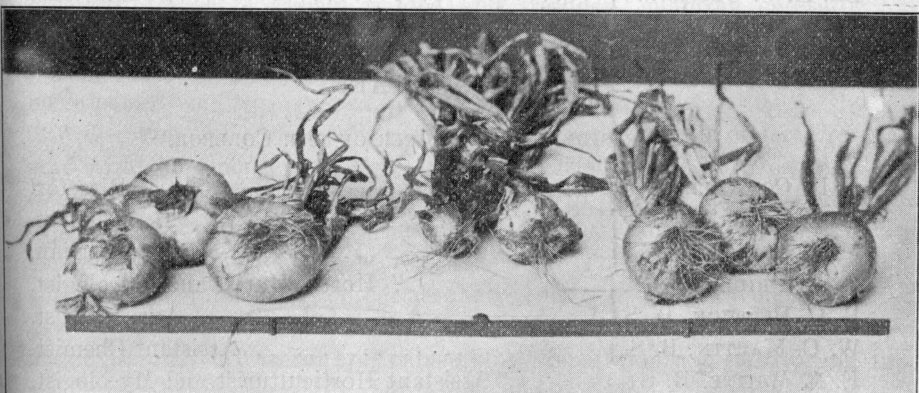




BULLETIN NO. 60.

Agricultural Section—JUNE, 1901—Horticulture.
(Beeville No. 5.)

TWO METHODS
OF
GROWING ONIONS.



POSTOFFICE:
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CULTIVATION OF ONIONS.

By B. C. PITTSUCK AND
S. A. MCHENRY.

Among our marketable vegetable crops the onion is perhaps one of the safest and most profitable to the general grower. Its easy adaptability to almost all soils, hardiness under severe changes in temperature, its drouth resisting qualities, ready and profitable response to applications of manures and its general freedom from insect enemies commends it to the attention of our truck growers. While the onion can be grown with fair success for the kitchen garden in almost all localities and by almost anyone, to be successful as a truck crop, the grower must know how to grow it. The nicer points of onion culture embrace *peculiar preparation of the land, selection of proper variety, purchase of good seed, method of planting and care of crop to maturity*. The land must be well prepared by repeated plowings for some weeks before using land, seed selected with greatest care as to variety wanted and freshness, planting carefully looked after in all its details, and the crop given the cleanest cultivation throughout its entire season of growth, whether cultivated by hand or horse power.

Well-rotted stable manure is justly the most popular form of fertilizer used with the onion crop. Care should be taken not to use fresh and coarse manure as it is a source of weeds and will cause much additional expense in the way of cultivations. The bone compounds, guanos and blood fertilizers are also to be recommended. The first two should be applied at the rate of one ton per acre mixed in equal parts. Wood ashes as a top dressing is valuable. The onion crop is a surface feeder, hence the advisability of careful and painstaking preparation and cultivation, and lightly harrowing in all applications of fertilizers. The time applications should be made for the onion crop will vary with the kind of fertilizers used. Bone and potash materials should be applied at least two weeks before the onion is started in field.

The test with onions herein reported upon was formulated for the purpose of estimating the difference in yield and cost of growing, due to hand and horse culture. Seeds were planted both in the field and in beds. Two varieties were included in the test—Red Bermuda and Creole. All horse cultivated plots were seeded in 30-inch rows; hand cultivated plots in 14-inch rows. The distance in the rows was the same in each instance—4½ inches apart.

CULTIVATING BY HAND.

The commercial onion crop in Texas is grown both from seed planted in the field and from seed planted in beds and transplanted to the field. Horse and hand culture of the crop each have their advantages. Hand culture is a new system for this section, but has given very promising results. The experiments herein reported embrace results secured from a test of the horse system of culture compared with the hand system, two varieties being used—Creole and Red Bermuda. The trials were conducted in duplicate with each of these varieties so that the results secured might be the more reliable.

There is quite a diversity of opinion regarding the value of *horse vs. hand* culture with onions. During the season of 1898 the Station carefully planned and carried out a test embracing these two fields of inquiry. The opinion held by many growers, that the extra cost of cultivating and handling by hand will offset the increase in yield, was found to be groundless. An acre of hand-cultivated onions was grown to maturity at a cost of only seventy-five cents more than it cost to grow an acre of horse-cultivated onions. In this instance hand culture with Bermuda onion gave an increase in yield of 8601 pounds. The total cost of the crop, less seed, was \$29.44 for hand culture and \$20.83 for horse culture. The value of the crop at one cent per pound, less cost of growing to maturity, trimming and sacking, was \$102.08 in the first instance, and \$24.68 in the latter—a net increase of \$77.40 per acre in favor of hand culture with the Bermuda onion.

BED VS. FIELD PLANTING.

Planting seeds in beds and transplanting to the field proved more profitable than field plantings. The cost of growing an acre to maturity (horse culture) was less where seeds were planted in beds. With both the Bermuda and Creole a net profit was realized. The cost of growing an acre of onions to maturity, planting seeds *in beds* and transplanting to the field was \$16.00; planting seeds *in field*, the cost to maturity was \$16.65. With the Bermuda a net profit of \$25.94, due to planting seeds in beds was realized; with the Creole a net increase of \$5.09 was realized.

The plan of the experiment included six plots—three of Bermuda and three of Creole, as follows:

BERMUDA AND CREOLE.

Plot 1.—*Horse Culture*, seed planted in field, rows 30" x 4½".

Plot 2.—*Horse Culture*, seed planted in beds and transplanted to field, rows 30" x 4½".

Plot 3.—*Hand Culture*, seed planted in field, rows 14" x 4½".

CONCLUSIONS.

1. Hand culture with onions is more profitable than horse culture.
2. Planting seeds in beds and transplanting to the field with either hand or horse cultivated onions is more profitable than planting seeds in the field.
3. It costs less (where labor ranges from fifty cents to seventy-five cents per day) to grow an acre of onions to maturity by planting the seeds in beds than by planting in the open field.

SUMMARY OF RESULTS.

RED BERMUDA.

1. *Horse Culture*, seed planted in field, rows 30"x4½", made a net profit per acre of \$24.68.
2. *Horse Culture*, seed planted in beds and transplanted to field, rows 30"x4½", made a net profit per acre of \$50.65.
3. *Hand Culture*, seed planted in field, rows 14"x4½", made a net profit per acre of \$102.08.

CREOLE.

1. *Horse Culture*, seed planted in field, rows 30"x4½", made a net profit per acre of \$53.36.
2. *Horse Culture*, seed planted in beds and transplanted to field, rows 30"x4½", made a net profit per acre of \$58.95.
3. *Hand Culture*, seed planted in field, rows 14"x4½", made a net profit per acre of \$80.44.

GROWING AND MARKETING.

SEED.—One of the most important points in onion culture is to procure seed adapted to the section in which they are to be grown. Many of the most popular varieties grown farther north fail to produce a good crop in South Texas, and most of those that do make a satisfactory yield produce an onion that will not keep in this climate. From our past experience with twenty-three varieties we can recommend but two for extreme South Texas—the Red Bermuda and the Creole. Most of the Creole seed are grown in Louisiana. However, a small amount is raised in this State, and seems to be equal in quality to that grown in Louisiana. The production of Creole seed is one of the neglected industries among our gardeners, and no doubt would prove profitable to those who would acquaint themselves with its production, and engage in the business.

With the Bermuda onion it is quite different. The American grown seed has proved very inferior to the imported stock. Bermuda onions

from American grown seed do not mature well, and usually have a large soft stem, and will keep but a short time after maturing. *The best Bermuda seed are grown on the Teneriffe Islands and along western coast of Africa.* Imported seed, if not fresh, have a low germinating power.

SEEDING.—The amount of seed required to plant an acre of onions varies according to the method of planting. It is important that the amount of seed, the area of the seed bed and the size of the field to be planted should be rightly proportioned in order that economy of production may be insured. Horse culture, seed planted in the field, rows 30"x4½", requires 1½ pounds per acre; hand culture, seed planted in field, rows 14"x4½", requires 3 pounds per acre. A saving of 33⅓ per cent. in amount of seed required per acre is made by planting seeds in beds and transplanting to the field—requiring in the first instance one pound and the latter two pounds per acre.

About five hundred square feet of bed surface is required for each pound of seed. This space can, by careful handling, be reduced to four hundred square feet. Therefore, for an acre of transplanted onions to be cultivated in 30"x4½" rows, five hundred feet of bed surface will answer the purpose for each acre, and one thousand square feet for onions transplanted in rows 14"x4½".

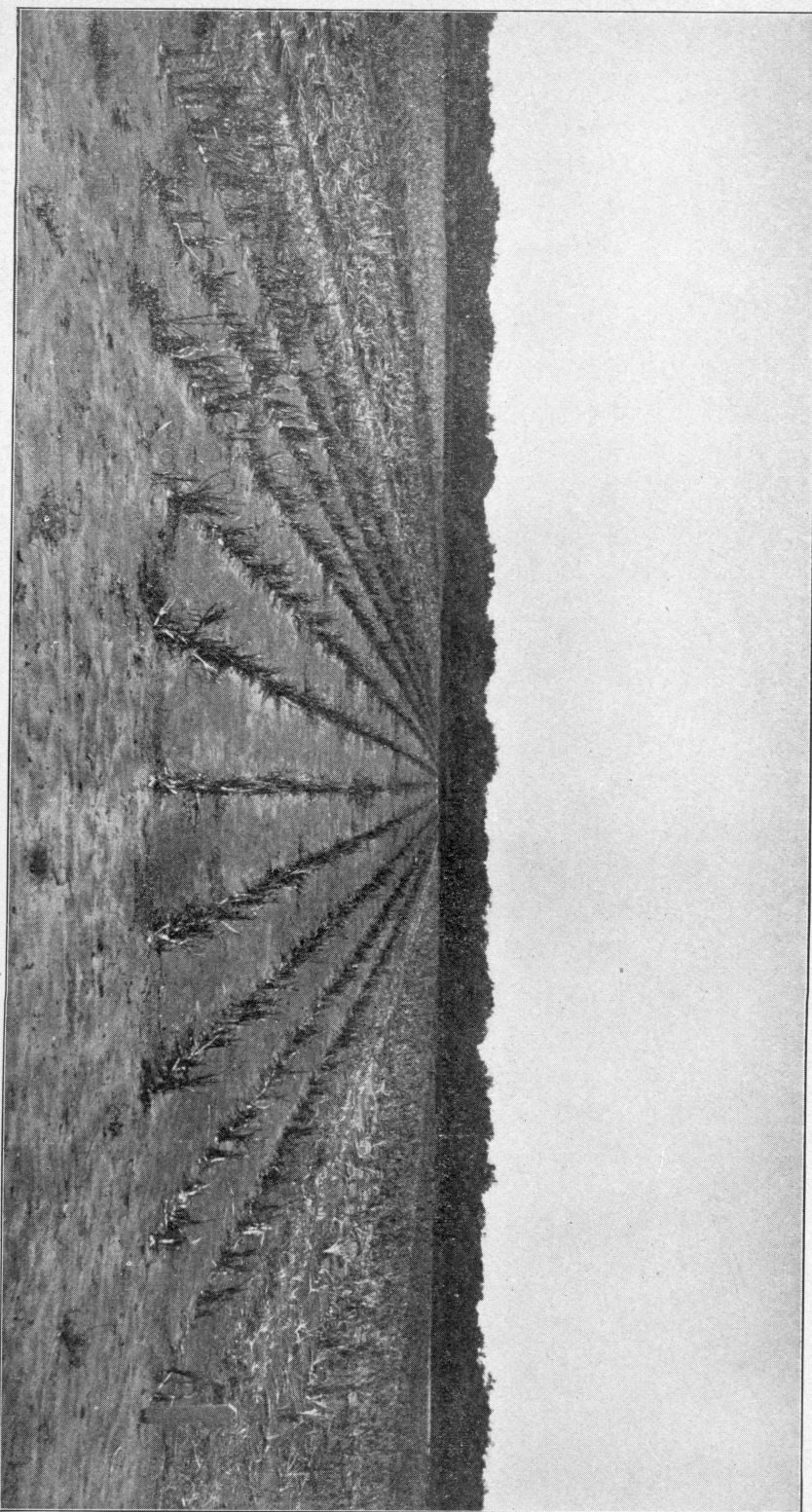
Several reasons may be given why less seed are required when planted in beds. 1. The soil in the bed is more easily prepared, and moisture conditions are directly under the control of the grower, which is not the case in the field. Consequently a larger per cent. of the seed germinate into healthy plants. 2. Transplanting from beds, each plant is placed where it belongs. In field plantings thinning is resorted to, which necessitates a loss of many good plants.

The above conditions existing as to the two methods effect a saving of 33⅓ per cent. in amount of seed required in favor of planting seed in beds.

SEED BEDS, PLANTING AND CULTIVATION.—A piece of rich sandy loam, free from weed seed and convenient to water should be selected for seed beds. Seed may be sown in drills three or four inches apart, or broadcasted. In either case they should be covered with soil only one-half inch deep. If the weather is warm and dry the beds should be sprinkled twice a day until the seed germinate, which is usually about nine days. If moss or other similar material can be had it will be found of value to be used as a mulch on the seed beds until the plants are about ready to come through the ground. It should then be removed. The use of the mulch will reduce the number of waterings required and insure a larger percentage of germination. The seed beds should be kept free from weeds and the plants in a thrifty condition until they are about six inches high. They should then be transplanted to the field.

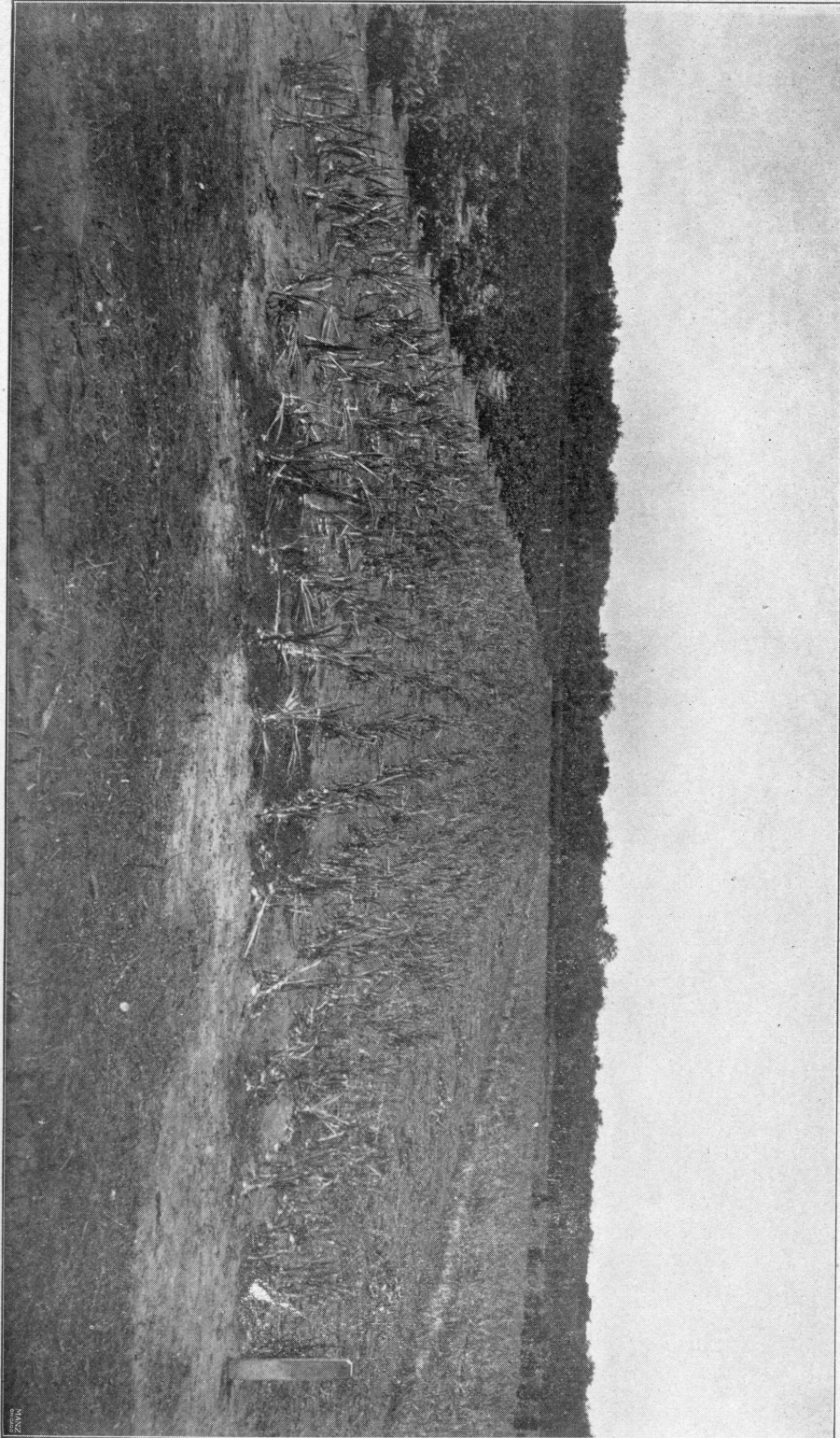


CUTTING NO. 1. CREOLE AND BERMUDA. YIELDS OF VARIETIES UNDER HAND AND HORSE CULTURE.



CUT NO. 02. RED BERMUDA ONION. HORSE CULTURE.

CUT NO. 3. RED BERMUUDA ONIONS. HAND CULTURE.



MAZ

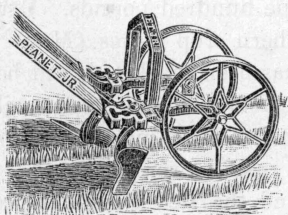


FIG. NO. 1.

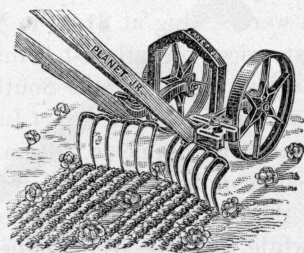


FIG. NO. 2.

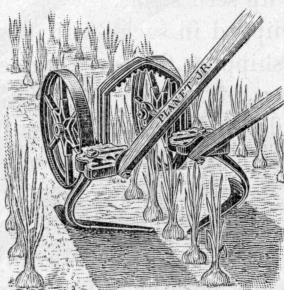


FIG. NO. 3.

Figs. 1, 2, and 3 show uses that can be made of the Planet Jr. Wheel Hoe in Cultivating Young Crops.

Before transplanting the roots and tops should be cut back. Besides benefiting the plants, this operation renders them more easily handled in the field while transplanting. If the soil to which they are to be transplanted is in proper condition, no trowel or dibble need be used, the onion being pressed into the ground by the forefinger. Cultivation should be shallow but frequent, never allowing the weeds a start. In cultivating care should be exercised not to work the soil to the onions, or hill them. However, it is not necessary to remove the soil from the bulbs, as is frequently recommended.

GATHERING AND SHIPPING.—Onions should not be gathered until they are fully matured, otherwise they will not keep. As they near maturity the tops break and lop down. After pulling they should remain in the fields a few days until dry, and then the tops and roots should be trimmed off. They are then ready to be sacked and marketed, or removed to a suitable place and stored and held until marketed.

Usually at time of gathering the price is low, as many growers sell direct from the field. During the season of 1899-1900, early onions (June 1st) sold at two to two and one-half cents per pound at the time of gathering. By the time the general crop was gathered the price went as low as seventy-five cents per hundred pounds. After the bulk of the

crop had gone to market, prices gradually improved until July 24, 1900. onions were selling at \$1.25 to \$1.50 per one hundred pounds. Usually the best prices prevail just before the Southern crop moves (May), and again after the bulk of the Southern crop has been marketed, and before the Northern crop matures (July and August). Therefore, it will be found most profitable to raise extra early onions and market as soon as matured, or hold the general crop until the rush is over.

For the early planting referred to we find the Red Bermuda preferable, while for long keeping the Creole has no superior in this climate. The Creole is not suited for early planting, because under these conditions it is inclined to put up seed stems.

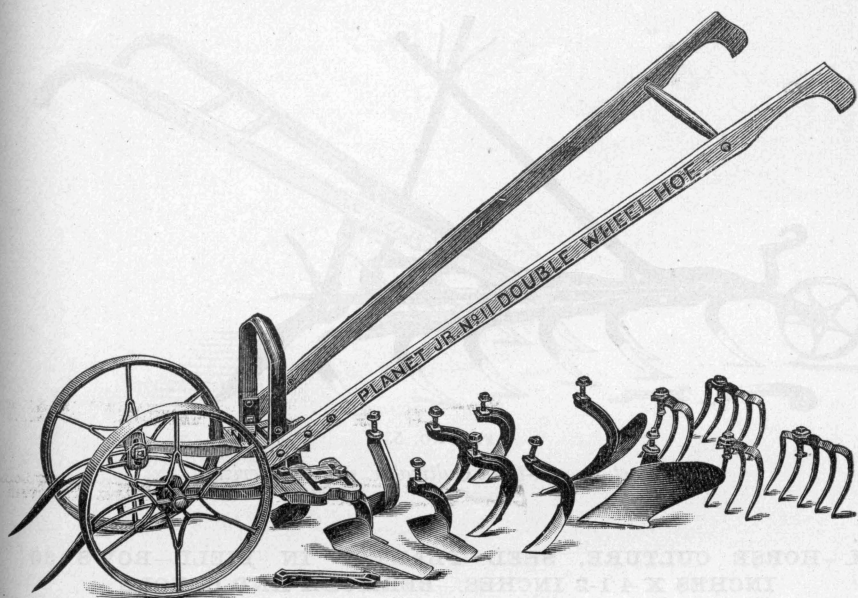
Onions are generally shipped in sacks, but it will be found profitable to use crates or boxes for shipping the early, tender varieties, such as the Red Bermuda.

The El Paso onion under favorable conditions does well here, but is very inferior to the Creole in points of hardiness and vigor and also in keeping qualities.

The Danvers make a light yield and lack the keeping qualities.

The Australian Brown has been tested here only one season. Yield of salable onions was practically nothing. The stems were very large and soft and did not mature in a way to be marketable. Similar results have been noted at Port Lavaca, while at a distance of 150 miles from the coast the Australian Brown is reported as doing well.

The following tables give the actual cost of growing the onions included in the test of "methods of growing." The expense is shown in detail according to method. It will be noticed that the nineteen operations necessary to mature the onion crop grown from seed planted in the field with horse cultivation amounted to \$16.45 per acre, while only thirteen operations were necessary when the same crop was grown by "hand culture." It is important that we should remember that the hand culture produced about three times the yield grown by horse culture.



· FIG. NO. 4.

Planet Jr. No. 11. Double Wheel Hoe, with Attachments.

If we compare the cost of experiment I with that of experiment II it will be seen that there is practically no difference in the cost of growing an acre of transplanted onions as compared with the crop grown from seed planted in the field, but the yield per acre is very much in favor of the transplanted acre. The same character of cultivation was given both crops.

The repeated cultivations and the careful thinning and transplanting required under normal conditions when seed are planted in field, as shown in experiment II, increase the cost of the system of production far beyond the expectations of the inexperienced grower.

In order that the reader may better comprehend the system of cultivation used, illustrations showing special tools employed in the cultivation of the onion crop are inserted, which are quite effective and not so expensive as to prevent their use by any truck grower desiring to economize labor.

While we have had no general and practical experience with adjustable cultivator tools other than the Planet Jr. single horse and hand cultivators which are manufactured by S. P. Allen & Co., Philadelphia, Pa., there are probably others equally as well suited for the cultivation of garden crops. Some of those embraced in this class and offered by implement dealers and seedmen are "Iron Age," by Henry A. Dreer, Philadelphia; "Everitt's Wheel Hoe," J. A. Everitt, Indianapolis, Ind.; "McGee Wheel Hoe," James H. Gregory & Sons, Marblehead, Mass.; "Universal Wheel Hoe," Ames Plow Co., New York; "Combination Wheel Hoe," B. F. Avery & Sons, Dallas, Texas.

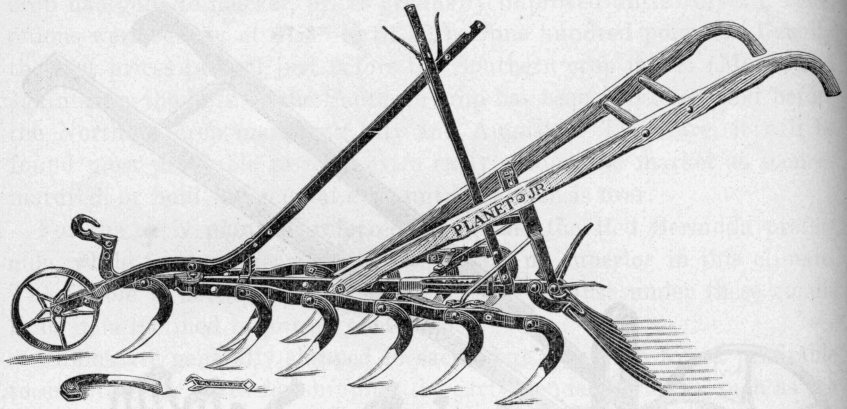
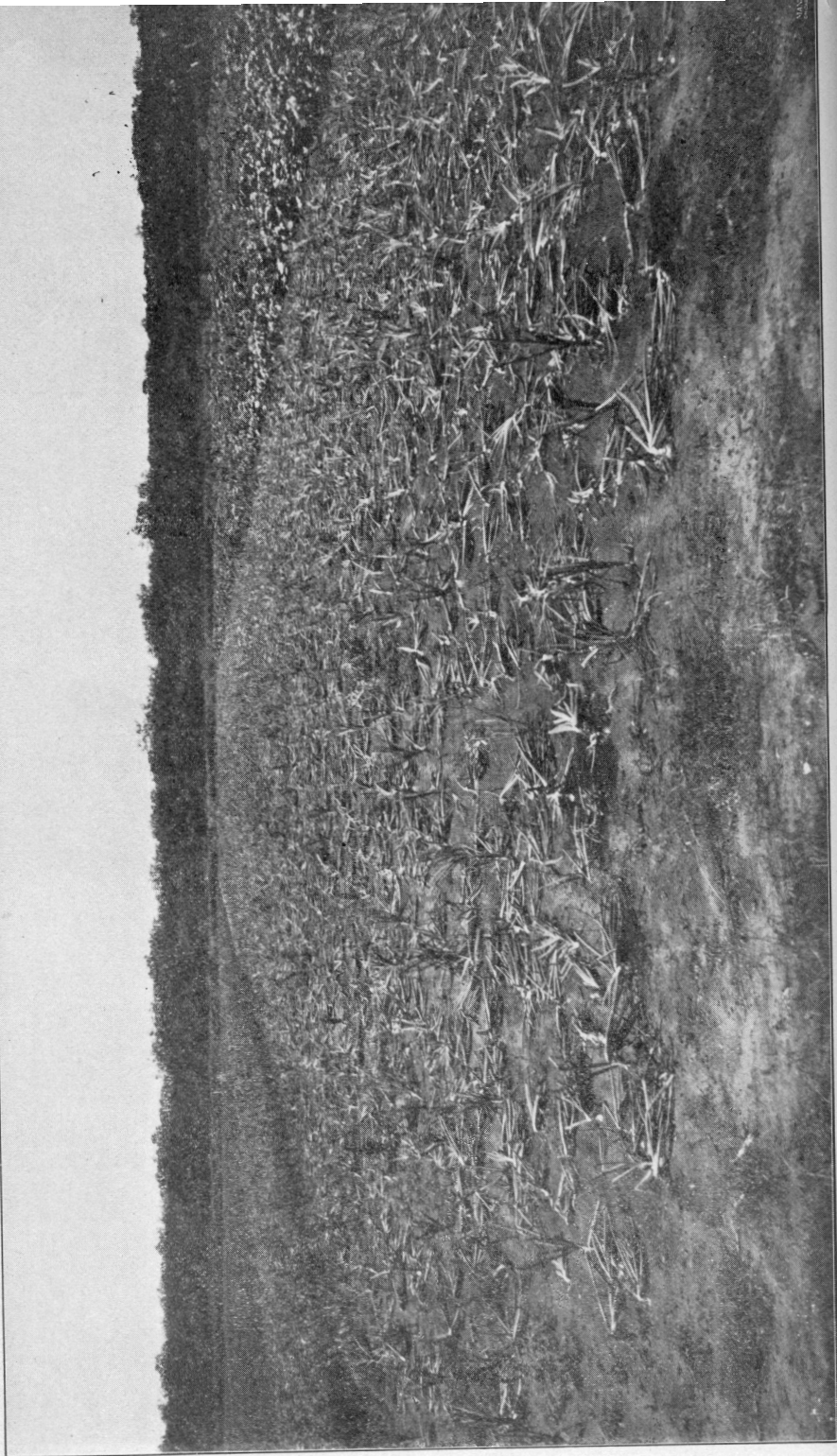


FIG. NO. 5.

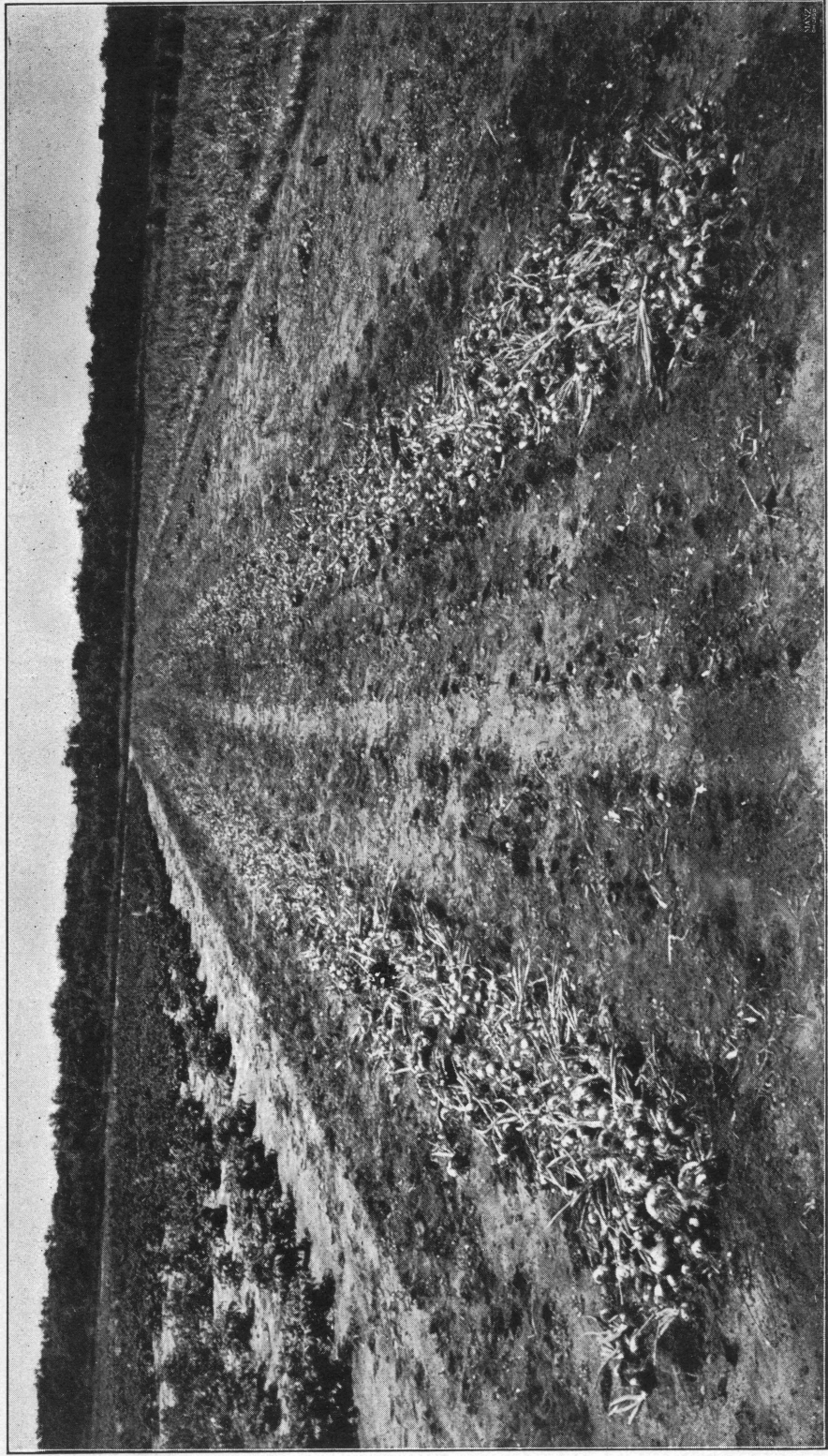
Planet Jr. 12-tooth Cultivator, with Pulverizer.

I.—HORSE CULTURE, SEED PLANTED IN FIELD—ROWS 30 INCHES X 4 1-2 INCHES.—BERMUDA AND CREOLE.

Sept. 14.....	Plowing and harrowing land	\$ 2 00
Oct. 16.....	Hand raking.....	95
Oct. 28.....	Planting seed in field.....	60
Nov. 11.....	Cultivating—wheel hoe (Planet Jr.).....	70
Nov. 16.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Dec. 1.....	Cultivating—wheel hoe (Planet Jr.).....	40
Dec. 2.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Dec. 19.....	Cultivating—wheel hoe (Planet Jr.).....	40
Jan. 1.....	Cultivating—wheel hoe (Planet Jr.).....	60
Jan. 2.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Jan. 19.....	Cultivating—wheel hoe (Planet Jr.).....	40
Jan. 20.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Jan. 25.....	Thinning and transplanting.....	3 90
Feb. 2.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
March 20.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
April 3.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
April 12.....	Hoeing—weeding hoe.....	1 50
April 16.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
May 1.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
	Cost to maturity.....	\$16 45
	Gathering Bermuda (4551lbs.).....	\$ 38
	Topping and sacking.....	3 80
	Total cost for Bermuda onions.....	\$20 83



CUT NO. 4. CREOLE ONION. HAND CULTURE.



CUT NO. 5. HARVESTED RED BERMUDA. HAND CULTURE.

**II.—HORSE CULTURE, SEED PLANTED IN BEDS AND TRANS-
PLANTED TO FIELD—ROWS 30 INCHES X 4 1-2 INCHES.—
BERMUDA AND CREOLE.**

Sept. 14.....	Plowing and harrowing land.....	\$ 2 00
Oct. 16.....	Hand raking.....	75
Oct. 28.....	Planting seed in beds and care to time of transplanting...	1 75
Dec. 2.....	Pulverizing land (Acme harrow).....	25
Dec. 26.....	Weeding and stirring seed beds (knife).....	1 20
Jan. 3.....	Pulverizing land (Acme harrow).....	25
Jan. 12.....	Transplanting to field (hand).....	4 40
Jan. 18.....	Cultivating—wheel hoe (Planet Jr.).....	30
Jan. 20.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Feb. 2.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
March 20.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
April 3.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
April 12.....	Hoeing—weeding hoe.....	1 50
April 16.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
May 1.....	Cultivating—12-tooth cultivator (Planet Jr.).....	60
Cost to maturity.....		\$16 00
	Gathering Bermuda (7336lbs.).....	\$ 61
	Topping and sacking.....	6 10
Total cost for Bermuda.....		\$22 71

**III.—HAND CULTURE, SEED PLANTED IN FIELD—ROWS 14
INCHES X 4 1-2 INCHES.—BERMUDA AND CREOLE.**

Sept. 14.....	Plowing and raking land.....	\$ 2 00
Oct. 16.....	Hand raking.....	75
Oct. 22.....	Planting.....	1 00
Nov. 11.....	Cultivating—wheel hoe (Planet Jr.).....	1 40
Dec. 1.....	Cultivating—wheel hoe (Planet Jr.).....	80
Dec. 16.....	Cultivating—wheel hoe (Planet Jr.).....	80
Jan. 2.....	Cultivating—wheel hoe (Planet Jr.).....	80
Jan. 19.....	Cultivating—wheel hoe (Planet Jr.).....	80
Jan. 25.....	Thinning and transplanting.....	5 85
Feb. 2.....	Cultivating—wheel hoe (Planet Jr.).....	80
March 21.....	Cultivating—wheel hoe (Planet Jr.).....	80
April 13.....	Hoeing—weeding hoe.....	80
April 16.....	Hoeing—weeding hoe.....	80
Cost to maturity.....		\$17 40
	Gathering Bermuda (13,152lbs.).....	\$ 1 09
	Topping and sacking.....	10 95
Total cost of Bermuda onions.....		\$29 44

FINANCIAL RESULTS.

RED BERMUDA ONIONS.

	Yield per acre in pounds salable onions.	Value of yield at 1 cent per pound.	Cost of growing crop to maturity.	Cost of gathering.	Cost of trimming and sacking.	Total cost of growing, trimming and sacking crop.	Net profit per acre.
Horse culture, seed planted in field.	4,551	\$45 51	\$16 65	\$ 0 38	\$ 3 80	\$20 83	\$24 68
Horse culture, seed planted in bed and transplanted to field.	7,336	73 36	16 00	61	6 10	22 71	50 65
Hand culture, seed planted in field.	13,152	131 52	17 40	1 09	10 95	29 40	102 08

CREOLE ONIONS.

	Yield per acre in pounds salable onions.	Value of yield at 1 cent per pound.	Cost of growing crop to maturity.	Cost of gathering.	Cost of trimming and sacking.	Total cost of growing, trimming and sacking crop.	Net profit per acre.
Horse culture, seed planted in field.	7,842	\$77 42	\$16 65	\$ 0 64	\$ 6 47	\$23 76	\$53 66
Horse culture, seed planted in bed and transplanted to field.	8,257	82 57	16 00	69	6 90	23 59	58 95
Hand culture, seed planted in field.	10,664	106 64	17 40	89	8 91	26 20	80 44

The stand of Bermuda onions, on horse-culture plots, where seeds were planted in the field, was not as good as on other plots. The season was unusually favorable for field plantings. Several light showers fell just previous to planting. The poor stand with the Bermuda was due to the seed—with both bed and field plantings the seed showed poor germinating qualities. The stand with the Creole onion, field planting, was better than is usually secured.

The above tables of financial results indicate that the Bermuda onion will respond more liberally to hand culture than will the Creole onion. The Creole onion in experiment I and II gave a greater net profit per acre than the Red Bermuda onion under similar conditions, while with *hand culture*, the Red Bermuda made an increased net profit of \$21.64 per acre over the Creole onion. The results with horse culture with the two varieties indicate that the Creole onion is better suited for the purpose, while for hand culture the Red Bermuda is to be preferred.

All methods of culture resulted in net profits per acre varying from \$24.68 (Red Bermuda—horse culture, seed planted in field) to \$102.08 (Red Bermuda—hand culture, seed planted in field).

The onion crop herein reported upon was grown without irrigation. Under the favorable conditions that surround the truck grower in the coast country, one man can, without irrigation, grow and market eight acres of onions, which, estimated at an average price of one cent per pound, will be worth \$1,052.16 on the market. One man to handle eight acres, hand cultivation, would require some help at time of transplanting and gathering, but will not keep him employed the entire season. The estimated cost of help one man would need in working the eight acres referred to above would be about as follows: At time of transplanting, \$26.00; at time of gathering and topping, \$72.00.

Hand culture only slightly increases the cost of growing the onion crop, and at the same time enables the grower to plant more than double the number of plants to the acre.

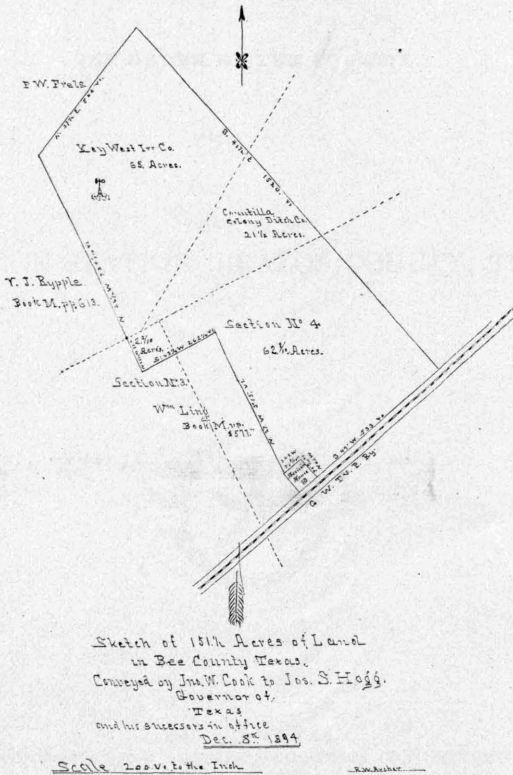


FIG. NO. 6.

BEEVILLE STATION SURVEY.
(151 1/2 acres.)

House and Irrigation Reservoir are located near Wind Mill on "Key West Irr. Co." Survey.