

# RETURNS TO PRIMING BURLEY TOBACCO

*With Special Consideration for Hand versus  
Machine Methods and Scaffolding*

By Joe E. Fuqua, William O. Atkinson and George B. Byers



PRIMING SAVES VALUABLE LEAVES. THE BURLEY PLANT ON THE LEFT WAS PRIMED TWICE, THE MIDDLE PLANT WAS PRIMED ONCE. THE PLANT ON THE RIGHT WAS NOT PRIMED.

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## SUMMARY

Additional yield of burley tobacco resulting from priming exceeded 300 pounds per acre each year in 1961 and 1962. Two primings increased the total value of the tobacco per acre a range of \$193 to \$205 in 1961 and from \$230 to \$282 in 1962. Most of the increased value resulted from additional yield; however, in 1962 the stalk-cut portion of the primed tobacco averaged \$1.70 more per 100 pounds than the unprimed stalk-cut tobacco. The increased quality was made possible by harvesting the stalk-cut portion of the plants at a riper stage.

Returns per hour of additional labor to prime an acre of tobacco ranged from \$1.07 to \$1.53 in 1961 and from \$1.41 to \$2.34 in 1962, depending on the methods of priming and curing. Included in the methods of priming were variations in the number of leaves tied in a bunch in both machine and hand priming. Curing methods included housing the leaves the day of priming and hanging leaves on a scaffold in the field for 3 to 4 days before housing.

Additional labor required to prime an acre of tobacco two times varied from 115 to 170 hours in 1961, and 103 to 164 hours in 1962, depending on the methods of priming and curing. The hand method of priming and tying two leaves in a bunch required the most additional labor and machine priming, with four leaves per bunch requiring the least additional labor.

Hanging primed leaves on a scaffold in the field for three to four days before housing increased the value of the cured leaf by an average of \$3.76 per 100 pounds or \$28 per acre in 1962. Additional labor required to scaffold two primings averaged 5.2 hours per acre (labor to erect the scaffold not included).

A comparison of machine and hand priming methods with equal numbers of leaves tied in a bunch shows that the labor saved with the machine generally offsets the additional costs when one acre is primed annually. When three acres are primed in one year, returns per hour of labor are slightly higher for machine priming.

Machine costs per acre (not including costs of string or labor) decreased from \$30 for one acre to \$8 when four acres were primed in 1962. String costs per acre were about two and one-half times greater for machine priming than for comparable hand methods owing to the need for stronger string for the machine. In 1962 on two primings, when three leaves were tied in a bunch, string costs per acre for machine and hand priming were \$10 and \$4, respectively.

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RETURNS TO PRIMING BURLEY TOBACCO - WITH SPECIAL  
CONSIDERATION FOR HAND VERSUS MACHINE METHODS  
AND SCAFFOLDING

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Methods of increasing income from burley tobacco, Kentucky's main cash crop, are continually being sought. Increased fertilization, use of higher-yielding and disease-resistant varieties, and application of sucker deterrents have made contributions to yields, but have not always increased quality.

Priming is a method some farmers are using to increase both yields and quality. Priming is the process of removing the lower leaves of the burley plants when these leaves are mature (usually lemon yellow). The leaves are strung in some manner and allowed to cure. Generally, priming saves about four to five leaves that are otherwise lost. In some seasons, the number of leaves that could be saved is much greater.

PREVIOUS STUDIES ON PRIMING

Priming experiments were originally started in 1945 at the Agricultural Experiment Station in Lexington. Results for two years (1945, 1946) showed that maximum yield, price and income were obtained from the tobacco crops which were primed two times.<sup>1/</sup> In 1947 maximum income and yield were obtained with three primings; however, the third priming returned only \$0.60 per hour to the additional labor. The returns per hour of labor for two primings each in 1945, 1946 and 1947 averaged \$1.32, \$1.66 and \$2.33, respectively.

Even with proven relatively high labor returns, priming has been practiced by only few farmers. A partial answer can be found in the "disadvantages of priming" as learned in the 1945-46 study: (1) greater care required in curing primed leaves, (2) the uncertainty of good curing weather for late-harvested tobacco, (3) shortage of labor, and (4) competition of other farm enterprises with tobacco for use of farm labor.<sup>2/</sup>

An additional reason for farmers not priming is the stoop labor that is involved when done by hand. The hand method of priming is hard work that occurs when temperatures are high - generally the last of July or the first of August. The worker must either bend over or crawl to pull the leaves - in either case, an uncomfortable position.

PURPOSE OF THE STUDY

The objectives of this study were to determine: (1) the profitableness of priming burley tobacco, (2) comparative labor requirements, costs and labor returns of priming by a hand method and by using a small, one-man, manually-operated machine and (3) the effect of placing the primed leaves on a scaffold in the field for three or four days before housing in order to remove the moisture more rapidly and expose the leaves to sunlight and increased air movement to aid in reducing "house burning."<sup>3/</sup>

<sup>1/</sup> George B. Byers, Charles E. Bortner and William B. Back, Effect of Maturity and Priming of Burley Tobacco on Yield, Quality and Labor Requirements of the Crop, Kentucky Agr. Exp. Station Bulletin 552, May 1950

<sup>2/</sup> Ibid, page 22.

<sup>3/</sup> The third objective was included in the 1962 experiment only.

The first objective may seem to be redundant of the previous published work of 1945-47 and subsequent tests carried on through 1954. However, several changes have occurred since the original priming work, such as, improved varieties (both larger in size and higher yielding), increased fertilization, greater use of artificial heat in curing tobacco, and a higher price level.

#### PROCEDURES USED

In 1961, 10 plots, each consisting of 2 rows 150 feet long and 42 inches apart, were included in the priming test. Five harvesting methods were used, allotting two plots for each method. In three methods a one-man priming machine was used, and two, three or four leaves were tied in a bunch.<sup>4/</sup> In another method the tobacco was primed and tied by hand placing two leaves in a bunch. All these plots were primed two times. In the remaining method the tobacco was not primed but harvested as stalk-cut tobacco to serve as a check.

A similar priming test was conducted in 1962. The number of harvesting methods was increased to seven, and two curing methods were tested. Twenty-eight plots were used; each plot was two rows wide (rows 42 inches apart) and 100 feet long. The leaves from one half of the primed plots were taken to the barn the day of priming. Leaves from the other half of the primed plots were hung on a scaffold in the field and left to cure for three to four days before housing.

Seven harvesting methods (six primed and one not primed) of two plots each were duplicated in both the scaffolded and unscaffolded curing methods. In three harvesting methods, the tobacco was primed two times, using the priming machine, tying two, three or four leaves in a bunch. Another three methods consisted of hand priming two times with two or three leaves placed in a bunch and hand priming once with two leaves to a bunch. In the remaining method the tobacco was not primed.

About four leaves per plant were pulled in each priming for both years. However, the method of determining the number of leaves to be primed was different. In 1961, the worker decided which leaves were mature and ready to prime from each plant. This method resulted in an average of almost four leaves per plant but created a large variance among the plots. To decrease this variability in 1962, four leaves were removed per plant in each priming. Taking a fixed number of leaves was used only to facilitate the experiment and is not necessarily recommended for the farmer. Leaves should be removed on the basis of their maturity, and the number will vary among plants and seasons.

In both years, the unscaffolded primed leaves were hung in the barn and allowed to yellow for 24 hours before any supplemental heat was used. In 1962 the scaffolded primed leaves, after hanging in the field for three or four days, were placed in the barn and heat was applied immediately. The heat, supplied by small gas curing stoves, was kept low initially. When the leaves were nearly cured, the temperature was raised in order to dry the midribs completely.

All plots were fertilized at the rate of one ton of 5-10-15 per acre. In 1961, Kentucky 9 was the variety grown and in 1962 Kentucky 12 was grown. All plots were topped at the same time and suckered once just before cutting. The unprimed plots in 1961 were cut one week before the primed plots. In 1962 the unprimed plots and primed-once plots were cut five days before the plots that were primed twice.

<sup>4/</sup> "Bunch" as used in this publication refers to the leaves held by one loop in the string by either machine or hand methods.

Time records were kept on all operations where priming and the methods of priming might affect the amount of labor used. The operations timed for the primed plots were: (1) priming (removing leaves from plants), (2) carrying out, (3) loading and unloading, (4) putting leaves on stick, (5) hanging on the scaffold (when applicable), (6) hanging in the barn, (7) taking down from rails, (8) bringing into stripping room, (9) tying leaves in hands, and (10) pressing. The operations timed on the stalk-cut for both primed and unprimed plots were: (1) suckering, (2) dropping sticks, (3) cutting, (4) bringing into stripping room, (5) stripping and (6) pressing.

#### HAND VERSUS MACHINE METHODS

##### Description of the Machine Methods

The worker pulled the leaves by hand as he sat on and pushed the machine backwards between the two rows of tobacco (Fig. 1). The leaves were placed on a stitching (looping)

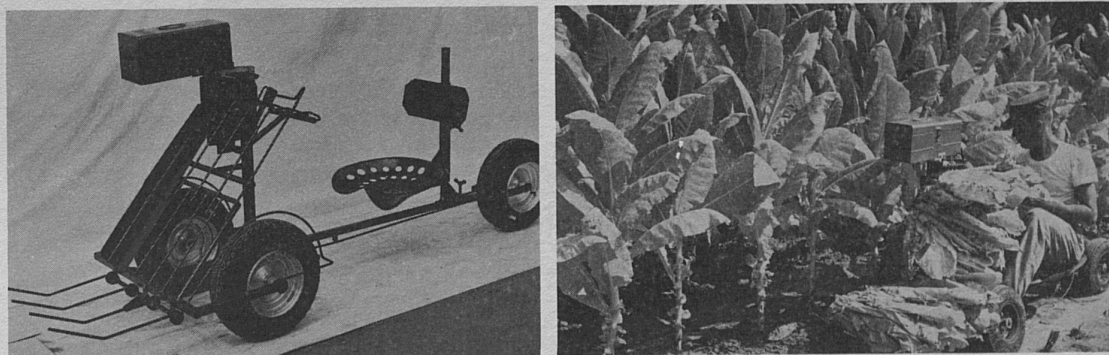


FIG. 1. - (LEFT) ONE-MAN MANUALLY OPERATED PRIMING MACHINE WITH STITCHING (LOOPING) ATTACHMENT AND DUMPING LEAF RACK. (RIGHT) OPERATION OF THE PRIMING MACHINE.

attachment in front of the worker. A lever was pushed forward and a needle threaded with string was activated, looping the string around the bunch of leaves. After the leaves were stitched, they moved into a holding rack in front of the stitching attachment.

When 25 bunches, the number put on one stick, had been stitched, the string was cut.<sup>5/</sup> The rack holds enough for three to four sticks. The machine used in 1961 had a stationary rack and when the rack was full the worker had to get off the machine and unload the stitched leaves. The machine used in 1962 had a dumping lever in front of the worker's seat which lowered the loaded rack. When the rack was full, the lever was pushed forward and the stitched leaves slid to the ground as the machine moved away from the leaves.

<sup>5/</sup> In 1962, the number of bunches per stick was varied on the first priming in the following manner: two leaves per bunch - 35 bunches per stick; three leaves per bunch - 30 bunches per stick; and four leaves per bunch - 25 bunches per stick. However, when more than 25 bunches were put on a stick, the string of leaves was too long to be conveniently tied and handled on the stick.

The machine-stitched leaves were tied to the stick by placing the string into notches cut in each end of the stick with a hack saw (Fig. 2). The string was wrapped around the

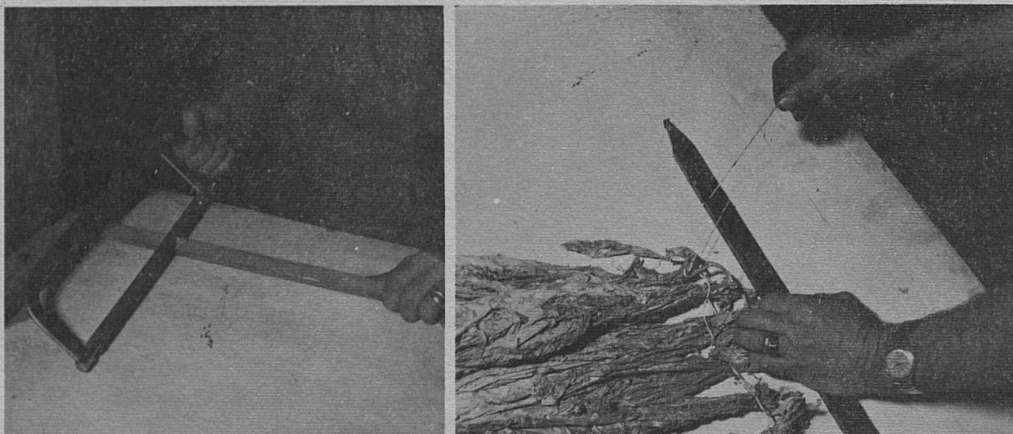


FIG. 2. - (LEFT) CUTTING A NOTCH IN THE TOBACCO STICK FOR ATTACHING MACHINE TIED LEAVES. (PHOTO ON THE RIGHT) ATTACHING A STRING OF MACHINE TIED LEAVES TO THE STICK.

stick two times and the second wrap placed into the notch. Then the first wrap was placed into the notch, thereby causing the weight of the leaves to make the string secure.

After curing, the machine-stitched leaves were removed from the stick to tie into hands by detaching the string from the stick and pulling one end of the string to free the leaves (Fig. 3). (The string unravels in a similar way to the string in a feed sack.)



FIG. 3. - REMOVING THE STRING FROM THE STICK AND CURED LEAVES.

Description of Hand Methods

The hand methods were similar to those described in previous publications.<sup>6/</sup> The worker moved backwards between the two rows to be primed, pulling a burlap sack on the ground in front of him (Fig. 4). Wire (preferably) or string was tied to the corners at each end of the sack to make a convenient handle for carrying the leaves.



FIG. 4. - HAND METHOD OF PRIMING. INSET SHOWS BURLAP SACK ON WHICH THE PRIMED LEAVES ARE PLACED. NOTE THE WIRE HANDLES.

Two workers were necessary in tying the leaves on the stick (Fig. 5). One worker handed the leaves in the desired number to the second worker who looped the string around the leaves on the stick.

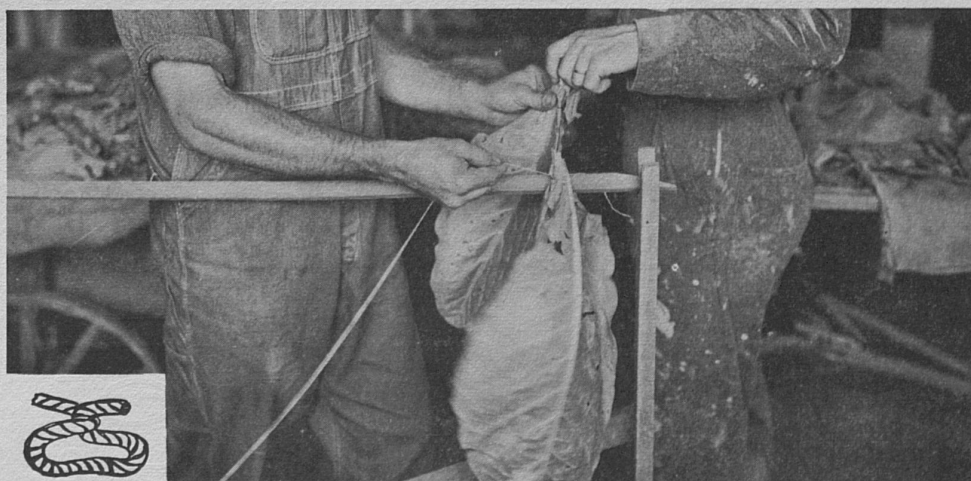


FIG. 5. - HAND TYING OF PRIMED LEAVES. INSET SHOWS THE LOOP MADE AROUND EACH BUNCH.

<sup>6/</sup> George B. Byers, Charles E. Bortner and Earl R. Young, How to Save Time in Priming Burley Tobacco, Agricultural Extension Service, University of Kentucky, Leaflet 92 (revised), May 1955.

Machine Costs

The purchase price of the machine used in 1961 (with stationary leaf-holding rack) was \$265. The machine used in 1962 (with dumping-leaf rack) cost \$287.

Included in fixed (overhead) costs are depreciation, interest on investment, taxes, insurance and housing (Table 1). Depreciation was calculated on an estimated life of 15 years with no salvage value (purchase divided by 15 years = depreciation). Interest on investment was calculated as 5 percent of one-half the purchase price. Taxes, insurance and housing

TABLE 1. - FIXED AND VARIABLE COSTS FOR THE ONE-MAN MACHINE  
IN 1961 AND 1962

Fixed Costs			Variable Costs		
Item	Annual Cost		Item	Cost Per Acre	
	1961	1962		1961	1962
Depreciation <sup>a/</sup>	\$17.67	\$19.13	Repairs	\$1.00	\$1.00
Interest <sup>b/</sup>	6.62	7.18			
Other Costs <sup>c/</sup>	2.65	2.87			
	\$26.94	\$29.18			

<sup>a/</sup> Depreciation was based on purchase prices of \$265 in 1961 and \$287 in 1962. Estimated life was 15 years and no salvage value was included.

<sup>b/</sup> Interest was computed as 5 percent of one-half (average value) the purchase price.

<sup>c/</sup> Other costs included insurance, taxes and housing and were estimated as 1 percent of the purchase price.

were grouped together in other costs and were estimated as 1 percent of the purchase price. Total fixed costs per year were \$26.94 in 1961 and \$29.18 in 1962. (The higher fixed costs in 1962 resulted from a greater purchase price due to the addition of the dumping-leaf rack.)

Variable costs occur when the machine is used. Repair, labor and string costs are the variable costs involved in using the priming machine. Repair cost is estimated at \$1.00 per acre of priming (Table 1). <sup>7/</sup> The amount of labor and string varies with the number of leaves put in a bunch, therefore, the labor and string costs are presented in other tables.

<sup>7/</sup> Cost of repairs is based on the manufacturer's estimates that the machine can be put in new condition for about \$10. He also estimates the minimum use between reconditionings to be 10-15 acres primed twice. Therefore, the estimate of repairs seems plenty liberal.



TABLE 2. - COST PER ACRE OF THE ONE-MAN PRIMING MACHINE  
AT VARIOUS LEVELS OF ANNUAL USE <sup>a/</sup>

Number of Acres Primed Annually <sup>b/</sup>	Cost Per Acre	
	1961	1962
1	\$27.94	\$30.18
2	14.47	15.59
3	9.98	10.73
4	7.76	8.30

<sup>a/</sup> Cost of labor and string not included.

<sup>b/</sup> If less than one acre is primed, the fixed cost would remain the same as for one acre.

Cost per acre, not including labor and string costs, decreases rapidly as acres are increased (Table 2). Cost per acre can be calculated by dividing total annual fixed costs by the number of acres to be primed annually plus variable costs per acre. For example, if two acres had been primed in 1962, the cost per acre would have been  $(\$29.18 \div 2) + \$1.00 = \$15.59$ .

#### String Costs for Both Machine and Hand Methods

The string used in machine priming was 18-pound test and cost \$1.25 per pound. One pound contained approximately 1,550 feet; therefore, each 12.4 feet cost \$0.01. The string used to tie the hand primed was a lighter string, approximately 6-pound test, and cost \$1.44 per pound. One pound contained approximately 4,800 feet; thus, 33.3 feet cost \$0.01.

The amount of string required per acre varied with both number of leaves per bunch and time of priming. The greater number of leaves per bunch the less string required per acre (Table 3). The second priming required more string per acre than the first priming. In 1962 string costs per acre for two primings with the machine were \$13.13, \$10.15 and \$8.58 when two, three and four leaves, respectively, were put in a bunch. <sup>8/</sup>

String costs per acre for hand priming were approximately 37 percent of machine primed for comparable methods. For two and three leaves per bunch string costs were \$4.88 and \$3.80 per acre, respectively, for two hand primings.

#### Labor Requirements in Priming <sup>9/</sup>

Additional labor <sup>10/</sup> required to prime an acre of tobacco two times ranged from 103 to 170 hours depending on the method of priming (Table 4). The hand method of priming required the most additional labor when two leaves were tied in a bunch - 170 hours in

<sup>8/</sup> The calculated string costs for 1961 were practically equal to those in 1962.

<sup>9/</sup> Priming as referred to in this publication includes the following operations: removing leaves from the stalk, carrying leaves out, loading and unloading, putting leaves on the stick, hanging on the scaffold (when applicable), hanging in the barn, taking down from rails, bringing into stripping room, tying leaves into hands, and pressing the tobacco.

<sup>10/</sup> Time required for the whole priming operation was greater than the additional hours shown in Table 4. By priming two times, labor in cutting, stripping and pressing the stalk-cut portion of the tobacco was reduced. For example, in 1962 the stalk-cut tobacco that was primed two times required 32 hours less labor per acre than the stalk-cut tobacco that was not primed.

TABLE 3. - STRING USE AND COST FOR MACHINE  
AND HAND PRIMING IN 1962

Method	Feet of String Per Acre <sup>a/</sup>	Cost of String Per Acre <sup>b/</sup>
Machine Primed		
Two leaves per bunch		
1st priming	7,461	\$ 6.02
2nd priming	8,817	7.11
Total	16,278	13.13
Three leaves per bunch		
1st priming	6,000	4.84
2nd priming	6,581	5.31
Total	12,581	10.15
Four leaves per bunch		
1st priming	5,258	4.24
2nd priming	5,383	4.34
Total	10,641	8.58
Hand Primed		
Two leaves per bunch		
1st priming	7,370	2.21
2nd priming	8,912 <sup>c/</sup>	2.67
Total	16,282	4.88
Three leaves per bunch		
1st priming	5,840 <sup>c/</sup>	1.75
2nd priming	6,828 <sup>c/</sup>	2.05
Total	12,668	3.80

<sup>a/</sup> Inches of string per bunch times the average number of bunches primed from the plots of the same treatment adjusted to an acre basis.

<sup>b/</sup> String used in the machine cost \$0.01 for 12.4 feet. String used in hand tying cost \$0.01 for 33.3 feet.

<sup>c/</sup> Estimated. All others are calculated from actual measurements.

TABLE 4. - LABOR REQUIREMENTS PER ACRE FOR VARIOUS HARVESTING AND CURING METHODS, 1961 and 1962

Method	Additional Labor to Prime - Hours Per Acre <sup>a/</sup>		
	1961 <sup>b/</sup>	1962	
		Not Scaffolded	Scaffolded
Machine Primed - Two Primings			
Two leaves per bunch	153.8	138.3	144.5
Three leaves per bunch	122.4	121.4	126.0
Four leaves per bunch	114.8	102.6	108.6
Hand Primed - Two Primings			
Two leaves per bunch	170.0	159.0	163.6
Three leaves per bunch	-	136.7	141.2
Hand Primed - One Priming			
Two leaves per bunch	-	90.2	91.8

<sup>a/</sup> Time required for the whole priming operation was greater than the additional hours of labor to prime. Priming two times reduced the labor in cutting, stripping and pressing the stalk-cut portion of the tobacco 26 and 32 hours per acre in 1961 and 1962, respectively, when compared with the stalk-cut tobacco that was not primed.

<sup>b/</sup> Primed leaves in 1961 were taken to the barn the day they were pulled. In 1962 one-half of the primed leaves were hung on a scaffold in the field for three to four days. The remainder of the primed leaves were put in the barn the day they were pulled. None of the stalk-cut tobacco was scaffolded outside.

1961 and 161 hours in 1962. In 1961, the hand priming required about 16 hours more per acre than the machine priming when two leaves were tied in a bunch. In 1962, the hand priming with two leaves placed in a bunch required about 20 hours more labor per acre than the machine priming and tying two leaves per bunch. Also in 1962 when three leaves were tied in a bunch, hand priming required about 15 hours more labor per acre than the machine priming.

Machine priming when four leaves were tied per bunch required fewer additional hours per acre than any other method - 115 hours in 1961, and 103 hours in 1962. Tying four leaves per bunch in hand priming was not included in the experiment. However, since hand methods required 15 to 20 more hours per acre than machine methods when two and three leaves were tied in a bunch, hand priming and tying four leaves per bunch can be assumed to require more labor than the comparable machine-primed method. <sup>11/</sup>

#### SCAFFOLDING PRIMED LEAVES

In 1962, leaves from one half of the primed plots were put on a scaffold in the field (Fig. 6). After three to four days, the leaves were moved into the barn.



FIG. 6. - MACHINE-PRIMED LEAVES HANGING ON A SCAFFOLD IN THE FIELD.

#### Effect on Quality

The quality of the primed leaves (measured in terms of price per 100 pounds) was increased on all priming methods by scaffolding the leaves outside for three to four days (Table 5). The increase within the same priming method for two primings ranged from

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<sup>11/</sup> In previous priming experiments two leaves per bunch in hand priming were found to be the most desirable from a quality standpoint. However, in these experiments, limited artificial heat was used. With artificial heat or by scaffolding leaves outside for 3 or 4 days, quality can be maintained with three leaves per bunch and possibly four leaves per bunch by hand methods.

\$1.68 to \$4.92 per hundred. The average price of all plots primed twice in the two curing methods was \$66.93 for those scaffolded and \$63.17 for the unscaffolded, or an average increase of \$3.76 per 100 pounds due to scaffolding. The plots primed twice averaged 745 pounds of primed leaves on an acre basis. This means scaffolding returned a gross of \$28.01 per acre for two primings.

Rain fell the fourth night the scaffolded leaves of the first priming were in the field. However, the quality of the scaffolded leaves was higher than the unscaffolded leaves. The scaffolded leaves of all harvesting methods of the first priming averaged \$3.35 more per 100 pounds than the unscaffolded leaves.

#### Effect on Time

Scaffolding the primed leaves requires some additional time. Hanging on the scaffold is an extra operation; however, two other operations are affected by this curing method - loading on the truck or wagon and unloading at the barn. <sup>12/</sup>

The additional time required to scaffold two primings ranged from 4.5 to 6.2 hours per acre among the various methods of priming and averaged 5.2 hours per acre. In other words, an average of \$28.01 per acre was gained for an additional 5.2 hours of labor when two primings were made. <sup>13/</sup>

### RETURNS TO PRIMING

#### Increased Yield

The primary reason for priming is to save leaves that will ordinarily be lost as the tobacco matures. The saving of leaves is the major part of yield increases. However, part of the yield increase can be attributed to the possibility of more growth and maturity in the plant that has been primed.

The total pounds primed is not the same as the total increase due to priming. Some of the leaves that would be in the first priming and practically all in the second priming are harvested on the unprimed tobacco. For example, in 1961, the weight of primed leaves was 340 pounds for the first priming and 381 pounds for the second priming or a total of 721 pounds for the two primings. However, the total increase of the primed-twice over the unprimed tobacco averaged 317 pounds. In 1962, similar figures show an average of 326 and 419 pounds for the first and second primings, respectively, or a total of 745 pounds. The increase of two primings over the unprimed averaged 342 pounds per acre and one priming over the unprimed averaged 311 pounds.

Yield differences were adjusted where the method of priming would not logically cause any variation. The weights of the stalk-cut portions for all plots primed two times were averaged. Similarly, the weights of the stalk-cut portions of the plots primed once and the plots not primed each were averaged.

<sup>12/</sup> This analysis is based on the assumption that the scaffold is adjacent to the tobacco field. If the primed leaves must be loaded and transported to the scaffold, more labor will be required.

<sup>13/</sup> No charge for materials or labor in erecting the scaffolds was made. This would vary among farms depending on the degree of permanence desired. The scaffolds could be made with scrap lumber or poles and be constructed with a very small amount of labor.

TABLE 5. - AVERAGE PRICE PER 100 POUNDS FOR PRIMED LEAVES FOR THE VARIOUS PRIMING AND CURING METHODS IN 1962

Method	Average Price Per 100 Pounds					
	Not Scaffolded			Scaffolded		
	First Priming	Second Priming	Both Primings <sup>a/</sup>	First Priming	Second Priming	Both Primings <sup>a/</sup>
Machine Primed - Two Primings						
Two leaves per bunch	\$ 61.18	\$ 64.67	\$ 63.23	\$ 63.35	\$ 71.00	\$ 67.80
Three leaves per bunch	60.87	64.50	62.87	65.47	68.53	67.15
Four leaves per bunch	63.50	65.70	64.72	65.03	67.49	66.40
Hand Primed - Two Primings						
Two leaves per bunch	56.59	64.01	60.90	63.03	68.07	65.82
Three leaves per bunch	63.26	64.91	64.20	63.36	71.00	67.48
Hand Primed - One Priming						
Two leaves per bunch	58.48	-	-	63.71	-	-

<sup>a/</sup> Weighted average of the first and second primings.

The weights of primed leaves from all plots within each priming were averaged. In other words, the weights from the first primings on all plots were averaged and all the second primings were averaged. To obtain total yield the applicable averages were added. For example, in 1962, yield of the tobacco primed twice equalled 326 pounds first priming plus 419 pounds second priming plus 2,236 pounds stalk-cut tobacco, or a total of 2,981 pounds per acre. Total yield for tobacco primed once was 326 pounds for one priming plus 2,624 pounds of stalk-cut tobacco, or 2,950 pounds per acre. The unprimed plots averaged 2,639 pounds per acre in 1962. In 1961, plots primed two times averaged 2,487 pounds per acre (340 + 381 + 1,766) and the unprimed plots averaged 2,170 pounds per acre.

#### Effect on Quality

In 1962, a marked increase occurred in the quality of the stalk-cut portion of the tobacco primed twice as compared with that of the tobacco primed once or not primed. The stalk-cut portion of the tobacco primed two times, primed one time and not primed averaged \$66.37, \$64.84 and \$64.67, respectively, per 100 pounds. Most of the increase was a result of higher grades in the bright leaf, red leaf and tips.

The stalk-cut portion of the primed and unprimed tobacco averaged practically the same in the 1961 test (\$71.06 and \$71.10 per 100 pounds for primed and unprimed respectively). However, in the 1961 test the tobacco was topped low, and priming was started later than the desirable stage of maturity. Dates of priming were: first, August 17 and 18, and second, August 25 and 26. The low topping contributed to the lower yields in 1961. In contrast, the 1962 tobacco was topped high and priming started early (both primings were completed before topping). Priming dates in 1962 were: first, July 24, 25 and 26; and second, August 2 and 3.

Cutting dates in 1961 were August 30 for the unprimed and September 6 for the primed. In 1962 the unprimed and primed once were cut August 22 and the primed twice was cut August 27.

In view of the results of these two years, increased quality in the stalk-cut part of the tobacco can be expected when priming makes possible harvesting of ripe tobacco.

#### Increased Value and Returns Per Hour

In 1962, priming two times increased the total value of the tobacco a range of \$229.77 to \$281.50 per acre. In 1961, the increases for two primings ranged from \$194.19 to \$205.16 per acre (Table 6). This range was the result of the variation in grades of the primed leaves only. As stated previously, the variation in yields was removed within each category - primed-once, primed-twice and unprimed. Since the number of leaves per bunch and method of curing the primed leaves did not affect the quality of stalk-cut, the price of the stalk-cut was averaged within each category of zero, one and two primings.

Returns per hour of additional labor to prime an acre of tobacco ranged from \$1.07 to \$1.53 in 1961 and from \$1.41 to \$2.34 in 1962 (Table 6). The relatively wide ranges in returns per hour were a result of machine and hand priming methods, varying numbers of leaves in a bunch, number of acres primed annually with the machine, and two curing methods for the primed leaves.

TABLE 6. - RETURNS, MACHINE AND STRING COSTS AND LABOR IN PRIMING BURLEY TOBACCO BY VARIOUS METHODS <sup>a/</sup>

Method	Increased Value For Priming <sup>b/</sup> (Per Acre)	Machine and/or String Costs When Priming Annually		Additional Hours of Labor to Prime (Per Acre)	Returns to Labor	
		One Acre (Per Acre)	Three Acres (Per Acre)		One Acre (Per Hour)	When Priming Annually Three Acres (Per Hour)
<u>Machine - Two Primings</u>						
Two leaves per bunch	\$205.16	\$40.78	\$22.82	153.8	\$1.07	\$1.19
Three leaves per bunch	196.18	38.31	20.35	122.4	1.29	1.44
Four leaves per bunch	194.19	36.06	18.10	114.8	1.38	1.53
<u>Hand - Two Primings</u>						
Two leaves per bunch	193.04	4.56	4.56	170.0	1.11	1.11
<u>1962 Priming Test</u>						
<u>Not Scaffolded</u>						
<u>Machine - Two Primings</u>						
Two leaves per bunch	247.15	43.31	23.86	138.3	1.47	1.61
Three leaves per bunch	246.56	40.33	20.88	121.4	1.70	1.86
Four leaves per bunch	259.18	38.76	19.31	102.6	2.15	2.34
<u>Hand - Two Primings</u>						
Two leaves per bunch	229.77	4.88	4.88	159.0	1.41	1.41
Three leaves per bunch	255.79	3.80	3.80	136.7	1.84	1.84
<u>Hand - One Priming</u>						
Two leaves per bunch	185.26	2.21	2.21	90.2	2.03	2.03
<u>Scaffolded</u>						
<u>Machine - Two Primings</u>						
Two leaves per bunch	281.41	43.31	23.86 <sup>c</sup>	144.5	1.65	1.78
Three leaves per bunch	277.86	40.33	20.88	126.0	1.89	2.04
Four leaves per bunch	272.07	38.76	19.31	108.6	2.15	2.33
<u>Hand - Two Primings</u>						
Two leaves per bunch	267.70	4.88	4.88	163.6	1.61	1.61
Three leaves per bunch	281.50	3.80	3.80	141.2	1.97	1.97
<u>Hand - One Priming</u>						
Two leaves per bunch	202.32	2.21	2.21	91.8	2.18	2.18

<sup>a/</sup> No charges are made for fuel used in artificial heat and labor and material used in the construction of scaffolds.

<sup>b/</sup> Yields per acre in 1961 for tobacco primed twice and not primed averaged 2,487 and 2,170 respectively or an increase due to priming of 317 pounds per acre. In 1962, tobacco primed twice, once and not primed averaged 2,981, 2,950, and 2,639 pounds per acre or an acre increase of 342 pounds for priming twice and 311 pounds for priming once.



Returns per hour to priming were calculated by subtracting machine and/or string costs from the increased value due to priming and dividing the remainder by the additional hours to prime. Machine costs are calculated on one acre and three acres primed annually. Returns for machine priming other acreages can be computed by referring to Tables 2 and 3. By increasing the acres primed per year from one to three, returns increased per hour a range of \$0.12 to \$0.19 depending on the number of leaves per bunch.

When the returns per hour of hand and machine priming are compared on equal leaves per bunch, the labor saved generally offsets the machine and additional string costs. <sup>14/</sup> If three acres are primed, the returns per hour are slightly higher for machine priming (Table 6). In 1961, when tying two leaves per bunch, machine priming returned \$1.07 and \$1.19 per hour for one and three acres, respectively, while hand priming returned \$1.11 per hour. The returns per hour in 1962 for machine priming when two leaves were tied per bunch were \$1.47 and \$1.61 for one and three acres, respectively, for unscaffolded leaves, whereas hand priming returned \$1.41 per hour. With only one exception, scaffolding increased returns from \$.13 to \$.20 per hour. The exception was machine priming with four leaves tied in a bunch where returns to labor per hour in the two curing methods were about the same.

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<sup>14/</sup> The most favorable return per hour was from machine priming four leaves per bunch due to the lower labor requirement. However, a comparable hand priming method of four leaves per bunch was not available for comparison.