Dr. Mahlstede read the paper, "Laminate Budding, A Technique for Budding Incompatible Woody Plants." (Applause)

# "LAMINATE BUDDING", A TECHNIQUE FOR BUDDING INCOMPATIBLE WOODY PLANTS

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Incompatibility between stock and scion has been a basis for research in the field of plant propagation for centuries. The present techniques, for the most part, find their beginnings hundreds of years ago when ingenious plantsmen developed the double working method of propagation. John Parkinson (7) in 1629 wrote, "The green and yellow nectorin do best on plumme stocke" but that others should be worked on an "apricocke" that was previously worked on "plumme or they will die of starvation." In 1665 Austin (1) wrote, "Set graft upon graft for divers years together." Miller (5) in 1759 described double working pear and quince when the pear to be dwarfed was uncongenial with the quince.

More recently, Garner (3, 4) published a description of "Double-Shield Budding" in which a blind shield of the compatible variety is inserted into the stock so as to be an intermediate between the stock and the varietal bud. He states, "The resulting trees have developed stronger unions and grown more than single worked trees . . . Double-shield and single budded trees were sawn longitudinally through the union and this revealed that the intermediate budless shield had grown rapidly and had become the main link between the Williams' scion and the quince rootstock."

Nicolin (6) first described the "Nicolieren Bud" in 1953 This method utilizes a "T" incision in the stock, into which a varietal bud is inserted with a matching "nicolier" shield between it and the stock

In Europe, both of these methods have proven to be satisfactory for overcoming certain incompatibilities of plants propagated by grafting. However, in North America the application of these techniques has generally led to unsatisfactory stands in the field. Cummings (2) secured only a 55 per cent stand with Nicolieren budding at the Canada Experimental Farm, Morden, Manitoba, in a 1956 trial. From verbal and other communication with propagators in this country it has become apparent that results have not been satisfactory, very possibly because of the different climatic conditions found in a continental or inland climate.

Trials at Iowa State University also were rather disappointing Yet, it seems safe to assume that the trials of Garner and Nicolin have established the principle and practicability of the double shield type bud-

[1]Journal Paper No J-3781 of the Iowa Agricultural and Home Economics Experiment Station, Ames, Iowa, Project No 1310

ding Indeed, the value of such a method is well recognized. Because the double shield type budding has proven so successful in Europe, studies were initiated to develop a comparable method that would consistently give stands equivalent to those realized by the ordinary single budding operation under North American conditions. This study resulted in the "laminate bud" technique for propagating incompatible woody plants by budding.

The "Laminate" method consists of two separate budding operations employing the normal "T" bud technique, spaced three or more weeks apart. The laminate bud depends upon the use of a manufactured bud stick which, to the author's knowledge, has never before been reported in a scientific publication.

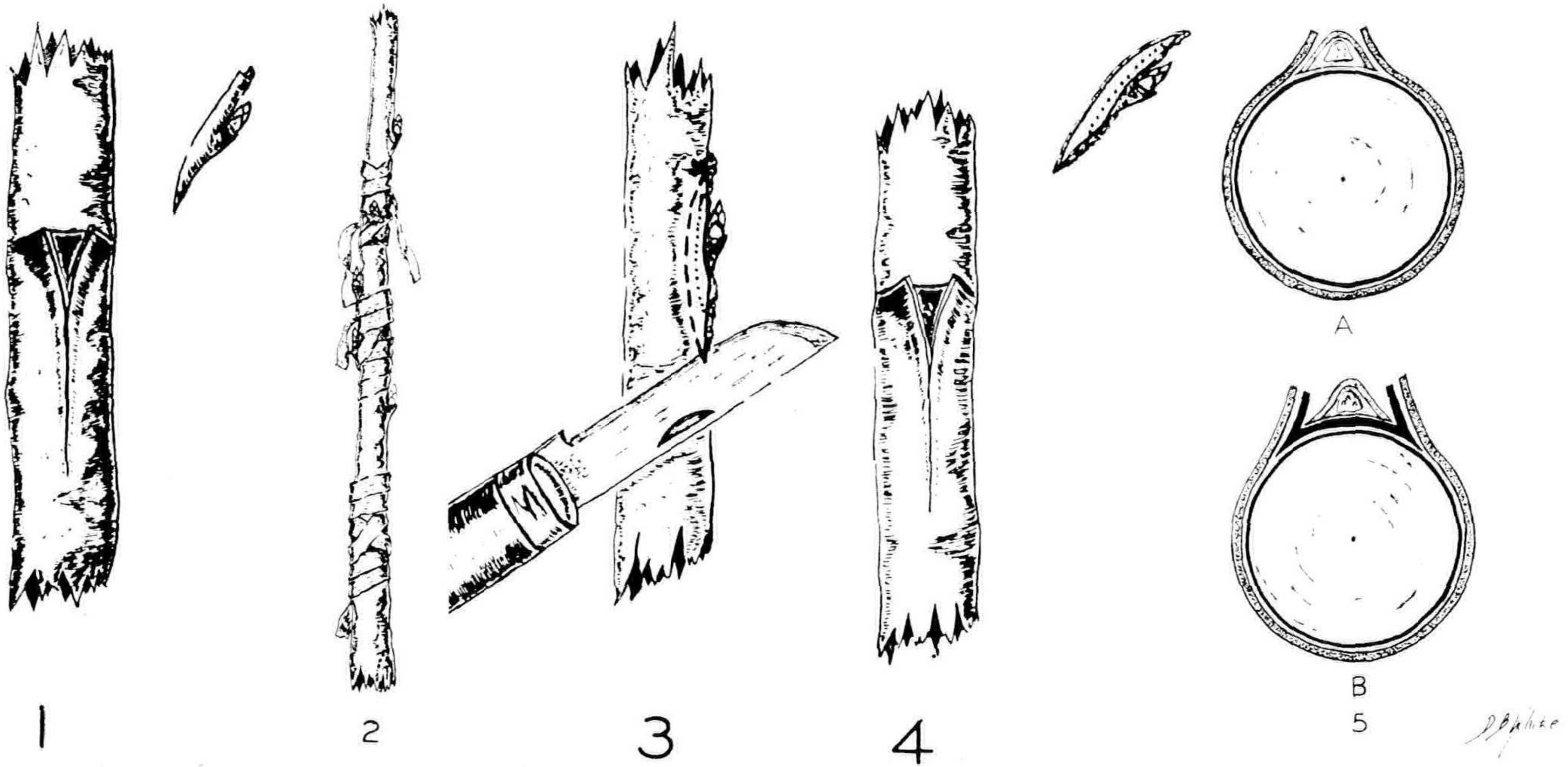
Buds of the desired variety are first budded onto compatible interstock scions at intervals of approximately three inches and staggered up and around the branch in spiral fashion. Care must be taken to ensure that only a moderate amount of bark (and wood, if desired) is taken with this bud. In effect. one makes a bud stick of the desired variety from a branch of the compatible intermediate stock. The "Speed-Easy" type bud tie greatly facilitates the preparation of the manufactured bud sticks. After the buds have united, a process which takes approximately three weeks, they are removed by slicing into the wood of the manufactured bud stick so that a small platelet of the intermediate stock is removed with the varietal bud. This unit, or "Laminate Bud," composed of a bud with a knitted shield on the back of it, is now handled in the same manner as any other bud would be in the "T" budding technique

Success of this method dictates that bud sticks be made as early as possible in the budding season, in order to allow sufficient time for the bud to knit to the compatible stock before the laminate bud is transferred to the rootstock The laminate bud is best transferred at the normal time set aside for the propagation of the variety in question.

The experiment for testing the laminate bud technique was started on July 22, 1959 On that date, Bartlett pear buds, as many as nine per stem, were inserted on Beurre De Anjou stock By mid-August these buds had knitted sufficiently for transfer. On September first, 65 laminate buds (Bartlett on De Anjou) were inserted on Malling Quince "A." Since Quince "A" is not reliably hardy at Ames, a bud-take count was made on 13 October and some buds were sacrificed to make sure that they were alive. Fifty seven or 87.7 per cent of the 65 laminate buds, had knitted to the stock and were alive.

The total time required to accomplish the two budding operations with the laminate bud is just twice the time required to place one single bud. If one considers the per cent take and the time required to make the necessary manipulations for either of the European methods, it appears that the laminate method is more economical.

This technique could be easily scheduled into the present system of budding used by most nurseries. Since the European experiments offer experimental proof of the basic principle, the laminate bud techni-




1. Single bud inserted on stock; 2. Portion of a manufactured bud stick; 3. Cutting Laminate bud + Platelet of interstock; 4. Laminate bud inserted on rootstock; 5 A, Cross section of stem with single bud; 5 B, Cross section of stem with Laminate bud.

que may be considered sufficiently developed for trial by nurserymen who might benefit by its use Furthermore, there is no reason why laminate budding should be restricted to fruits, since the principles should apply to all woody plants that are propagated by budding.

## LITERATURE CITED


1. Austin, R. 1665. Treatise on Fruit Trees, ed. 3, Oxford, pp 110-165.
2. Cummings, W A. 1958. Propagation of Prunus Species and Varieties. Proc. Plant Prop. Soc.
3. Garner, R. J. 1953. Double-Working Pears at Budding Time. Rep. E. Malling Res. Sta. for 1952, pp 174-175
4. Garner, R. J. The Development of Double-Shield Budding to Overcome Stock/Scion Incompatibility. International Hort. Congress.
5. Miller P 1759.. The Gardners Dictionary. ed 7 London.
6. Nicolin, P. 1953. Nicolieren, A New Method of Grafting Plt. Prop. Soc. Proc. pp 41-44.
7. Parkinson, J. 1629. Paradisi in Sole Paradisus Terrestris, London, p. 540.



## ACKNOWLEDGEMENT

Seven Dwarfs Nursery, Medford, Oregon, for furnishing certain of the quince stock used in the experiment.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(*Editor's Note*: Time did not permit the presentation of the second paper. However, it is included at this point as a matter of record.)

# "TENANT GRAFTING", A QUICK METHOD OF PROPAGATING INTERSTEM TREES


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One of the major obstacles in producing interstem dwarf trees is the prolonged time interval between propagation and salable size. The present methods encompass a minimum of two growing seasons.

The techniques used today are essentially the same as the one described in 1665 by John Rea (1). He wrote "I have found out another expedient to help them (dwarf trees) forward, that is, by grafting the eyen of the Paradise Apple in a crab, or other apple stock, close to the ground, with one graft, and when that is grown to the bigness of a finger, graft thereon, about eight inches higher, the fruit desired . . . and will cause the trees to bear sooner, more and better fruit."


[1]Journal Paper No J-3778 of the Iowa Agricultural and Home Economics Experiment Station, Ames, Iowa Project No 1310