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MODERATOR BRIGGS: Thank you, Dale. To continue on this morning we are going to hear about teaching college students some of the methods of grafting. We have with us Mr. O. A. "Jolly" Batcheller. He is the Chairman of the Department of Ornamental Horticulture, California State Polytechnic College, Pomona, California — Jolly:

METHODS OF TEACHING GRAFTING

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The theory of grafting and budding is easily learned. The conditions and after-care also present no problem, but to teach individuals the actual skill and manipulative practice of budding and grafting is more difficult. It is to this matter I am going to direct my presentation.

Our senses which help us learn: sight, hearing, and touch, are perhaps the most important in this experience because the actual material we are working with is so small that class demonstration does not have the desired effect and can actually detract from the presentation, unless accompanied with larger models. If the students cannot see what is actually being done, they may get the wrong impression or lose interest and be distracted.

The use of the blackboard is helpful, but not always do our drawings appear to others as they do to us. The use of colored chalk improves this, but still this is a two-dimensional presentation while the actual material is three-dimensional.

I have found that after a preliminary presentation by lecture of the reasons for grafting, the limitations, the conditions, and the after-care, that an actual demonstration with living ma-

terial and the appropriate model leave an indelible impression on the student. It clearly shows him what has to be done and the manner in which it is actually accomplished.

For some institutions this would be adequate. At Cal Poly we believe that a person should be able to perform the skill of budding and grafting. We do not contend that this must be learned to the degree of a commercial budder or grafter, but to the degree that he can put in a bud or make a graft and expect it to grow. Further, he should be able to direct others, and check the work of others to see that it is done correctly.

To make sure a student knows exactly what the bud or graft will look like when completed, and to insure that all will see exactly the stock and scion in the same position, I pass around an actual bud or graft. The variation from normal comes in the fact that the bud or graft are in large test tubes filled with water. This protects the graft from being changed. The round tube with the water actually magnifies the image. Even without preservatives the bud or graft will keep several weeks in excellent condition.

A sharp knife is an essential tool in proper budding and grafting, and the students are taught how to check a knife for sharpness, and also how to correctly sharpen their own knives. We recommend that each horticultural student purchase a good knife, but we do supply Henkle 302½ straight knives for the laboratory work.

Prior to the start of the laboratory period the knives, the whet stones, rubber bands and a supply of freshly cut material suitable for practice is assembled. In addition, there is the test material tied in bundles with a plant tag which I pass out after the student feels he thoroughly understands and is capable of performing the required graft or bud. I then give another demonstration of the required graft, and pass out the grading sheet. While the students look on I tear the graft apart and grade it. In the case of a large lab of twenty students I may do it two or three times so that each student is thoroughly aware of the points he is to be graded upon.

Following this demonstration the students are allowed to practice on the supplied material while I circulate observing, making suggestions, and actually grading their practice grafts; checking their knives for sharpness and assisting in every way possible.

Because of the varying abilities, some students are ready for their test before others; and the new and different material is handed out. I station myself at one end of the lab, and as they complete the test they label it with their name and bring it to me. While they are standing beside me watching, I tear the graft apart and grade it for them. They can see what they have done correctly, and what they have missed. In the case of budding, the students bring the bud stick from which at least ten buds have been removed. From observing the cuts on the bud stick I can tell a great deal about the buds removed.

As matching the cambium is the most important part of a good graft, I check this by stripping the phloem tissue from either side of the scion and observe the match with a hand lens. After checking in this manner I also strip off the phloem from the scion and by sight and touch (dragging the tip of the knife across the stock and scion) I can determine how closely the match has been made.

For large cleft grafts we bring in branches from trees on the campus, and tie them upright to the legs of the benches. The students complete their graft all but waxing and bagging and are then graded as mentioned above. Their label is marked with the grade for the lab and becomes the attendance record for the day.

Following the grading of the graft, students may work on actual material I have brought in gallon container stock, citrus, hibiscus, or camellias. The students are free to graft them over to selected varieties which we have and are then at liberty to take these home for their gardens.

I urge the students to practice before class and to take home the budding rubbers or grafting tools to try something at home.

MODERATOR BRIGGS: Thank you very much, Jolly.

Our next speaker is again from the University of California at Davis who will speak to us on the materials and equipment used in budding and grafting — Mr. Curtis Alley. Curtis:

MATERIALS AND EQUIPMENT USED IN GRAFTING AND BUDDING

CURTIS J. ALLEY
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Grafting Materials

Rubber budding strips of various sizes are used for grafting. Exposed to air this material loses it elasticity and will fall off. Below ground there is no change so the strip must be cut after a period or it will girdle the graft union.

Raffia is used particularly with bench grafts of grapevines. This material is very good in that it rots in the soil. However, the material must be kept moist prior to planting. If allowed to dry it becomes loose and untied.

Medium to heavy cotton string is frequently used in field grafting. When covered with soil this material disintegrates in two to three weeks. If used in the air then it must be cut.

There are the various types of tapes that are used for grafting. Cloth nurseryman's tape has adhesive on one side. It is commonly used for whip grafting. This item is becoming more difficult to find. The cloth tape will deteriorate in the soil. Plastic nurseryman's tape is often used now in place of cloth tape. It is waterproof and very long lasting. Plastic tape is resistant to weather and soil and must be cut.