BULLETIN NO. 59.

Agricultural Section—MARCH, 1901—*Field Crops and Live Stock.*

FORAGE CROPS.

REPORTS OF

COÖPERATING STOCKMEN AND FARMERS FROM 71 COUNTIES.

ALFALFA.
JAPAN CLOVER.
MELILOTUS.
CRIMSON CLOVER.
WHITE CLOVER.
VELVET BEAN.
BEGGAR WEED.
COW PEAS.
RESCUE GRASS.
KAFFIR CORN.
FIELD CORN.
CHUFAS.

POSTOFFICE:
COLLEGE STATION, BRAZOS COUNTY, TEXAS.

AUSTIN, TEXAS:
VON BOECKMANN, SCHUTZE & CO., STATE CONTRACTORS.
1901.

TEXAS AGRICULTURAL EXPERIMENT STATIONS.

OFFICERS.

GOVERNING BOARD.

(BOARD OF DIRECTORS A. & M. COLLEGE.)

M. SANSOM, President.....Alvarado.
F. A. REICHARDT.....Houston.
P. H. TOBIN.....Denison.
A. P. SMYTH.....Mart.
JOHN W. KOKERNOT.....San Antonio.
JEFFERSON JOHNSON.....Austin.
DR. A. C. OLIVER.....Douglassville.
W. P. MALONE.....San Marcos.

STATION STAFF.

THE PRESIDENT—TREASURER OF THE COLLEGE.

J. H. CONNELL, M. Sc.....Director.
H. H. HARRINGTON, M. Sc.....Chemist.
M. FRANCIS, D. V. M.....Veterinarian.
R. H. PRICE, B. S.....Horticulturist and Mycologist.
B. C. PITTUCK, B. S. A.....Agriculturist.
P. S. TILSON, M. S.....Associate Chemist.
W. C. MARTIN, B. S.....Assistant Chemist.
E. A. WHITE, B. S.....Assistant Horticulturist and Mycologist.
J. W. CARSON, B. S.....Farm Superintendent.
J. G. HARRISON.....Bookkeeper.

SUPERINTENDENT OF BEEVILLE STATION.

S. A. MCHENRY.....Beeville, Bee County.

NOTE.—*The main station is located on the grounds of the Agricultural and Mechanical College, in Brazos County. The postoffice address is COLLEGE STATION, TEXAS. Reports are sent free of cost to farmers of the State upon application to the Director.*

FORAGE CROPS.

This report on the growth of forage crops, under the practical farm conditions existing in Texas, is published as a record of the successes and failures experienced by practical farmers in handling crops which have been new to them in many instances. *The facts herein stated are important* while many predictions that are made by the coöperative grower as to the success or failure of certain crops are printed without our specific endorsement, which must be withheld until such crops have actually failed or succeeded.

The counties in which crops have been grown are given in connection with the postoffices, so that the climate and the soil may be better understood by the reader. The weather map of the State, showing the average distribution of the rainfall throughout Texas, is also supplied in order that the influence of moisture upon the success of the crop may be considered. We have been unable to supply those coöperating with us with the rain gauges and thermometers necessary for an accurate record of the weather conditions existing during the time these crops were grown, but in many instances the correspondent describes the weather as accurately as may be. We hope to improve upon this feature of the work in the near future by supplying a number of weather recording instruments.

THE ADAPTABILITY OF CROPS TO SOILS.

The normal distribution of our grasses, forage crops, and other field products is an interesting study in itself. Just why a crop succeeds in one locality and fails in another will depend almost solely upon soil, temperature, and rainfall. Every plant has a restricted set of conditions limiting its range and the possibility of its growth. Rainfall is a very common controlling factor; where it occurs in abundance, the growth of such plants as Red clover, Crimson clover, and Indian corn is assured, while, if we test these plants under dry or semi-arid conditions, they fail because their constitutions demand a larger supply of water than is there available. Therefore, no Red clover is grown in this country west of the one hundredth meridian, but Alfalfa takes its place because of its hardiness and drouth resisting qualities.

An example of the influence of soil upon the distribution of crops is easily found in the case of Red clover being supplanted by the Cow pea as the Southern, or Gulf States are approached because the physical and chemical conditions of the soils of the Gulf States are but little suited to Red clover, which delights in porous, calcareous lands. Upon such soils, even in the Gulf States, it will thrive and has proven a profitable crop in a few restricted localities. Some plants are fond of peculiar forms of plant food as, for example, Kentucky Blue grass thrives in all of its splendor upon the soils that have been formed from the Trenton lime stone. It delights in lime, phosphates, and good drainage, while

Alfalfa appears indifferent to lime and largely careless of the phosphates. Its daily food is nitrogen and potash more largely than any other forms; Melilotus is a great lime "crank" and asks for little else under ordinary weather conditions; it has been known to thrive upon the barest limestone rocks where its roots could penetrate through the crevices in the rock to the moisture found several feet below the surface.

With the diversity of soil possessed by Texas and a range of climatic conditions that is most puzzling to the visitor in the State, the special adaptability of forage plants is a matter of constant interest. In one county a plant will thrive while in an adjoining section it has no practical value; hence the experience of one grower often contradicts the careful observations of another and yet each may be correct so far as his limited observation extends.

In the coöperative experiments that have been conducted throughout the State for several years, under the supervision of the Texas Experiment Station, it has been our intention to encourage the experimental growth of a number of crops that were thought to be but poorly suited to the soil and climate of our State. Under these circumstances it is not to be wondered at that some of the growers who were unfamiliar with the crops in their charge have misunderstood the objects or purposes for which the seed were planted. This seems to have been especially true of alfalfa. Instead of cutting the crop for hay when the plants were blooming freely, some of our coöperators waited and allowed seed to form to judge of the *seed* making capacity of the plant which, without proper machinery for harvesting, was useless since the yield of seed could not be determined. Comparatively few farmers or stockmen raise alfalfa for seed but as a hay crop, which is very profitable where as much as one and one-half to three tons per acre can be grown annually. For years to come it will remain an excellent crop for sale upon our markets, since Texas now affords a large and excellent market for the alfalfa hay growers of Colorado.

Failures, as well as successes, are herein reported, believing that all of the matter presented has great practical value. In some instances the cause of the failure is obvious; in others, not so clear. One of the frequent causes leading to the failure of many experimental crops is found in the preconceived opinion of the grower who lacks faith in the possible adaptability of the crop to his soil. Under such conditions the grower does not study the peculiar needs and requirements of the crop under his care, which results in unintentional neglect at a critical moment in the life of the plant. This difficulty can only be met by the development of a deeper interest in the success of the experimental crops in the care of the practical grower. All available literature bearing upon the crops in hand should be carefully studied and the facts so gained should be adapted, through the good judgment of the grower, to local conditions.

As an instance of this difficulty, we call attention to many reports received here of alfalfa crops "dying during August or September on account of the hot sun," whereas, in most of these cases, no doubt, the crop had only reached its period of rest and was waiting for fall rains to put out a new crop of leaves, which would be more or less persistent throughout the entire winter season. If not grown under irrigation, alfalfa usually rests for four or eight weeks during the summer season because of dry, hot weather, though it may be stimulated to continued growth if kept constantly mowed or pruned back by stock grazing upon it.

RAIN CHART FOR TEXAS.

Average Annual Precipitation in Texas from Data Contained in Special Bulletin No. 5, Texas Section, Climate and Crop Service, U. S. Weather Bureau, Galveston, 1895.

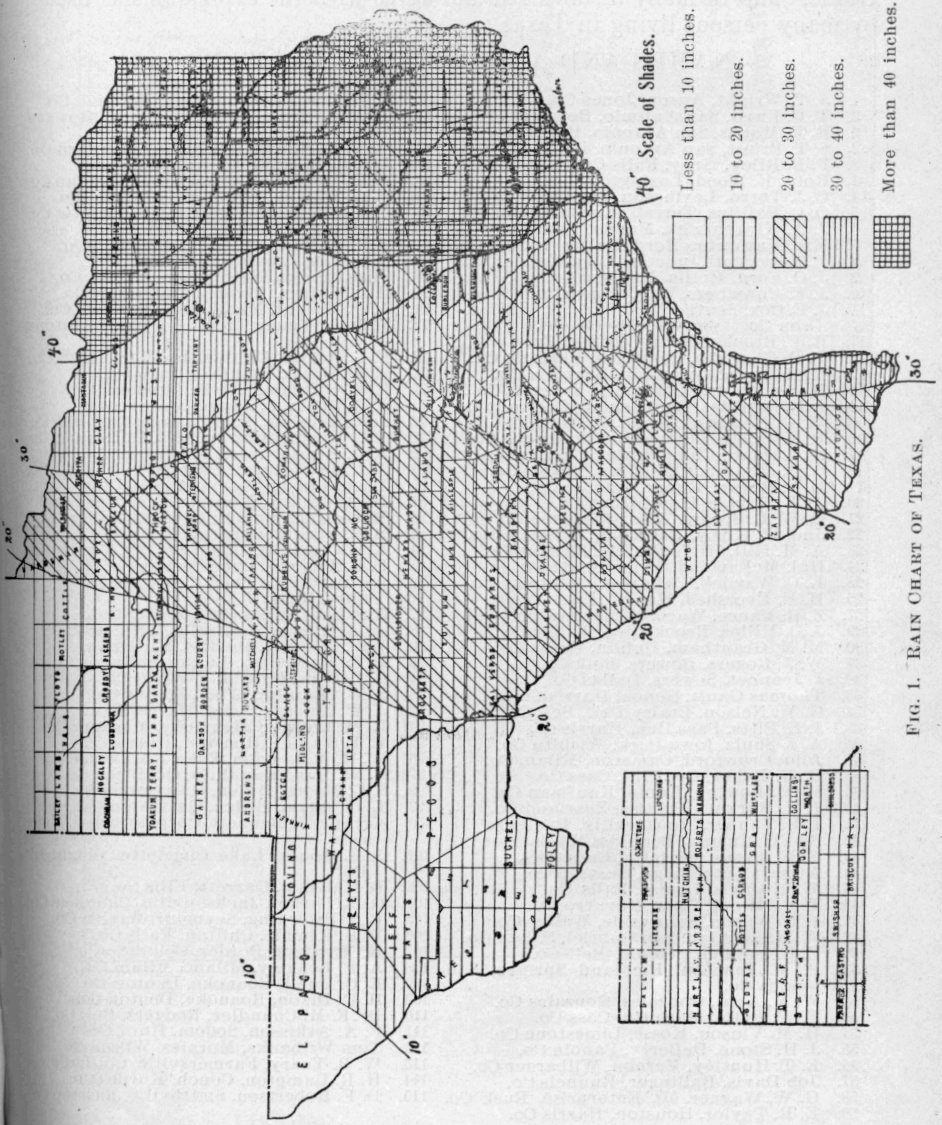

FIG. 1. RAIN CHART OF TEXAS.

PLAN OF THE REPORT.

The names and address of coöperating stockmen and farmers are shown below and a map of Texas (on opposite page) with numbers shown corresponding to the name of the grower as shown in the list.

Each report is preceded by the map number of the grower, and the location of the experiment is also indicated, whenever reported, by the abbreviations used to indicate "Central Texas," "North Texas," "West Texas," etc. These terms are taken from the "U. S. Official Postal Guide," and in many instances do not agree with the expressions as used by many persons living in Texas.

NAMES AND ADDRESSES OF GROWERS.

1. J. T. Wright, Anson, Jones Co.
2. T. C. Frost, San Antonio, Bexar Co.
2. R. E. Morris, San Antonio, Bexar Co.
2. S. T. Priest, San Antonio, Bexar Co.
3. P. F. Riley, Gray, Falls Co.
4. Robt. E. Wood, Lexington, Lee Co.
4. C. J. Torro, Lexington, Lee Co.
5. O. C. Phillips, Terrell, Kaufman Co.
6. J. A. Kirkpatrick, Marlin, Falls Co.
7. Mrs. Katherine Hord, Dallas, Dallas Co.
8. R.R.Crockett, Junction City, Kendall Co.
9. J. O. Ford, Hollis, Madison Co.
10. J. E. Chambers, May, Brown Co.
11. J. E. Cox, Southerland Springs, Williamson Co.
12. R. P. Brooks, Bedias, Grimes Co.
13. T. D. Giesecke, Columbia, Brazoria Co.
13. R. M. Knox, Columbia, Brazoria Co.
13. Harry Rhodes, Columbia, Brazoria Co.....
14. A.R.Voorhies, Rock Island, Colorado Co.
15. W. G. Nelms, Rosebud, Falls Co.
16. H. K. Foote, Cotton Gin, Freestone Co.
17. W.G.Hoard, China Springs, McLennan Co.
18. C. B. McGregor, Millican, Brazos Co.
19. L. F. Brown, Runge, Karnes Co.
20. J. W. Taylor, Hunt, Hunt Co.
21. G. W. L. Spears, Alto, Cherokee Co.
22. Jno. W. Kirby, Buttfield, Jefferson Co.
23. A. M. Hill, Hill's Prairie, Bastrop Co.
24. Hal. McFarland, Tyler, Smith Co.
25. L. C. Warlick, Childress, Childress Co.
26. H. E. Evershed, Henly, Hays Co.
27. Z. B. Vance, Waco, McLennan Co.
29. J. D. Miller, Brookshire, Waller Co.
30. M. M. Grantham, Dublin, Erath Co.
31. W. J. Rogers, Bowers, Polk Co.
32. J. Jeannet, Sowers, Dallas Co.
33. Thomas Gault, Genoa, Harris Co.
34. G. W. Nelson, Prairy Dell, Bell Co.
35. J. L. Pitts, Pasadina, Harris co.
36. A. I. Shulz, Iowa Park, Wichita Co.
37. John Crawford, Cameron, Milam Co.
38. C. W. Baker, Red Hill, Cass Co.
39. W. H. Bowlby, Kemp, Kaufman Co.
40. J. H. Burkett, Curtiss, Eastland Co.
41. J. B. Tanner, Hookerville, Burleson Co.
42. Geo.W.Murray, Beaukiss, Williamson Co.
43. F. W. Bette, Marietta, Cass Co.
44. Aupust Letz, Paige, Bastrop Co.
45. W. C. Davis, Louise, Falls Co.
46. J. N. Milner, Cade, Navarro Co.
47. I. D. Wilson, Sunnyside, Waller Co.
48. W. H. Locklan, San Gabriel, Milam Co.
50. E. L. Shumm, Temple, Bell Co.
51. P. M. Johnson, Richland Springs, San Saba Co.
52. W. M. Kehl, Gonzales, Gonzales Co.
53. F. W. Betts, Marietta, Cass Co.
54. H. M. Vinson, Kosse, Limestone Co.
55. J. H. Stone, DeBerry, Panola Co.
56. E. T. Huntley, Vernon, Wilbarger Co.
57. Job Davis, Ballinger, Runnels Co.
58. G. W. Wagner, Mt. Enterprise, Rusk Co.
59. E. R. Taylor, Houston, Harris Co.
60. R. M. Lesesne, Henrietta, Madison Co.
61. T. C. Lutterlock, Big Springs, Howard Co.
61. W. T. Burkhead, Big Springs, Howard Co.
62. J. J. Kelt, Rice, Navarro Co.
63. W. G. McDaniel, McGregor, McLennan Co.
64. F. A. Looney, Wharton, Wharton Co.
65. Chas. Fordtran, Fayetteville, Fayette Co.
66. N. P. Gregg, Nursery, Victoria Co.
67. D. J. Thomas, Glidden, Colorado Co.
68. Sam Moss, Devine, Medina Co.
69. Chas. Hodge, Nelsonville, Austin Co.
70. H. L. Griggs, Alvarado, Johnson Co.
71. A. P. Wright, Mathis, San Patricio Co.
72. John A. Young, Prairie Hill, Limestone Co.
73. F. L. Martin, Chillicothe, Hardeman Co.
74. H. M. Glass, Post Oak, Jack Co.
75. E. L. Hutchins, Alvin, Brazoria Co.
75. J. L. Durham, Alvin, Brazoria Co.
76. John Dierlam, Port Lavaca, Calhoun Co.
17. G.G. Hood, China Springs, McLennan Co.
78. A. J. Brown, Seale, Robertson Co.
79. J. J. Hawsberger, Pearland, Brazoria Co.
80. Theo. Brasig, Peters, Austin Co.
81. M. A. Cauley, Moran, Shackelford Co.
82. Herbert Taylor, Monaville, Waller Co.
83. B. F. Parker, Content, Runnels Co.
84. R. R. Crockett, Junction City, Kimble Co.
85. F. L. Thomas, Goree, Knox Co.
86. Arthur A. Beverly, Copperas Cove, Coryell Co.
87. Gus Long, Eliasville, Young Co.
88. A. A. Gibson, Centralia, Trinity Co.
89. Wm. A. Long, Davilla, Milam Co.
90. D. E. McFadden, La Porte, Harris Co.
91. C. L. Rice, Floydada, Floyd Co.
93. J. W. Manning, Alief, Harris Co.
93. J. W. Murray, Alief, Harris Co.
94. R. M. Lessner, Hennessy, Madison Co.
95. E. R. Taylor, Houston, Harris Co.
96. W. H. McLendon, Fate, Rockwall Co.
97. C. W. VanNess, Jines, Ochiltree Co.
99. S. C. Moore, Hulen, Galveston Co.
99. L. C. Moats, Hulen, Galveston Co.
100. Arthur W. Bennett, Corpus Christi, Nueces Co.
101. J. E. Jones, Lake Charlotte, Chambers Co.
102. D. E. Easin, Garrett, Ellis Co.
103. G. L. Parker, Jacksonville, Cherokee Co.
105. R. J. Browning, Seymour, Baylor Co.
106. F. B. Kimble, Chilton, Falls Co.
107. H. G. Seiger, Border, Colorado Co.
108. A. P. Longley, Milano, Milam Co.
109. E. C. Buell, Roanoke, Denton Co.
109. H. C. Dixon, Roanoke, Denton Co.
110. Dr. F. M. Chandler, Rodgers, Bell Co.
111. F. A. Atkisson, Sodom, Hunt Co.
112. Tom Wilbanks, Morales, Wilson Co.
113. W. B. Yeary, Farmersville, Collin Co.
114. H. R. Lampton, Couch, Karnes Co.
115. D. E. Robertson, Smithville, Bastrop Co.

[The numbers in above list refer to corresp onding numbers on map.]

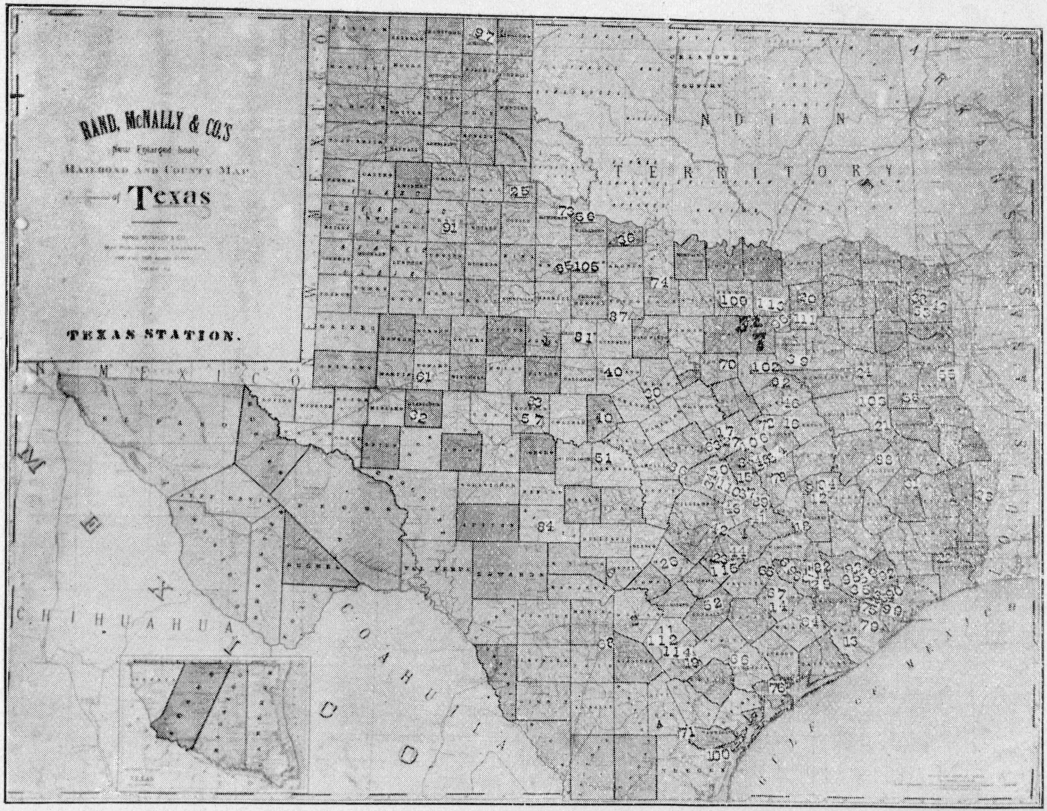

FIG. 2. LOCATION OF COÖPERATIVE EXPERIMENTS.

1. ALFALFA.

(*Medicago sativa.*)

This plant is well distributed over all parts of the United States, with few exceptions, and has been under cultivation for several hundred years. The two varieties, the Common and the Turkestan (or Sand) Alfalfa, differ very little in appearance, but seed of the latter has given promise of greater drouth resisting qualities than the ordinary alfalfa possesses.

If once sown upon suitable land, the crop grows from the old roots, year after year, producing an abundance of very fine hay at slight cost per acre. Its season of growth throughout this region is from September until July, during which time it yields a large amount of grazing and from one to four cuttings of hay. If planted in the fall, care must be taken to seed the crop so early that the young plants will be well established and toughened before the early frosts endanger their vitality. September and October are preferable for fall planting. Spring planting is safer and is more generally practiced; February being selected or the first part of March in the more northern portion of Texas.

The land should be well prepared and as free from weeds as possible. On soils that run together easily, the seed may be only harrowed in, but upon light, porous soils they may be covered to a depth of two or three inches with safety. In very dry localities it is safest to plant the seeds in drills one and one-half or two feet apart and cultivate the crop lightly during the first season. This often enables the crop to grow such a large tap root that it can supply the moisture demands of the plant during seasons of great drouth. Twenty pounds of seed per acre, sown broadcast, is an abundance where land is properly prepared; for rough land, sow more seed. Fluctuation in the price of seed show that quotations range from six to twelve cents per pound.

The crop can be used for pasture purposes and is especially prized in certain sections for pork production—where the hogs are trained to graze upon the crop throughout several months of the year. During the fall season, fat hogs are sometimes marketed off of Alfalfa fields without the use of additional grain. It is claimed that 1000 pounds of pork can be produced from each acre so grazed.

Alfalfa is fast becoming a standard hay throughout the entire west and southwest. It sells upon the local markets in Central, Southern, and Eastern Texas at from $10.00 to $14.00 per ton at nearly all seasons of the year. *Its composition is practically the same as that of wheat bran.* All kinds of stock are fond of the hay and it is eaten with very slight waste. It has a very large amount of protein, which, together with its high digestibility, enables it to be used as a substitute for grain to a large extent upon the stock farms of the State. During favorable seasons, between three and four tons per acre have been grown upon the more fertile soils of the State.

The lower Brazos valley, the fertile black lands of North Texas, and certain other regions of smaller area have grown Alfalfa extensively dur-

ALFALFA:

ing the past six or eight years, finding a ready market for the hay and steadily increasing the State's annual production of Alfalfa hay. The efforts to grow this crop, herein reported, make valuable contributions to our knowledge upon the adaptability of the crop to the several distinct soils of our State.

All of the Alfalfa herein reported was seeded in the spring months, and in many cases it was planted too late for best results with only average rainfall. In the latitude of Bexar and Brazoria counties the seed should be germinated not later than February and as we approach the latitude of Dallas and Fort Worth, March is the ideal season for planting. Despite the late planting given many of the lots of seeds reported on above the Alfalfa is reported as generally successful. In passing upon the merits of Alfalfa, it should be borne in mind that the work here reported *is for the first year after spring seeding.* Under such conditions we expect only light crops of hay as compared with the second and third year's growth under normal conditions.

[The number appearing before each of the reports refers to the map number, page 48.]

(1) J. T. WRIGHT. *Anson, Jones county* (N. Tex.).

Dark, very rich sandy soil, well drained, fine cotton land. Planted March 5 and April 7; germinated March 15 and April 15; first blooms June 10 and August 10; quality good; quantity good and value good, especially for hog pasture. Season about an average. Rainfall above normal up to August 1, and below normal afterwards. The very high temperature of July and August seemed to wilt it very much; low temperature (20°) of March 23 killed most of March 5 planting. No insects and no fungous. Rabbits are our worst enemies; almost impossible to raise Alfalfa without fencing against the rabbits.

(2) J. C. FROST. *San Antonio, Bexar county* (S. Tex.).

The seed sent me was "dry land Alfalfa." Planted in first week of February, 1898. Could discover but few plants appearing, which we thought must be alfalfa. These from the continued dry weather soon disappeared. The land was a loose soil with considerable lime in it, and was probably not suited to the plant, and crop failed for lack of rain to start crop off.

(2) R. E. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Well pulverized black mesquite (not waxy) soil, well drained, and well fertilized with vegetable matter. Previous crop sorghum. Planted April 4, 1898, and germinated April 7 (very late planting). Bloomed in July. Cut August 5, about eighteen inches high, and did not cut second time, as it did not grow high enough. Very good yield; quality fair. Value, I cannot say, for I let it remain standing until the seed ripened, consequently stock would not eat it—not having had any Alfalfa to eat before. Season temperature far below normal; also rainfall. I believe Alfalfa will do some good in this section without irrigation if we can bring it through the first summer alive. I noticed today that some of it is coming up again, notwithstanding the rabbits eat the stubble two inches under the ground. I saved some seed, and will sow again this spring. Will mix and sow with oats about first of February, so the dry, high winds will not dry the ground out before plants take root.

(3) P. F. RILEY. *Gray, Falls county* (C. Tex.).

The land selected was where a garden was planted last year, consequently it was fertile and in a fine state of cultivation. The land selected is a dark sandy, with red clay foundation six inches below, but of such a nature as to bake. The land was turned and thoroughly pulverized, and rows laid off eighteen inches apart and covered one and one-half inches deep. Planted on March 26; the seed germinated six days later; blooms appeared first of June and about the first of August,

FIG. 3. BRAZOS VALLEY ALFALFA. SHOWING CROP OF 18 DAYS GROWTH AFTER FIRST CUTTING—APRIL 23.

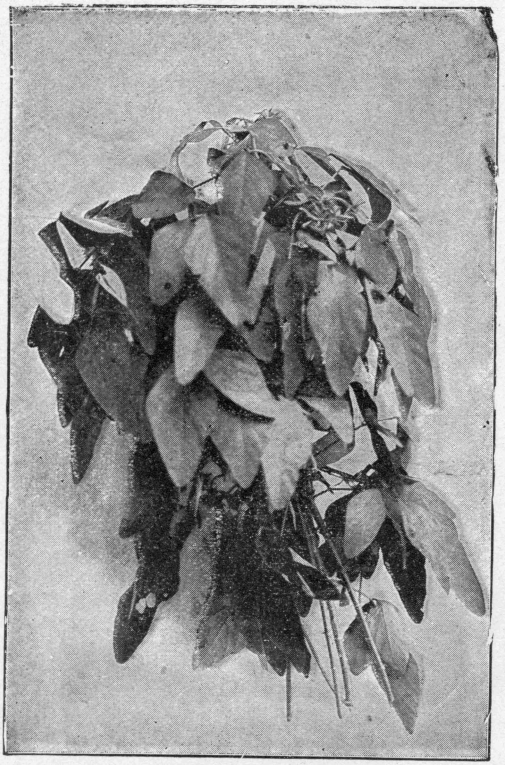

FIG. 4. GIANT BEGGAR WEED.

(SEE PAGE 64.)

ALFALFA:

at which time I thought it best to cut in order to save the seed. I cut and threshed out the seed, but could not clean them thoroughly, therefore cannot estimate the quantity. It was again blooming in September. My hogs have kept it down since October 15. The rainfall during this season was more than usual. No fungous or insect pests attacked the plants. From the history of alfalfa, I think it would be a hard matter to make a success on most farms in this sandy belt. What we call alkali spots are a great pest, and they are spreading rapidly. With this exception, this certainly would be the best country for Alfalfa this side of the Pecos Valley.

FIG. 3. A SINGLE ALFALFA PLANT.

(4) ROBT. E. WOOD. *Lexington, Lee county* (C. Tex.).

Alfalfa was planted on well drained land containing a high per cent. of potash, that had lain out for several years and previously cropped with Irish potatoes; fertility, good; the plant came up and grew very rapidly until it began to bloom, at which time it was about one foot high, and did not seed well; was thin during the hot weather of July, at which time it died down, though the stems of some of them were green. Planted March 5, and germinated three days later; bloomed June 1 and August 15. We had an excessive rain during the first four months, accompanied by high temperature, which did considerable damage to the plant. No insects or fungous diseases attacked the plants. I do not think the plant suited to this soil, which is a black prairie.

(5) O. C. PHILLIPS. *Terrell, Kaufman county* (N. E. Tex.).

Alfalfa planted April 8, and germinated to a nice stand April 16; bloomed June 2. On May 25 it was six inches high, and on June 16 it was eighteen inches high, yielding at the rate of three tons per acre. A part of the Alfalfa died adjacent to a patch of dead cotton. I think it a fine forage plant, and also valuable as a fertilizer where it grows successfully.

ALFALFA:

(6) J. A. KIRKPATRICK. *Marlin, Falls county* (C. Tex.).

Land was in good condition when planted—on rolling postoak land; no crop on land last year; poor land. Season was normal; rainfall below normal. The rabbits and grasshoppers kept it eaten down so as to prevent it from making anything.

(7) MRS. KATHARINE HORD. *Dallas, Dallas county* (N. E. Tex.).

Alfalfa was planted on thin land—a high loam with a rock subsoil—but was in good condition. Previous crop, corn, sown with oats. It did well, and is still growing. I have one acre in alfalfa, this being its third year. I have cut it five times this season, and it is now growing, and there is a nice pasture for my cow.

(8) R. R. CROCKETT. *Junction City, Kendall county* (C. Tex.).

I had no ground suitable for sowing the Alfalfa, but I know from experience that it will grow here if watered, and is a valuable crop when it is not grown on dry land.

(9) J. O. FORD. *Hollis, Madison county* (E. Tex.).

Grown on a sandy soil with a clay foundation, well drained and very fertile, and had been an old gin lot some seven or eight years ago. Was planted in sweet potatoes last year, which put the soil in good condition. Was plowed to a depth of eight inches. Planted March 5, germinated April 9; first blooms July 6, last blooms August 30. The season was exceptionally good, and the rains came just when needed, and about the proper quantity. No insects or fungous diseases bothered the plants. I never gathered it, but it did well. It grew some two or three feet high. I tried it on my place two different times without success. The first time I sowed it with oats, but the season was dry, and it died out during the summer.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

Planted on deep sandy soil; broken early; in cotton last year. Land too deep for corn to do well. I planted the Alfalfa in drills eighteen inches apart and cultivated with hoe. Planted on 1/200 acre plot, and the first cutting made about ten pounds (one ton per acre), and the second about the same. After cutting it twice it matured a good crop of seed. Planted April 11; germinated April 16. First blooms were noticed about June 1. It was from eighteen inches to two feet high June 15, when I cut it. It made fine hay; horses ate it greedily. July 20 it was ready to cut again, and yielded about two tons per acre, and quality was excellent.

(11) J. E. COX. *Southerland Springs, Williamson county* (C. Tex.).

Planted on black sandy soil; broke with eight-inch turning plow ten inches deep; planted in drills three feet apart March 8; germinated March 12; first blooms May 8, last blooms July 11. Yield was very poor and quality poor; season not as good as normal; rainfall above normal.

(12) R. P. BROOKS. *Bedias, Grimes county* (E. Tex.).

I was much surprised at the growth of Alfalfa on our uplands. I had been told that it would not grow on our uplands, but I find that it grows to the extent that, in my opinion, it will be a very profitable crop, and I expect to plant it to some extent next year.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Planted on black sandy soil. Land plowed deep and well prepared. During good years this land will make thirty bushels of corn per acre. Planted April 14, and germinated April 17; did not bloom. A few seed came up, but died from drouth during the latter part of September.

ALFALFA:

(14) A. R. VOORHEES. *Rock Island, Colorado county* (S. E. Tex.).

Planted on land of medium fertility, but in good condition; previous crop, corn. Planted March 1; germinated March 8. Crop attained a height of ten to eighteen inches. Few of the blooms ripened during the season; seems adapted in growth to our sandy loam soils. Crops so small no estimate could We had suitable weather during the growth of the plants—probably more rain possibly be formed, but Alfalfa in our neighborhood makes three crops each year. than usual during the spring and early summer months. The insects were very destructive.

(15) W. G. NELMS. *Rosebud, Falls county* (C. Tex.).

Planted on a clay, sandy soil in good condition; previous crop, cotton (previous crop not good). Planted March 15; germinated to a good stand April 1; bloomed July 1. The first cutting was good; rainfall normal. No insects or fungous diseases bothered the plant. It grew well and seeded, but it requires close watching to get it to seed well; then the soil does not suit it.

(16) H. K. FOOTE. *Cotton Gin, Freestone county* (E. Tex.).

Planted on dark, sandy, upland loam, April 1. Germinated and a fair stand came up and grew nicely until 13th of July, when it all died.

(17) W. G. HOARD. *China Springs, McLennan county* (C. Tex.).

The land for this crop was broken January 1 with a walking plow running five inches deep, and afterwards harrowed with a steel harrow; harrowed again on March 8. After the light rain on August 6, I planted alfalfa (August 9); germinated about the 13th to a perfect stand. Land was in a good pulverized state, rather high prairie, red, with some sand, but all of a rather drouthy nature. The previous crop of cotton made about two hundred pounds per acre last year. Got about 700 pounds this year. Heavy frost on March 20 killed fully one-half of the Alfalfa. First blooms appeared 15th of June; last blooms 1st of July. I have been living in this country eight years, and will say I believe that out of eight years there has been but two years that there could have been more than one cut or full crop. Will say, however, that ten miles west of here, on the Bosque river bottom, I have seen Alfalfa six inches high on the 12th of March. The only crop cut this year was cut on July 20. Will say that I hardly think Alfalfa can be made a success without irrigation on this land. I cut off a few branches on July 1 which were about five inches high, but no good, apparently.

(18) C. B. McGREGOR. *Millican, Brazos county* (C. Tex.).

Planted on new black prairie black land; came up to good stand; grew about eighteen inches high and seeded; died down during the dry weather, and has never appeared again. Roots look dead, and I believe they are. I have never cut it.

(19) L. F. BROWN. *Runge, Karnes county* (S. Tex.).

Planted March 10, germinated March 16; first blooms May 1, last blooms July 1. Good yield and fine feed for stock—hogs and horses. Grew about two feet high, branched well, and am well pleased with it.

(20) J. W. TYLER. *Hunt, Hunt county* (N. E. Tex.).

The soil was well pulverized before planting; good drainage; manured with well rotted stable manure. The previous crop was sorghum. Very cold and wet for several days after planting—very unfavorable to seed germinating, but most of the seed came up and did well. Rainfall above normal; minimum temperature retarded, and in some instances entirely prevented germination. No destructive fungous diseases or insects.

(2) S. T. PRIEST. *San Antonio, Bexar county* (S. Tex.).

Planted on sandy soil with good drainage. Previous crop cotton, yielding about 600 pounds cotton per acre. Planted March 5, germinated March 8; first

ALFALFA:

blooms May 13, last blooms September 13; good yield, quality, and value. Season good; rainfall rather above normal. Planted in drills two feet apart. A cutting made June 8 measured two feet and five inches high. After first cutting, made another—cutting some and leaving some in the field, which died.

(21) G. W. L. SPEARS. *Alto, Cherokee county* (E. Tex.).

Planted on new, rich, clay sandy land in a good state of cultivation, which was not planted last year. It is a light sandy soil with a yellow subsoil, underlaid with stiff clay twenty-four inches below surface. Planted March 7, germinated March 12. Grew about twenty-six inches high, of good quality. The stock ate it and seemed to relish it, and I think it will do well in checks where the land is very rich and underlaid with clay. The season was more favorable than usual, crops of all kinds doing well in this community so far as rain was concerned.

(22) JNO. W. KIRBY. *Buttfield, Jefferson county* (S. E. Tex.).

Planted March 15, germinated March 22. Bloomed about August 15. It grew from one to two feet high.

(23) A. M. HILL. *Hill, Bastrop county* (C. Tex.).

Planted on sandy soil, well pulverized before planting. Last year's crop, sorghum. Planted April 13, germinated April 23. Gathered seed middle of September. Did not cut or graze; the chickens have kept it well nipped. It is now making some growth. Season better than usual; more rainfall than usual.

2. JAPAN CLOVER.

(*Lespedeza striata.*)

This is a summer growing plant that thrives on most of the light soils found between the Trinity river and the Carolinas, throughout the Gulf States. Whether or not it can be successfully cultivated for practical purposes as far west in Texas as San Antonio, Waco, or Dallas is unknown. Thus far, we have not learned that the plant has been found west of the Brazos river at any point. It is strictly a Southern forage crop and will not thrive north of the latitude of Kentucky.

Seeds have been distributed all over the South from an original shipment that was received at Charleston, S. C., some years ago. Birds, winds, and all classes of live stock have been instrumental in scattering the seed westward.

When this plant first makes its appearance in a community, it is looked upon as a small weed and causes some discussion on account of its salivating effect upon horses. After a year or two, this tendency to salivate disappears and the new clover is recognized as a valuable forage crop to the community. In other instances, progressive stockmen buy the seeds and plant them in the community, where seeds have not been distributed by natural means, and these, in turn, are disseminated throughout the soils to which the plant is suited by the agencies mentioned.

FIG. 6. JAPAN CLOVER OR HESPEDEZA.

Seed should be sown in late spring—either upon well prepared land or the moist protected soils of partial woodland. Only unhulled seed are now upon the market—the hull enclosing the seed proper, not having been removed. Usually, a peck to one-half bushel of seed per acre is

JAPAN CLOVER:

planted in April or May, and often in March. The plant grows slowly at first, but with a fair amount of rainfall it will establish itself and will remain green through severe drouths until frost.

The tiny violet bloom that occurs during July or August is often overlooked, but the plant seeds the land abundantly and the crop of clover will repeat itself annually, if soil and seasons are favorable.

In many portions of the older States, where the crop has been grown and cared for, Lespedeza, or Japan clover, hay is highly prized for all classes of stock, and its reclaiming influence upon worn out soils is highly appreciated.

[The number appearing before each of the reports refers to the map number, page 48.]

(28) JNO. W. KIRBY. *Buttfield, Jefferson county* (S. E. Tex.).

Japan clover planted May 13, germinated May 24. Matured about October 25. It was planted in drills about twenty inches apart, and at the present time covers the ground completely. It is about four inches deep. Cannot say about quantity, quality and value. The season, as compared with normal, was wet and hot. If it is cut off stock will eat it; would make a good pasture. My opinion is that it would be difficult to mow. It may be because the clover is too thick on the ground. *Some of the plants gathered have a head three feet in diameter.*

(29) J. D. MILLER. *Brookshire, Waller county* (S. E. Tex.).

The condition of soil was good; drainage fair; well fertilized at time of planting. Planted April 1, germinated April 11. So far have noticed no blooms, and, though plants have made good growth, no satisfactory yield, though the plants are still growing. Season, compared with normal, was unfavorable, and the rainfall very unsatisfactory. This plant is unlike other clovers, it has not seeded or died down, but has grown slowly and seems to withstand the heat and drouth, and since our late rains seems to have taken a new growth. It is a beautiful plant, of a low, sprouting habit. As to the value of it, I am not yet ready to say, but in the spring I can tell you more about it.

(30) M. M. GRANTHAM. *Dublin, Erath county* (N. Tex.).

Condition of soil good; physical characteristics good; previous crop, sorghum; fertility good. Planted February 28, germinated March 1. Japan clover has not so far matured blooms. First and last, it has been very, very poor, leaving a few scattered stalks growing on soil in the spring. Can not yet tell as to quantity and quality.

(31) W. J. RODGERS. *Powers, Polk county* (E. Tex.).

The soil is what we call a wet crawfish pine land. It was used as a horse lot, and planted in the fall of '97 in turnips. At time of planting clover it was in a good state of cultivation. Planted April 10, germinated April 17, and began blooming September 15, and continued to bloom until frost. Has made abundant yield, growing from twelve to twenty inches high. I believe it to be valuable for pasturage; horses and cattle devour it greedily. The rainfall the past season was far above normal. I think it grows much ranker during a wet season. The plants were damaged considerably by insects just as it was coming out of the ground. Since planting I have noticed clover growing well all over this section of the country. I did not know what it was or how it originated. It flourishes anywhere it is not kept grazed down.

(32) J. JEANNET. *Sowers, Dallas county* (N. E. Tex.).

The soil was in good shape, and a crop of rye was raised on it during the previous year. This is a good sandy postoak loam. I planted the seed April 23, and in eighteen days it was all up. There was a lot of moisture in the ground, and the plants made a fine growth. Along in August I was looking for

JAPAN CLOVER:

blooms, when I noticed a few young sprouts. The clover was fifteen inches high. I thought it unable to make a second growth. Japan clover is by far the best clover I have tried.

(33) THOMAS GAULT. *Genoa, Harris county* (S. E. Tex.).

Japan clover planted on new land previously cropped with sorghum. The land is a good, heavy yellow clay, rather sticky. Planted March 15, and germinated in about twenty days. First blooms appeared about the middle of September, last blooms about October 20. The yield was not enough to cut. The weather was very dry. Some few bunches have died during last twenty days.

(34) G. W. NELSON. *Prairy Dell, Bell county* (C. Tex.).

The condition of soil at time of planting was good; drainage was all that could be desired; previous crop was cotton. Soil good black prairie; planted about the last of March; germinated somewhere in the neighborhood of two weeks later. Season as compared with normal was perhaps a little cold. Only a small per cent. of the seeds germinated, and their growth was poor, indeed, not attaining more than one inch during the entire season, and leaves were minute and yellow. After having had fourteen years' experience in Mississippi, I feel justified in saying it is not adapted to our clay lands here. All the weeds and grass were killed, and the crop kept clean.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Planted on black land; land plowed, harrowed and well prepared. Planted April 7, germinated April 17. Season was hot and dry. Japan clover made a good growth here, and is still growing and green, but has not bloomed yet.

(35) J. L. PITTS. *Pasadina, Harris county* (S. E. Tex.).

Soil was in fair condition at time of planting. Black waxy, with small trace of sand. Previous crop sorghum, and will make about one bale of cotton per acre. Planted March 18, germinated March 30. First blooms September 10, and matured seed about October 15. This clover has covered the ground solid, about six inches deep, and has held a fine green color. The sun did not seem to affect it. The spring was wet and cold, about a month late. May was very dry; also July and August.

(36) A. I. SHULZ. *Iowa Park, Wichita county* (N. Tex.).

Japan clover was planted March 4, germinated March 10. Six plants did not die when damaged by the freeze of March 23. They grew fifteen inches high, and look very fine, but have not bloomed yet.

3. MELILOTUS OR BOKHARA CLOVER.

(*Melilotus alba.*)

In many localities throughout Ohio, Kentucky, Illinois, and Iowa, this crop is looked upon as a mere weed growing by the road sides and upon the railroad rights of way, without being disturbed by any kinds of stock. In certain portions of the Southern States, especially in the black-land prairie regions of Alabama and Mississippi, where the lime rock now and then crops out from under the worn cotton land, Melilotus is highly prized as a forage crop and its growth has been largely extended within the past ten or fifteen years. In the Gulf States it has shown a great value as a forage plant. Stock soon become accustomed to it under these conditions and eat it freely, but when it is first introduced into a community or on a farm its peculiar odor will for a time prevent stock from tasting it.

The crop grows two years from a single seeding and will thrive so vigorously during the second year of its growth, if planted upon land rich in lime, that it astonishes the land owner who is accustomed to believe that such land is too poor to grow even weeds. If grown continuously upon such worn lime soils it largely restores them to their original state of fertility.

The crop should be grazed only lightly during the first year of its growth, but after it begins to put out its second season's foliage it may be grazed quite heavily without damage and will mature seed enough to keep the plant firmly established. For hay making purposes it is rather coarse or weedy, though stock, once accustomed to it, are fond of it and greedily eat the coarser parts. The leaves tend to shatter while being cured into hay, but this can be avoided by careful handling.

The seed are ordinarily sown in January or February at the rate of a peck or half bushel per acre and are thoroughly harrowed in. The young plant should be protected from grazing for several weeks until the root system has been sufficiently established to prevent stock from pulling the young plants out of the ground. The reports of its successful growth in Texas cover a wide range of territory and the trials herein reported will doubtless be read with interest.

[The number appearing before each of the reports refers to the map number, page 48.]

(27) Z. B. VANCE. *Waco, McLennan county* (C. Tex.).

Fertile sand was used for part of the seed and black land for the other part. The seed planted in sand did fine, and made four to six inches growth by June, standing the drouth very well. That planted on black land germinated, but died early, before the drouth set in (part of it came later within the week). Planted in March; it grew splendidly, branched, and where not planted too thick, made bushy plants. I kept all growth of weeds and grass down to head it, as I wished to see the blooms, and the yield in a row was fine, but it has not bloomed yet. It was killed down by the frost, but roots seem alive yet, and I should judge it would be valuable. I have a few seeds saved to plant this fall.

MELILOTUS OR BOKHARA CLOVER:

(2) BENJAMIN ANDREWS. *San Antonio, Bexar county* (S. Tex.).

Sandy loam, with porous subsoil; ten years in cultivation; last five years in garden truck; last previous crop Irish potatoes; land manured last five years with eight two-horse loads of stable manure, and plowed in with disc plow and followed by ten tooth harrow; harrowed twice, rolled down; soil very moist. Planted August 20, and germinated August 30. Bokhara clover made growth of eight inches, but was killed by frost on February 12.

(37) JOHN CRAWFORD. *Cameron, Milam county* (C. Tex.).

This grew splendidly on Little River bottom land.

(30) M. M. GRANTHAM. *Dublin, Erath county* (N. Tex.).

Soil was in good condition at time of planting; drainage good and previously cropped with sorghum. Planted February 28, germinated March 7. Grew from three to five and one-half feet high, but did not bloom; made good yield of very poor quality and large quantity; value very poor. The growth of this plant was very fast. Roots very large and deep in the ground, and could not be pulled up. Stock of no kind will eat it; it is bitter and has a pungent smell. It stood the drouth very well. I cut it October 15, and it is late putting out new growth.

(2) R. E. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Soil was finely pulverized and in good season. Black mellow soil, rich in vegetable manure; well drained, and previously cropped in sorghum. Planted April 24, and germinated April 28. Some of it came, but did not do any good, as it was too dry. The yield was very small, and of poor quality. Stock would not eat it green or dry, and so far it has not bloomed. I do not think Bokhara clover will stand this country, as well as alfalfa.

(38) C. W. BAKER. *Red Hill, Cass county* (N. E. Tex.).

Seed planted on deep sandy soil, broken broadcast, and drainage was good. The fertility was fine. Planted March 21, germinated April 1; first blooms June 1, last blooms September 28; very few blooms. Matured about October 10; yield and quality was good; quantity estimated at two tons per acre. The season was good and rainfall exceedingly heavy. I consider it a very fine variety.

(39) W. H. BOWLBY. *Kemp, Kaufman county* (N. E. Tex.).

The land, previous to planting Bokhara clover, was used as a corn patch, making at the rate of sixty bushels per acre. Land is clay and sand mixed, commonly called made dirt; land was broke and re-broke; drainage good; land is sand with gravel mixed. The clover being put on hillside is cause of some clay being mixed and land where clover is above the average in fertility. Planted March 20, germinated April 8. It is still growing, but has never bloomed. The roots below the earth one and one-half inches is much larger than stem above ground, penetrating to a considerable depth (sixteen inches to where it is broken off in the specimen sent). Top of root is one and one-half inches in diameter; stock on top of ground one-half inch. My plot of land being so small have no way to tell the yield per acre, but would guess about four or five tons, as it is of heavy growth—some of it stands fully four feet eight inches, of a woody stock and numerous and heavy branches. Leaves are not numerous, causing the plant to look more like a weed than clover. My stock does not seem to like it, but think if it will stand the winter stock will eat it then. There is a new growth of one and one-half inches starting on stem around root. First of season was very wet, continuing until summer, when it turned dry—so dry that cotton shedded everything but the bolls. This year has been a remarkable season for yields in all field crops—truck crops neglected for other crops; fall very favorable for growth and gathering of crops. I cannot recommend Bokhara clover as a grazing crop, and it will have to be sown very thick to make good hay on account of the tough woody nature of the stem, although stock may eat it after they get used to it. I do not think any ordinary drouth will affect it any, at least it has been perfectly green all summer, and is still a bright green, and seems to be growing. It is putting up new green shoots at crown of roots. If

MELILOTUS OR BOKHARA CLOVER:

it has the proper properties it would make a fair soiling crop, if a plow could cut the root. It is simply immense, although a root tested and measured this morning seems tender, and to cut like a turnip or beet.

(33) THOMAS GAULT. *Genoa, Harris county* (S. E. Tex.).

Bokhara clover was planted on new land of a heavy black clay texture, inclined to be a little sticky. Previous crop sweet potatoes. Planted March 16, germinated in fifteen days after sowing seed. Matured about the 1st of September, and I noticed a few blooms last week. Yield was not enough to cut, the weather has been so very dry here this season. The early part of the season was good, but the latter part drouthy. We had no rain since July 5 to wet the ground (ninety days), and every bunch of this clover that came up has lived through this dry season and looks very well now. Some of it is about twenty inches high now, and perfectly green. I cultivated it twice with plow and hoe. I set in drills twenty inches apart, and the Bokhara clover looks so very well that I am in hopes it will make a success here. The land in which I sowed this clover was in good condition when sowed, but a rain fell just after sowing and flooded the ground for over two days, which injured them some. Some of the seeds came up for the reason of the heavy rain. The stalks look something like alfalfa.

(40) J. H. BURKETT. *Curtiss, Eastland county* (N. Tex.).

Bokhara clover planted March 15, germinated March 26. It has failed to show any inclination to bloom, and not more than one per cent. of it withstood the frost on March 23, and high winds of March 27 and 28. The yield seems to be good, but of a rather coarse, woody nature. There was not sufficient amount to give any estimate of quantity or value. I think, however, that it is very promising, and would like to continue the experiments. What few plants there were left neither cold nor wet nor dry weather seemed to have any effect on them or their growth. Alfalfa grows much faster, but is very easily affected by dry weather, especially in the latter part of the growing season, and alfalfa came up to good stand.

(9) J. C. FORD. *Hollis, Madison county* (E. Tex.).

Soil rather sandy, mixed with clay; good drainage and planted in sweet potatoes during the past season. Quite rich, though not fertilized during past six or eight years. Planted April 5, germinated April 11. Clover has not so far bloomed, but looks quite vigorous, and is still green and growing. Seems to me to be an evergreen. The season was extraordinarily fine, and rain fell just when needed. It is my opinion that this variety of clover is too woody and tough to be of practical utility. The stalks are three and one-half to four feet high. I went out this morning and gave some of it to my horses and mules, but they would not touch it; I also tendered some to my Jersey cows. They nibbled it a little, but would not eat it to do any good.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Bokhara clover planted on black sandy land. Land plowed deep and well prepared. In favorable years this land will produce thirty bushels corn per acre. Planted April 7, germinated April 14. A few seeds came up after rain on 15th of May, and grew to height of eighteen inches, but died during the latter part of September.

(41) J. B. TANNER. *Hookerville, Burleson county* (C. Tex.).

Land was clean, mellow and well pulverized to a depth of six inches; black sandy loam prairie soil foundation. Top soil was a collection of soil from lots and cow pens, which makes it very prolific. It has a natural slope and has been in cultivation three years. First year it was cropped with oats, second year cotton, third year corn. Planted March 20. This clover soon attained a height of about twelve inches, but only one stalk bloomed and did not mature any seed. Planted in drills and plowed out with sweep. Season was noted for excessive rainfall during March, April, May and June. The clover seemed to do better in a maximum temperature than in a minimum. I have noticed that cotton died on this soil the second year of cultivation. I have sold the land back of mine, which has been in cultivation ten years. I have noticed that peas, tobacco and potatoes died on this soil. I think it was on account of rainfall or subsoil that the Bokhara clover was a failure.

4. CRIMSON CLOVER OR CRIMSON TREFOIL.

(*Trifolium incarnatum.*)

This plant has been used for many years in portions of Europe as a "catch crop" and for green manure and has been successfully introduced into the Southern portion of the United States, from New Jersey southward along the Atlantic coast. It is an annual, with showy, crimson blooms, that appear, in this latitude, about the first of April. It is a vigorous, fall and winter growing plant on *light soils that have a moderate amount of rainfall* during its growing period.

Planted in the late summer season or early fall, upon a firm seed bed, at the rate of ten pounds or fifteen pounds of seed per acre, will insure a good crop in those portions of the State where this clover will thrive. It is also known as Crimson trefoil, Italian scarlet, and as German clover, because of its extensive use in these countries.

[The number appearing before each report refers to the map number, page 48.]

(24) HAL McFARLAND. *Tyler, Smith county* (N. E. Tex.).

Crimson trefoil was planted in fresh soil, well broken and harrowed and in fine condition for a crop; sandy loam with clay subsoil; no lime; rather disposed to be dry and well drained. Planted September 1, germinated September 15. The season and rainfall were about normal. At this writing, November 1, the plants are up and growing nicely. The frost of October 20 and some showers of rain seemed to be advantageous to this crop.

(25) L. C. WARLICK. *Childress, Childress county* (N. W. Tex.).

Crimson trefoil came to a poor stand, and died soon afterward. Cannot say whether it was due to insects or dry weather, but think it was insects.

(27) Z. B. VANCE. *Waco, McLennan county* (C. Tex.).

Crimson trefoil was planted on a fertile sandy soil previously used as a garden, and had been fertilized to a large extent. Planted April 1, germinated April 7; poor stand; only a few stalks survived the first drouth, and all died later on.

(2) BENJAMIN ANDREWS. *San Antonio, Bexar county* (S. Tex.).

Crimson trefoil planted on a sandy loam soil with porous subsoil. Planted August 20, germinated August 28. The entire stand was killed by the severe frost of February 12, after making about six inches growth.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

The land was an open "sand ruff." Manured a little when broken. Planted May 2, germinated May 9. It came up nicely, but did not grow. It finally all died out without ever taking any start to grow. I think perhaps the soil was too dry for it to get a start.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Crimson trefoil planted May 7, came up May 14, and grew nicely until last of May, when it all died out from drouth.

(7) MRS. CATHARINE HORD. *Dallas, Dallas county* (N. E. Tex.).

Soil was in good condition; well plowed and sowed in oats, which were put in with disc harrow. The soil is thin with lime rock subsoil. Clover planted during first part of April, germinated some two weeks later. It came up nicely,

CRIMSON CLOVER OR CRIMSON TREFOIL:

and grew a few weeks rather spindling, and died during month of August. This was the second time I had tried this clover, each time meeting with the same results.

(8) R. R. CROCKETT. *Junction City, Kendall county* (C. Tex.).

I think condition in which Crimson trefoil was planted was not good, and none of the seed germinated.

5. WHITE CLOVER.

(*Trifolium repens.*)

This modest plant has been quite well scattered over the pasture lands of North Texas and is noticed growing profusely in the spring season in the yards of the towns and cities situated in the eastern and southeastern portion of the State.

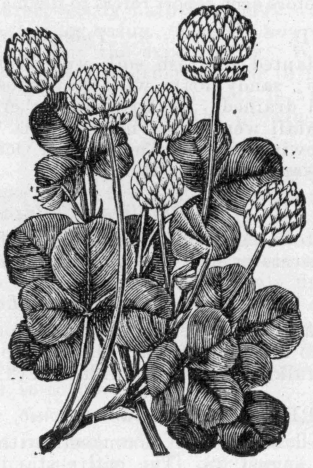

FIG. 7. LEAF AND BLOOM OF WHITE CLOVER.

It is excellent for pasture purposes because of its persistent habits, though some objection has been raised to it on account of its salivating effect upon horses grazing upon land containing this clover. However, some of the best pasture lands of the United States have this plant as a component part of the pasturage, where it justifies its existence every year by filling in the waste space and providing a nutritious bit of pasturage that is especially appreciated by milk cattle, sheep, and hogs. Its period of growth during early spring does not require it to resist drouth to any great extent in many portions of the State where spring rainfall is abundant, hence it can be used quite freely in many localities in the northeastern quarter of Texas.

WHITE CLOVER:

(39) W. H. BOWLBY. *Kemp, Kaufman county* (N. E. Tex.).

Land previously worked in corn, and was plowed and re-plowed before planting and raked off with land rake before planting. Soil in best possible condition. Soil was a clay loam with a mixture of clay and sand—sand predominating; makes fine crop of cotton; drainage good. Planted March 21, germinated April 6. Clover came to fine stand, and I was very proud of it. When about four or five inches high something began to eat off (possibly rabbits or chickens) the plants, and by the 10th of May was entirely destroyed. No insects or fungous diseases were noticed, although, as stated above, the White clover was destroyed by some cause, supposed by me to be rabbits or chickens, and has not shown up any more. I like the appearance of White clover much better than Bokhara. I notice a growth on my farm that looks like the White clover, but it may be Japan clover, as it has yellow blooms. I see it on stubble land and on turn rows, but do not know anything of the value thereof. It does not get over six inches high, and is of a sprouting nature.

(42) GEO. W. MURRAY. *Beaukiss, Williamson county* (C. Tex.).

White Dutch clover was planted on a good sandy soil April 1, germinated April 10 to a good stand, but only lived a few weeks.

(37) JOHN CRAWFORD. *Cameron, Milam county* (C. Tex.).

White Dutch clover was planted about the middle of March, but it did not prove of value, as the season was too dry.

(32) J. JEANNET. *Sowers, Dallas county* (N. E. Tex.).

The land is gray sandy postoak land. Was in good shape at time of planting. There was plenty of moisture in the ground and the grass was up in eighteen days, and grew nicely for two months. In July I noticed little blooms, but it never seeded. The plants were badly burned by the first of August. I believe this country is too hot for this clover.

6. VELVET BEAN.

(*Doliochos multiflorus.*)

This plant was used in Florida as a porch climber for a number of years before its value as a forage plant was discovered. Seedmen have advertised it very largely within the past five years and we have received a number of favorable reports concerning its growth in different parts of the State where the conditions have been favorable. We, however, consider it an experimental crop—particularly so, since its late maturing habits have thus far prevented it from ripening seed even when planted as early as March in this latitude. The seed are very large and one to two bushels are necessary to plant an acre broadcast. For drilling one-half bushel per acre is sufficient. The seed are expensive because a very small portion of Texas and Florida have thus far supplied the seed stores.

The plant has a wonderful tendency to make vine, but, in many cases, it is reported as having resisted drouth remarkably well. It promises a success in many counties of the State and is, therefore, of much interest to all who desire a vigorous forage crop or a heavy leguminous plant to be turned under for manurial purposes. The reputation of the Velvet bean as a "green manure" upon the orange groves of Florida has given it first place as a crop of this character throughout the South.

VELVET BEAN:

(33) THOMAS GAULT. *Genoa, Harris county* (S. E. Tex.).

I received from you one dozen Velvet beans and planted them during the last week in March. They came up in two weeks. They bloomed about the middle of July. Weather was very warm. They set well with beans, but failed to reach maturity before frost, which killed the vines. Some of them grew twenty feet long. The ground seems to be covered at least two feet deep with leaves.

(40) J. H. BURKETT. *Curtis, Eastland county* (N. Tex.).

Velvet beans were planted May 6, and germinated May 18. They grew very well at first; the drouth seemed to have no effect on them. They made a dense mat of vines, some of the runners being fifteen feet long. First blooms September 10, and failed to mature seed; the severe frost of October 17, which was nearly one month earlier than usual, injured them very much. They are valuable as a fertilizer.

7. GIANT BEGGAR WEED.

(*Desmodium tortuosum.*)

The reputation of this crop as a forage plant is largely based upon the use made of it in Alabama, Mississippi, and Florida, where it forms a natural growth upon the low sandy soils of that region. It has a rank, weed-like growth that prevents stock from grazing it so close as to kill it and, therefore, under the conditions described, it reproduces itself annually and supplies a large volume of feed to the range stock that are often reported as doing well during the entire winter, if allowed to graze upon this plant. See fig. 4, opposite page 50.

The commercial seed are not very sure to reproduce themselves. In many cases they fail to germinate. Whether this is due to over age of the seed or immaturity, we are unable to judge.

As a leguminous crop, it is not largely used by those stockmen and farmers who are familiar with, and can succeed in growing, alfalfa or melilotus, but upon some very poor sandy soils it is probably the best forage crop now available. Its field of successful growth seems to be the region south of the Ohio river.

[The number appearing before each report refers to the map number, page 48.]

(43) F. W. BETTE. *Boneta, Cass county* (N. E. Tex.).

Beggar weed was sown in a garden spot moderately rich of a wet sandy loam texture, well pulverized, previously grown in tomatoes, cabbage, etc. Planted April 12, germinated April 24. I do not remember date of first blooming, but gathered ripe seed September 10. It is still blooming, and will continue to bloom until frost, as I cut some of it back. It is making an abundant yield, spreading and growing, some of it as high as eight feet. The season was about normal from planting time to June 1. The season was very dry through the month above mentioned. From that time on, normal. Did not notice effect of minimum and maximum temperature, although this plant failed to do any good until the hot weather set in. October 1 the worms had made an appearance in this plant, eating the seed but not bothering the leaves, and from their appearance at present they will develop into a large worm resembling cotton boll worms. Some of them are nearly red, others are nearly black. We know nothing of this plant here, but I think May 1 about the time to sow in this section owing to the fact that it did not grow early. It came up promptly, but did not grow for some time.

GIANT BEGGAR WEED:

(2) R. E. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Beggar weed was planted in a finely pulverized mesquite soil well drained and previously cropped with sorghum, and well fertilized with vegetable matter. Planted April 4, germinated April 8. Cut about July 30. The plant was about three feet high, and did not bloom. Did not grow high enough to cut any more, and seemed to stand the drouth very well. Made a very good yield, but very coarse, woody stalk, and of very poor value. Cannot get cattle or horses to eat it green or dry. I think the Beggar weed will resist drouth, but do not think it of any value as fodder, as I could not get anything to eat it. The roots are still green, and suppose it will come out again this spring.

(38) C. W. BAKER. *Red Hills, Cass county* (N. E. Tex.).

Land was broken broadcast, bedded and harrowed. Deep sandy soil; drainage good; fertility good. Planted March 21, germinated April 15. Matured last of September. Commenced blooming the 15th of July, and bloomed until latter part of August. The yield was good in quality; quantity, about three tons per acre. The season was good; rainfall extraordinarily heavy. The excessive rains caused it to shoot, but did not seem to check its growth. Am well pleased with it, and think it a very nice variety, and makes a fine fertilizer. The height is about eight feet.

(44) AUGUST LETZ. *Paige, Bastrop county* (C. Tex.).

Beggar weed was planted on a sandy loam soil, previously cropped with cotton of medium fertility. Planted April 16, and germinated about a week later. First blooms July 1, and continued blooming a long time. Yield was fairly good, but it is good for nothing after getting old. On the whole, it does not compare favorably with sorghum. It grows too slow at the start—the crab grass starts ahead, and keeps ahead. The cold weather keeps it back, but dry weather has no effect on its growth.

(4) ROBT. E. WOOD. *Lexington, Lee county* (C. Tex.).

Beggar weed was planted on a dry loam soil, fairly fertile; previously cropped with sorghum. Planted March 10, germinated fourteen days later. The yield was not good; the height was about five and one-half feet. I do not believe this plant is suitable for prairie land.

(45) W. C. DAVIS. *Louise, Falls county* (C. Tex.).

Soil was wet at time of planting; a black waxy, fairly fertile and previously cropped with sorghum. Planted April 29, germinated May 5. It grew very tall, and I think it will do well here. The early season was very wet, but the late season was very dry.

(24) HAL McFARLAND. *Tyler, Smith county* (N. E. Tex.).

I made two plantings of the Beggar weed—one in April and one in May; good soil, well worked, but both failed to germinate; cause unknown. I do not think it will succeed here.

(5) O. C. PHILLIPS. *Terrell, Kaufman county* (N. E. Tex.).

I planted the Beggar weed, but covered the seeds so deep that they did not come up.

(46) J. N. MILLER. *Cade, Navarro county* (N. E. Tex.).

Planted April 14, germinated April 26; matured well and seeded well. I did not gather seeds. Had only a few stalks, and did not get a good stand on account of heavy rains near germination. Beggar weed grows considerably faster during warm weather. It stands drouth well after getting well rooted. Beggar weed is O. K. if sown thick broadcast, but if too thin and in drill the plant is woody and tough. Horses and cattle are very fond of it. It stands drouth well.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Planted on black sandy soil. Land plowed deep and well prepared. Planted

GIANT BEGGAR WEED:

April 7, germinated May 15. Bloomed 1st of September. Yielded about half pint of good seed; grew five feet high. On the 20th of August plants came up. The season was hot and dry.

(47) I. D. WILSON. *Sunnyside, Waller county* (S. E. Tex.).

Seed planted July 10 in black sandy land, rich but flat. It grew from five to seven feet high. The yield per acre would be from five to six tons. It is tender and fine forage for stock. Plowed once; hoed it three times. It is a very healthy plant. It is the best on earth for feeding horses and cattle. Quantity from five to six tons per acre; the value I do not know.

(36) A. I. SHULZ. *Iowa Park, Wichita county* (N. Tex.).

Giant beggar weed was planted March 4, but got killed by frost. Planted again April 16 in the garden where I am subirrigating. Planted one row of this seed so that one end of it came close to the tiling. It grew five feet and six inches at the end near the tiling, and two feet at the other. Have not seen a bloom so far. I do not know the value of it.

(48) W. H. LACKING. *San Gabriel, Milam county* (C. Tex.).

The soil was finely pulverized and mellow of a black loamy character; drainage nearly perfect; previous crop cotton. Planted March 10, germinated March 17, and matured about July 1. The yield was very small, quality not good, quantity small, value poor. I do not think this forage plant will do on my soil, or perhaps it may be due to the season.

(49) J. W. TULER. *Hunt, Hunt county* (N. E. Tex.).

Giant beggar weed made a yield of good quality on my farm.

(19) S. F. BROWN. *Runge, Karnes county* (S. Tex.).

Giant Beggar weed planted March 10, germinated March 16. The cold weather of March 82 killed all but a few plants. None have bloomed so far, or seeded. Stock all afraid to eat it.

(28) JNO. W. KIRBY. *Buttfield, Jefferson county* (S. E. Tex.).

My land is what is commonly called in this country clay prairie, very level with poor natural drainage, and one year previous to planting it, had been plowed into beds thirty feet wide and fixed so that the surface water drained tolerably well and set in fruit trees. Then early last spring I plowed the land again. Very wet at time of planting. It had become so hard that I could not pulverize it. I took a hoe and dug out small patches in this hard ground and sowed the Beggar weed in that and covered them with small clods. Planted May 16, germinated May 2. The pigs kept it eaten off close to the ground until near the end of July, and it is now October 23, and the plants are about two feet high and has headed and ripened seed. The season was very hot and wet; rainfall was above normal. I believe the Beggar weed is a valuable forage plant. My pigs ate it more persistently than they did alfalfa that grew along by the side of it.

(50) E. S. SCHUMM. *Temple, Bell county* (C. Tex.).

The land that Beggar weed was grown on was in very good condition at planting time. Planted four days after heavy rain very shallow. Germinated to a poor stand, and so far has not bloomed. The stems are very sour. No stock will eat it. I do not believe it will do in this part of the country, as it is too dry.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

Deep "sand ruff" land, broken early. Such land needs no breaking; in fact, it does better without being broken, as it makes it blow worse. Vegetation always starts off very slow in the spring, but it is better later on. Beggar weed starts off slow and did better later on. Planted May 2, germinated May 9. First seed noticed July 15. The thickest bunches were cut July 15. It made

GIANT BEGGAR WEED:

fine, sweet hay. It spreads largely from the roots, and will do to cut every six weeks, and it made at the rate of about one ton per acre at each cutting, and I believe it would make three or four cuttings a year. The stalks I left in the field grew to a height of six or seven feet, and continued to grow steady until frost.

(51) P. M. JOHNSON. *Richland Springs, San Saba county* (C. Tex.).

Land was in good working order at time of planting; black sandy soil; land is fertile, well drained and previously used as a garden and orchard. Planted April 15, germinated April 24; only six or eight plants came and attained a height of about five feet. Insects destroyed the leaves, nothing but the naked stems left at this writing. Early part of the summer very dry, plenty of rain during June and July, very little rain during August and September and October.

(52) W. M. KEHL. *Gonzales, Gonzales county* (S. Tex.).

Planted March 8, germinated March 16. Giant Beggar weed stood the frost of March 22 and 23 all right; cultivated April 12 and 30 and on May 11. On May 11 it was four feet high, but the plants never bloomed until June 11. Seed matured June 25. The yield, I believe, was good, yet the blooms began to fall off right after blooming; it matured splendid seed. I cut it first of August, but all my stock refuse to eat it.

8. COW OR FIELD PEAS.

(*Vigna catjang.*)

Some thirty varieties of this crop have been developed by selection, differing from each other in the habits of the vine, the color of the seed, and the tendency to bear fruit. Some of the better known varieties are the Whippoorwill (or Speckled), which has moderate vine growth, matures fairly quickly, and produces a good crop of seed. The Wonderful (or Unknown) is a late maturing kind, develops rank vines and, under very moist conditions in this State, fails to mature seed before frost. The Everlasting, having a red seed, and vigorous vines, produces a rather small amount of seed per acre, but the plant is self-seeding under many conditions, hence its name. The Clay is a favorite variety throughout Louisiana and the soils near the Gulf. The Black Eye is a fairly early maturing variety and yields a large crop of vines and a medium crop of seed. Its white beans are largely used for the table. Used as a catch crop, to follow oats, or planted in corn fields during the lay-by season, the pea has been properly called the "Red Clover of the South," on account of its great value as a forage plant and its enriching effect upon soil.

Whether or not the crop is a success in Texas depends upon the rainfall of the particular region and the varieties selected. In many instances, our farmers and stockmen have abandoned the pea for sorghum because of the hardiness of the latter, but wherever the rainfall will permit the vine making varieties to be successfully grown, the crop should continue to be largely grown in Texas.

Ordinarily, in broadcasting the pea, one and one-half or two bushels of seed per acre are used. When cultivated in drills, one-half of that quantity of seed is sufficient. During seasons when the price of seed is high, the tendency to plant in drills is noticeable, but if the seed are raised upon the farm where sown, they are commonly planted broadcast except, possibly, for a small area planted in drills for seed purposes.

[The number appearing before each report refers to the map number, page 48.]

(a)—WHIPPOORWILL PEAS.

(2) BENJAMIN ANDREWS. *San Antonio, Bexar county* (S. Tex.).

Soil heavy clay, well drained, three years from mesquite sod; first cultivation, winter oats; second crop Wonderful Cow peas; third, rye. Land prepared by plowing with disk plow and harrowed twice. The Wonderful Cow peas were fertilized with ten bushels of wood ashes per acre; land moist and friable. Planted March 20, 1898; germinated April 3; first blooms May 16; last blooms May 29; first peas ripened June 7 and all ripe by July 2. Second growth, first bloom September 11; last blooms October 25. First Whippoorwill peas ripened September 22; second growth vines killed by frost October 25 and still had peas on vine. Season below normal during the first part and above normal during latter part until October 26; rainfall below normal. During the cold period growth was very slow, but later in the season very rapid. Vines made good growth and made good forage or fertilizer. Yield about eight and one-half bushels of good, plump peas.

COW OR FIELD PEAS:

(25) L. C. WARLICK. *Childress, Childress county* (N. W. Tex.).

Whippoorwill peas planted on good land previously cropped in cotton. Planted April 9, germinated April 15. Gave very good yield in quality and quantity considering the dry weather. The season was dry and rainfall less than usual. Peas were bothered some with cutworms in early stages.

(83) B. F. PARKER. *Content, Runnels county* (C. Tex.).

Peas planted May 1, and germinated to a stand. Yield one-half bushel from the seed sent. Quality good, value about two and one-half cents per pound. These seed produced extra well.

(84) R. R. CROCKETT. *Junction City, Kimble county* (C. Tex.).

Ground in good condition, rather cold; drainage good; previous crop corn; fertility good; planted April 2 and germinated April 9. The yield was good in quality and quantity. There is no market value here for peas, though the stores generally retail them at twenty pounds for a dollar. Season normal, rainfall slightly below normal. Most of the time the weather was very hot and very dry, but as I irrigated them I do not think they were injured by it. Insects did not bother the peas, though they got their share of everything else.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

Peas were planted in a deep sandy soil, second year's ground in cotton, which was regular West Texas "sand ruff." It absorbs all the water that falls on it. Planted May 2, germinated May 8. First blooms June 25, and continued to make peas until frost. The yield is enormous though I have not gathered them yet, but I am satisfied they will make sixty bushels per acre. Early part of season normal, latter part above normal; rainfall during the early part of the season normal; below normal later; maximum and minimum temperature had no apparent effect.

(85) F. L. THOMAS. *Goree, Knox county* (N. W. Tex.).

Land broken deep and put in good condition for peas. Planted on wheat stubble. Land of a rich sandy character and in a low place with sufficient moisture to germinate the peas readily. Planted April 16, and germinated April 27. First blooms appeared about the 15th of July and bloomed on until the dry weather cut them off. Did not mature well on account of dry weather and insects. Made about ten pounds of well developed peas and put on more, but failed to mature. The season was very dry; rainfall very light. They seemed to grow best in hot weather, but the dry hot winds setting in soon killed them. Some kind of insects killed the last blooms or they would have made double the amount of peas. Peas received good cultivation.

(86) ARTHUR A. BEAVERLY. *Copperas Cove, Coryell county* (C. Tex.).

Peas planted on black waxy soil with good drainage and previously cropped in oats. Planted April 25 and germinated to a good stand. Yield and quality splendid, and produced all that the vines could hold up.

(69) CHARLES HODGE. *Nelsonville, Austin county* (S. E. Tex.).

Peas were planted on a black sandy soil in good condition and previously cropped in Irish potatoes. Planted May 11 and germinated May 18. Matured last of July and continued to bloom until last of June. Made one-half bushel of peas of good quality from the seed sent. Season and rainfall about normal.

(87) GUS LONG. *Eliasville, Young county* (N. Tex.).

Whippoorwill peas were planted April 18 and germinated April 25; good quality and fair quantity; value about two cents per pound.

(71) A. P. WRIGHT. *Mathis, San Patricio county* (S. Tex.).

Peas were planted on a Nueces valley, light loam soil, very porous, and with no different subsoil. It was broken up in the fall and no winter rains on it. Planted March 10, germinated March 17; first blooms appeared May 9, and the vines continued to bloom through the summer, but did not make a pea; grew

COW OR FIELD PEAS:

very rank vines. Season about normal throughout growing season, but no winter rains, consequently, ten days or two weeks drouth made vegetation suffer. While these peas grew well and bloomed well, they made no peas at all. A great many of the blooms shed off and seemed to blast. I attribute it to the dry weather and storm during December.

(15) W. G. NELMS. *Rosebud, Falls county* (C. Tex.).

Peas were planted May 1 on a good gray clay land, with good drainage, and germinated to a good stand. The peas matured in July. Yield was extra good—fifty or sixty bushels per acre. Season about normal; rainfall about normal. The temperature had no perceptible effect upon growth of vines. We are very much pleased with them, and I think with a proper amount of rainfall they would return a cash value equal, if not ahead, of any crop planted.

(42) GEO. W. MURRAY. *Beaukiss, Williamson county* (C. Tex.).

Deep sandy soil, drainage good, in a good state of cultivation, fourteen years in cultivation. Planted April 1, germinated April 5. Matured sixty days after blooming and ripened. Yield, quality and quantity good.

(88) A. A. GIBSON. *Centreville, Trinity county* (E. Tex.).

Land was in good condition, but raw, new ground; but was a rich sandy soil, well drained, but had never been cultivated. Planted April 1, germinated April 10. Bore last peas about July 20. Yield was large and the quality good and was equal in value to any pea crop grown in this country. Rainfall was above normal.

(89) WM. A. LONG. *Davilla, Milam county* (C. Tex.).

Peas planted on a hard sandy land, very flat. From six hills that germinated about ten pounds of very fine large peas were gathered.

(43) F. W. BETTS. *Marietta, Cass county* (N. E. Tex.).

I planted this pea in my corn in April and worked it just as I worked my corn. The yield was good, but no better than other peas. I have saved the seed, however, and will plant again.

(90) D. E. McFADDIN. *La Porte, Harris county* (S. E. Tex.).

Peas were planted on hog wallow land in the edge of timber land, called black waxy, makes good drainage by bedding and ditching. New land—first crop; fertile, but no manure. Planted May 13 and germinated to a stand. Some of the vines had heavy crops and one hundred and twenty days from first blooms they still had green vines and green peas. Yield one gallon; season normal; rainfall just as needed. This report is valuable only to show that these peas do as well as above in this section after being eaten down close to the ground at first blooming time by cattle.

(59) E. R. TAYLOR. *Houston, Harris county* (S. E. Tex.).

Peas planted on a good black loam, previously cropped with potatoes; planted May 1, germinated in three days. Good yield and fine quality.

(2) E. B. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Soil was finely pulverized in good season and rich with vegetable manure. Black mesquite, well drained and previously cropped in sorghum. Planted April 4, germinated April 10. Began blooming in May. Continued to bear peas until last of August, when they all died from the effect of drouth. Yield was good and quality and quantity good. Season far below normal; rainfall far below normal. Whippoorwill peas did much better than Black-eye peas; stood the drouth better, made more vines than Black-eyed peas, and they made more peas by far than the Black-eyed peas and great deal heavier seed.

(91) C. L. RICE. *Floydada, Floyd county* (N. W. Tex.).

Soil in good condition, moist and mellow; drainage good, and previously cropped

COW OR FIELD PEAS:

in peanuts. Planted May 10, germinated May 16. Last blooms about October 10. Yield about one gallon from seed sent. Quality good; value not known. I believe this pea will be of value in this country and that they will yield heavily in good seasons.

(26) H. E. EVERSHED. *Henly, Harris county* (S. E. Tex.).

Land used in this test has been in cultivation for ten years as a garden and has been heavily fertilized. Planted March 9 and germinated March 17. Second planting April 15, germinated April 20. There were only a few seeds left for the second planting—producing only six plants. They began to bloom June 1 and ripen on 8th day of July and continue to bloom and ripen until killed by frost October 20. Three pounds of ripe seed, besides several messes gathered green for eating. They were of good quality. They stood the hot and dry weather well and did not stop blooming and making pods, but just wilted a little in the heat of the day and appeared as fresh as ever in the morning. These are superior to all the large Black-eyed peas—stands drouth and heat better and is a better yielder.

(93) J. W. MANNING. *Alief, Harris county* (S. E. Tex.).

Land was planted in sweet potatoes during 1897—producing a good crop. This is a heavy, black waxy, rich prairie land, flat and imperfectly drained. It was broke flat with turning plow in January, turned and harrowed again in March, bedded in four-foot rows, harrowed and planted June 2. Planted June 2 and germinated only five plants. The Whippoorwill peas were planted at the same time and near some of our Black-eyed peas. They received the same cultivation. The Black-eyed peas came to a good stand and fine growth, but failed to bear. The five plants of the Whippoorwill peas bore until frost—October 27.

(b)—LARGE BLACK-EYE PEAS.

(2) BENJAMIN ANDREWS. *San Antonio, Bexar county* (S. Tex.).

Peas were planted on a heavy clay loam soil, well drained. Three years from mesquite sod. First crop, winter oats, second, Wonderful Cow peas; third crop, rye. Plowed down and land prepared with disc plow and harrowed with straight-tooth harrow. Wonderful Cow peas were fertilized with ten pounds of wood ashes per acre; land moist and friable. Planted April 20, germinated March 31. First blooms May 10, last blooms June 2. Were all ripe by June 10 and vines were dead July 1. Yielded about three and one-quarter bushels per acre of good, plump peas. They are worth in the market here about $3.25 per bushel. The vines were too short to be of much value as forage.

(2) R. E. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Land was finely pulverized and in good season—black mesquite soil, well fertilized with vegetable manure and well drained. Previous crop, sorghum. Planted April 4 and germinated April 10. Began blooming much earlier than the Whippoorwill. Bloomed and bore peas until July 30, when the vines began to die, and all died within ten days; sorry yield and quality, value medium. Whippoorwill did much better in every way in the drouth country. I think Black-eyed peas will do well in this country if planted March 1.

(13) D. A. KNOX. *Columbia, Brazoria county* (S. E. Tex.).

Land was well pulverized and well drained; previous crop cotton, fertility medium, planted May 1, germinated May 9. The yield of this crop was good and the quality fine. I think this is one of the most valuable crops for this climate.

(94) R. M. LESSENER. *Hennesy, Madison county* (E. Tex.).

Peas were planted on a fertile soil mixture of sand and black loam and had been in cultivation three years; first year planted in corn, then two years in vegetables. Drainage sufficient. Planted March 11, germinated April 19, matured July 1. Yielded abundantly, quality fine. The season was too wet at first and then too dry for most vegetation. Rainfall was excessive and the weevil attacked it by April and prevented the crop from maturing.

COW OR FIELD PEAS:

(95) E. R. TAYLOR. *Houston, Harris county* (S. E. Tex.).

Peas were planted on a good black loam soil; planted May 1, and germinated to a good stand. Black-eye peas always make a good crop here—a good yield and good quality, and are very valuable as a food and as a fertilizer.

(96) W. H. McLENDON. *Fate, Rockwall county* (N. E. Tex.).

Land had been bedded in the fall previous to planting, rebedded in February and planted the Whippoorwill peas on April 25; germinated May 1. First blooms June 30, last blooms September 30. On June 11 had one inch rain; 25th, one-half inch rain; July 10, one inch rain. This pea yielded about thirty bushels per acre; quality extra good, value about thirty dollars per acre.

(97) C. VAN NESS. *Jines, Ochiltree county* (N. W. Tex.).

Soil dry and loose, of a dark sandy character, very rich, drainage good and a loose porous subsoil. It had been used as a garden spot. Planted May 10, germinated May 13; first blooms June 10 and continued to bloom until September 10. Matured from July 1 to September 20, when they were killed by frost. The quality was of the best; yielded about 115 pounds per acre; value two and one-half cents per pound, or about $28.75 per acre. Rating our ordinary season at one hundred per cent., the past season would not rate sixty per cent. During May, cold and dry; during July and August, hot and dry. Our rainfall is always light in this country. The rainfall during the past season was only about fifty per cent. of our regular rainfall and about eighty per cent. of the rainfall of the latter part of the season. There was no perceptible effect noted of the maximum and minimum temperature, and they were not troubled with any insects or fungous diseases. The Black-eye pea was the most successful experiment I made this year, as, besides making a good harvest, the vines are valuable as a forage plant.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

The land used had been broken early and compost scattered over the soil, which was a deep sand—two and one-half or three feet to the clay. It was six years grown in cotton. We have never seen it rain enough to make this land boggy. It seems to absorb all the water that falls on it without making it wet. However, corn does not do well on it. Planted May 2, germinated May 8, matured June 1 and yielded at about the rate of twenty-five bushels per acre. The quality was fair and valued about $1.50 per bushel in our market here.

(98) J. W. MURRAY. *Alief, Harris county* (S. E. Tex.).

Soil heavy, black waxy prairie, flat and improperly drained; planted in sweet potatoes last year; plowed with turning plow and harrowed in January; plowed and harrowed again in March; bedded in four-foot rows and harrowed and plowed down. Planted June 2 and germinated June 12; good stand; made very vigorous growth and fine quality, but failed to bloom. It made a second growth; rainfall above normal until the 15th of April, below until 25th of May, above to 20th of July and below to October 27 (frost). Black-eye peas from some unknown cause are, to a large extent, barren in this vicinity, this year making a large growth of vine and as the stems on which the blooms should appear seemed ready to put out blooms they just seemed to blight, while the plants continued a healthy growth.

(26) H. E. EVERSHED. *Henly, Hays county* (E. Tex.).

The first planting of Black-eye peas was killed by frost March 23. Second planting April 15, germinated April 20. There were only a few peas left for this second planting, which produced fifteen plants. They began to bloom about the 15th of May and got ripe about the 1st of July. There was only one bloom on the plants by the first of August. The fifteen pounds produced three pints of peas of fair quality.

(99) S. C. MOORE. *Hulen, Galveston county* (S. E. Tex.).

Common corn and cotton was raised on land used for peas. It was well fertilized. Planted April 1 and germinated April 7. Yielded one peck to each row of 150 yards. Fair quality.

COW OR FIELD PEAS:

(24) H. L. McFARLAND. *Tyler, Smith county* (N. E. Tex.).

Soil in good condition, sandy with clay subsoil. Planted April 1 and July 1. *I made two good crops—planting the first crop the second time.* This is the best pea that we have for this section. The season for 1898 has been good for the pea, numerous crops have been good, the black-eye being the standard. I would like to continue the experiments if I could be of any service to you.

(25) L. C. WARLOCK. *Childress, Childress county* (N. W. Tex.).

Peas planted on good land previously cropped with cotton. Planted April 9, germinated about April 15. This is an early and good pea—*more hardy than the Whippoorwill.*

(56) E. T. HUNTLY. *Vernon, Wilbarger county* (N. Tex.).

Soil in good condition and rather poor, with good drainage. Planted June 1, germinated June 4, matured in from eight to ten weeks. Yield good, quality good, value about two cents per pound. Season below normal, rainfall below normal. Grasshoppers did some damage, and a fly which looks like what is known as the dirt-dobber, only it has yellow wings, did some damage, though I cannot tell just what. Peas do very well in this country. Peas grown in this section for several years become larger and better each year, which seems to us that the climate is well suited to its growth.

(83) B. F. PARKER. *Content, Runnels county* (C. Tex.).

Soil was in good condition, previously cropped with cotton and produced about three-quarters of a bale per acre. Planted May 1, matured about the 1st of August. Yield about one and one-half per cent. and quality fine, value about three cents per pound. Rainfall below normal. The Large Black-eye pea produces abundantly here, but the crop was cut short by drouth. I think said pea will prove a success in this country.

(84) R. R. CROCKETT. *Junction City, Kimble county* (C. Tex.).

As I farm by irrigation, the ground was in good condition, was broke with a two-horse plow, then opened and seed planted in the furrow. Ground was previously cropped in watermelons, soil was rather rich, weather was rather cold when planted. Planted March 25, germinated in ten days. Peas came up and grew well in a few weeks, then vines turned yellow and the crop was a failure. The ground did not suit the peas. I think had snap beans been on the same land they would have made a good crop.

(85) F. L. THOMAS. *Goree, Knox county* (N. W. Tex.).

Land was put in good condition by breaking twice and harrowing. The land is level and a red, rich sandy soil, land moist and well prepared. Planted April 16, germinated April 26. First blooms about the 10th of June and bloomed on until last of August, began to mature the first of July. Made one-half bushel of well-developed peas from the seed sent, sold at the rate of two dollars per bushel. Season dry; also a light rainfall. Peas seemed to flourish in hot weather and are not readily damaged by dry weather. Last blooms destroyed by insects. Black-eye peas do nicely in this country.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Peas were planted April 7 on a black, sandy soil, land was plowed deep and well prepared, germinated April 14 and bloomed 18th of May, died from drouth in June, the season was very hot and dry. One rain May 15.

(100) ARTHUR W. BENNETT. *Corpus Christi, Nueces county* (S. Tex.).

Black-eye peas were planted same day as Whippoorwill peas, and as far as yield, adaptability, etc., is concerned, we can see no difference.

(71) A. P. WRIGHT. *Mathis, San Patricio county* (S. Tex.).

Light loam soil in Nueces valley. No winter rains until late in February and then no heavy or continued rains. Planted March 10, germinated March 17,

COW OR FIELD PEAS:

first blooms appeared May 9. Cannot give the amount of yield, but it was only fairly good on account of the very dry weather one month after beginning to bloom. Season about normal and rainfall about normal during growing season.

(101) J. E. JONES. *Lake Charlotte, Chambers county* (S. E. Tex.).

Black-eye peas were planted on a newly cleared piece of sandy loam which is pretty rich and well drained. Planted April 8, germinated May 18. Yield very fine and abundant; was only worked twice; rainfall during the season was excessive. I consider the pea of great value.

(15) W. G. NELMS. *Rosebud, Falls county* (C. Tex.).

Peas were planted on a gray clay soil, drainage good and previously cropped in cotton. Planted May 1 and germinated to a good stand. Matured during July; yield, quantity and quality good. Season fine and no effects noticed from maximum and minimum temperature. Peas were badly eaten by weevil. They did well here and will be valuable as a fertilizer and food for stock, and are readily sold on the market at remunerative prices.

(42) W. G. MURRAY. *Beaukiss, Williamson county* (C. Tex.).

Soil good sandy, well cultivated. Planted April 1, germinated April 10, matured about sixty days from blooming. Yield, including quantity and quality, good.

(77) G. G. HOOD. *China Springs, McLennan county* (C. Tex.).

Planted April 19, germinated April 22. First blooms appeared May 25, and harvested one quart July 6. This is fine as a table pea. I do not think it equals the Whippoorwill pea in production and resistance to adverse weather conditions. The season was not as warm as usual, with less rainfall, and made slow growth on account of dry and cold spring, some few lice apparently damaging the peas.

(102) D. E. EASON. *Garrett, Ellis county* (N. E. Tex.).

Rich, black, sandy soil, in good condition when planted in peas. Planted April 5; germinated April 12; first blooms June 1; last blooms July 30; yield, quantity and quality good; value fine. This is a good variety.

(7) JAMES J. EASLEY. *Station A, Dallas county* (N. E. Tex.)

Soil was well broken, well pulverized and in good tilth. These peas were planted in my garden spot, which has been used as a hog lot for several years and was very rich and had been broken up several times last fall and winter with small turning plow. Was used as a garden spot last year. Planted April 15, germinated April 22. I noticed first blooms about May 20, though they seemed to have some some days previous—judging from the amount of them. First rain in June. Quality was good, but owing to the heavy and continued rains from June 1 the quantity was damaged some. Early season good, but too much rain in June and then hot and dry winds. Too much rain during the season made it not as good as last season. We had heavy rains all during the month—more than normal. Hot, dry winds in June, drying and parching everything. I gathered a pint from the second crop of these peas. The season has been much more favorable for late, or summer, planting, with only late showers in August and September, and the crop seems to do much better.

(76) JOHN DIERLAM. *Port Lavaca, Calhoun county* (S. Tex.).

The land used in this test was a prairie sod land, broken last year and planted to cotton. Land was well broken, harrrowed off and planted. The land was good—no fertilizer was used. I planted some peas that I bought at the same time on the same land and I could see no difference in the quantity and quality of the yield and I suppose they were the same peas, although I bought these from a grocery store for table use. Planted April 27 and germinated in three or four days. First crop matured about 1st of June, made only a small crop; second crop the last of July. Last better than first in yield. They were late for our section and it turned off too dry. We have tried a few peas several times since, but I do not consider that they had a fair trial. We had no rain before the middle of June. The last crop was considerably injured by insects.

COW OR FIELD PEAS:

(103) G. L. BARKER. *Jacksonville, Cherokee county* (E. Tex.).

The land used was gray, sandy, fresh land of good quality and well drained. The land was only tolerably well prepared and planted. Planted March 15, germinated March 20, and the plants were still full of blooms on the 5th of July. No second crop on account of dry weather during summer. Cannot give yield, but of good quality and good quantity, value about $1.50 per bushel; season about normal; rainfall about normal. These peas are a fine success in this county, especially along the creeks and branches.

(104) T. C. LUTTERLOCK. *Big Springs, Howard county* (N. W. Tex.).

Peas were planted on a deep, sandy, virgin soil. Soil broke and pulverized, well drained and rich. Planted April 14, 1898. Yielded ninety-two hundred per cent. increase of peas of good quality, although it seemed affected by a sand storm which blew several days about the time of germination so that the per cent. of increase was diminished some.

(13) HARRY RHODES. *Columbia, Brazoria county* (S. E. Tex.).

Planted April 29 and germinated to good stand May 4. May 12 cultivated with four-shovel cultivator; May 19 used double-shovel; May 29 used sixteen-inch sweep. Made very rank growth, blooming June 6 and was in full bloom June 10. First edible June 29; first matured July 4. Quality was fine and peas large and pods full. No insects bothered the crop. They are the best peas I have ever planted. Had some common black-eyed peas planted, but they did not make as full a crop or stand the drouth near so well.

9. RESCUE GRASS.

(*Bromus unioloides.*)

This grass, also known as Schrader's grass, is found in a naturalized condition throughout the upper half of Texas pastures, as far west as New Mexico and extending well into the Indian Territory on the north. It is highly prized by the stockmen of the eastern Southern States and is cultivated both for pasturage and for hay. All light loamy soils produce an abundant yield and may be counted on as well suited to its growth.

It starts early in the fall season from self-sown seed that are dropped to the ground in May or June before and grows freely throughout the fall and winter if a moderate rainfall occurs. As a hardy, nutritious grass, easily cultivated and encouraged, it should receive more attention at the hands of our stockmen for developing our winter and early spring pastures. It is closely related to smooth Brome grass, but for Texas conditions is far superior to this near relative, known to the botanist as *Bromus inermis.*

FIG. 8. A BUNCH OF RESCUE GRASS.

Rescue grass will thrive when planted with Burr clover upon the soils lying east of the one hundredth meridian in Texas and north of the latitude of San Antonio. The two crops have about the same seasons of growth, and both can be followed to advantage by a summer grazing crop on the same land. For this purpose, Bermuda, sorghum, or Colorado bottom grass are suggested for use as these can be practically handled in this manner. Sorghum, peas or velvet beans may be used to follow successfully. Sown alone, a bushel of seed per acre should be planted in August or September. In mixture with Burr clover, one-half bushel will be sufficient. Prices of seed range from $1.00 to $3.00 per bushel.

RESCUE GRASS:

(109) E. C. BUELL. *Roanoke, Denton county* (N. Tex.).

Soil black, eastern slope, surface drainage; in cotton last year: planted March 11 and germinated March 20. Rescue grass grew very well and promised to equal English rye grass until it got so dry this fall owing to a regular drouth. It is dead, and, I think, completely.

(106) F. B. KIMBLE. *Chilton, Falls county* (C. Tex.).

Planted same time as Japan clover and on same soil. Planted March 5 and germinated March 15. This grass was doing well and I was very anxious to get a start of it, but my neighbor's hogs got out and they must be very fond of it, as they ate it close to the ground and ruined it, but I can say, however, it is a success in this country or county. My father-in-law has two or three acres and says this is the best grass he has ever tried in this country.

10. RED KAFFIR CORN.

(*Sorghum vulgare.*)

Among the non-sweet sorghums, the Red and White Kaffirs are most prominent. Chicken corn, Jerusalem corn, Dhourra and Milo maize are the other best known members of this group.

The Red Kaffir matures more quickly than the White and for this reason is preferred by some stockmen whose lands are situated in a decidedly dry locality where the rainfall is expected to extend over only a few weeks of summer. In dry countries the yield of either kind of Kaffir will exceed that of corn. In Eastern Kansas the average yield per acre, for seven years, for Red Kaffir was fifty-five bushels, while the yield of Indian corn was only thirty-nine bushels, according to the reports of Prof. Georgeson. Another important factor demonstrated by Georgeson of the Kansas Station was that for feeding purposes (to steers) Kaffir meal is almost as good as corn meal, pound for pound. Steers were fed equal amounts of Red Kaffir, White Kaffir, and Indian corn, and only slight differences in gains were observed when fed these distinct rations.

The crop is sometimes sown for pasturage in this State and in this case is allowed to grow up to half its full height before turning stock on it. For this purpose it may be drilled or may be broadcasted. Usually, however, it is planted in drills and cultivated as corn is for the production of its seed and fodder.

Throughout the heavy rainfall belts of Texas, Kaffir corn is often a failure on account of the small insects that frequent the blooming heads and that appear to destroy the pollen, resulting in "blasting" the crop of seed. No remedies have yet been suggested for this trouble.

[The number appearing before each report refers to the map number, page 48.]

(61) W. T. BIRKHEAD. *Big Springs, Howard county* (N. W. Tex.).

Grown on a sandy loam with natural drainage. Previous crop Jerusalem corn. Planted April 11 and germinated April 19. Matured about June 10. Indicated yield about thirty bushels per acre, well headed and sound. I look upon it as the equal of Indian corn for stock and poultry food. The season was rather below normal. Insects and fungous pests in this climate very numerous and very destructive, rendering it almost impossible to grow successfully a great many varieties of field crops. Red Kaffir corn appears to be freer from attacks of these pests than anything I have tried. White milo maize was planted on the same day on the same kind of soil and received the same cultivation, but failed to head.

(62) J. J. KELT. *Rice, Navarro county* (N. E. Tex.).

Planted April 1. Yield was very poor; some of the heads had no seeds, and, while three-fourths of the heads had the appearance of being blighted, I do not think, from my limited observation, that the Red Kaffir corn equals the White in productiveness or in any other quality in this climate.

(12) R. T. BROOKS. *Bedias, Grimes county* (E. Tex.).

Land well plowed and pulverized, nearly level, very fertile and had not been cultivated for several years. Planted April 10, germinated April 25. Entire crop was destroyed by chinch bugs.

RED KAFFIR CORN:

(11) J. E. COX. *Southerland Springs, Wilson county* (S. Tex.).

Grown on black sandy mesquite land, rather drouthy, broke with eight-inch turning plow, running ten inches deep. Planted in drills three and one-half feet apart, six inches apart in the drill. Planted March 8, germinated to a good stand on the 14th, instant. Matured July 25. Yielded at the rate of twenty-five bushels per acre. Quality good and value estimated at seventy-five cents per bushel. The season was about normal. The red and black weevils are very destructive to Kaffir corn in this climate.

(46) J. M. MILLNER. *Cade, Navarro county* (N. E. Tex.).

Grown on land previously cropped with oats. Soil broken with eight-inch turning plow, running four inches deep, harrowed and bedded at once, drainage good. Planted April 14, germinated April 24. Did not mature will on account of drouth in July. Yield good, considering drouth. Allow me to say that I prefer Red Kaffir corn to the White. Rainfall was rather heavy during the early part of the season.

(63) W. G. McDANIEL. *McGregor, McLennan county* (C. Tex.).

Soil was in fine tilth; drainage good, and previously cropped in cotton. Planted March 9, germinated March 19, matured late. Kaffir corn was very promising until it was nearly ripe, when it seemed to blight. I think if the corn can be kept from blighting it is a good crop, especially if a person has a machine for cutting—then the cost of gathering would be small.

(5) O. C. PHILLIPS. *Terrell, Kaufman county* (N. E. Tex.).

Kaffir corn planted April 8, germinated April 12, matured July 25. Thinned to one or two stalks every eighteen inches. Each stalk matured a good head. After cutting the first heads, it suckered a number of small heads, but the chinchbugs reduced these heads. Will plant this crop another year.

(64) F. A. LOONEY. *Wharton, Wharton county* (S. E. Tex.).

Soil in good condition, well cultivated, good drainage, previously cropped in cotton, manured the soil which is as good in production as any in the county. Planted February 8, matured late. First blooms about May 1, last blooms June 12; yield splendid, quality very good and abundant quantity. I fed it all as a green forage. I believe that it would yield profitably in this county.

(65) CHARLES FORDTRAN. *Fayetteville, Fayette county* (C. Tex.).

Land broken up in the fall; pulverized with disc harrow and laid off into beds with middle breaker. Soil loose black, well drained and very fertile. Previous crop cotton. Planted April 1; germinated April 12; first tassel noted in July; last in October—did not yield one seed. Season was dry. I attribute the non-production of seed to the hot dry weather, accompanied by high winds and insects. There seemed to be a sweet sticky substance to attract the insects. Sorghum also failed to produce seed here this year, though did not have as many insects on the heads. About the 15 of July we had a good rain; it put out new shoots and would have made seeds if we had had another rain, which has not fallen up to this date. A heavy frost fell on the night of October 20. The stalks seemed to be very short—none of them over four and one-half feet.

(45) W. C. DAVIS. *Louise, Falls county* (C. Tex.).

Planted on black waxy soil with good drainage; previously cropped with sorghum. Planted April 18, germinated April 25; matured about September 1; yield good; early season was wet; late season very dry. Average temperature very high for this country.

(4) ROBERT E. WOOD. *Lexington, Lee county* (C. Tex.).

Planted on land previously cropped in cotton; good fertility; yielded about one-half bale per acre. Planted March 14, germinated March 11. First blooms appeared about May 7. Yield very poor, blasted like all sorghum; covered with insects. Season above normal for the first four months, then below normal; an excess of rainfall; temperature very high; a little white louse covered the seed heads.

RED KAFFIR CORN:

(6) J. A. KIRKPATRICK. *Marlin, Falls county* (C. Tex.).

The land in this test was not cultivated last year. I put the land in good condition before planting. Light, sandy postoak land, high and rolling. Planted about the first of April and yield was very good, though I did not measure it.

(66) N. P. GREGG. *Nursery, Victoria county* (C. Tex.).

Planted Kaffir corn May 1; almost a complete failure.

(67) D. J. THOMAS. *Gliddin, Colorado county* (S. E. Tex.).

On March 1, 1898, Kaffir corn was broadcasted and afterwards bedded into rows three feet apart. The rows were drained to the south—running north and south. I planted millet on the same land last year which yielded abundantly; owing to the drouth the yield was not what it otherwise would have been. The birds destroyed them as fast as they ripened, hence I failed to save more than a quart of seed.

(68) SAM ROSS. *Devine, Medina county* (S. Tex.).

Kaffir corn was planted on a loose soil, very moist, drainage good. Planted on March 2 and germinated on March 9; bloomed June 23 and matured about July 18. The yield was very fine and consisted of three crops. The corn was the finest I ever saw and the harvest very large—two to three heads to one stalk. Doves and ants were injurious.

(69) CHARLES HODGE. *Nelsonville, Austin county* (S. E. Tex.).

Soil was in good condition when planted; a fertile black prairie land; good; previously cropped in cotton; planted March 9; germinated March 24; bloomed about first of Jnue; yield good; corn stalks five to six feet high; tender and brittle.

(70) H. L. GRIGGS. *Alvarado, Johnson county* (N. Tex.).

Land was previously cropped in oats; was broken in the summer and again in the fall and was in fine condition when planted; black waxy, underlaid with gravel which will make sixty bushels oats per acre nearly every year. Kaffir corn grew about seven feet high; made one large, well matured head on each stalk, smaller heads blasted.

(71) A. P. WRIGHT. *Mathis, San Patricio county* (S. Tex.).

Land had been plowed in the fall; no winter rains; light loam Nueces Valley, subsoil same as surface. The only rain sufficient to start crops was on January 12. Planted March 10 and germinated March 17. I lost this crop by a horse getting into it and eating it down. It was very promising. I raised an acre in 1897 which was very fine and conclude generally that it is a success here.

(72) JOHN A. YOUNG. *Prairie Hill, Limestone county* (C. Tex.).

Gravelly black soil; well drained to the south and east; previously used as garden spot; soil medium. Planted February 27 in rows four feet apart and eighteen inches in the drill. It all germinated by March 10; matured July 1; began to head May 7; suffered from both cold and drouth. Yielded about forty bushels per acre. Quality good; the season was very unfavorable.

(35) J. L. PITTS. *Pasadina, Harris county* (S. E. Tex.).

The soil was in fine condition, black waxy with a slight trace of sand; previous crop sorghum. Planted Kaffir corn March 22, germinated April 4; grew five feet high; yielded a good crop of fodder of fine quality. This land will yield about one bale of cotton per acre under favorable conditions.

(73) F. L. MARTIN. *Chillicothe, Hardeman county* (N. Tex.).

Grown on a red sandy loam near valley and Wanderers creek, which is a typical wheat land, with a Panhandle loam from six to eight inches deep, underlaid with a compact clay which is almost impervious to water. Land was cultivated in wheat last year; broke eight to nine inches deep in June; pulverized

RED KAFFIR CORN:

with drag harrow and was loose and treated with good supply of manure when planted in Kaffir corn. Planted April 13 in rows three and one-half feet wide and eighteen inches in the drill. Germinated April 20; first blooms about July 5. The heads matured well but were rather small compared to the Kaffir corn grown here for the last few years; quality fine; inclined to sucker and suckers made very little corn on account of drouth; cut with a McCormick harvester; estimated yield about two tons per acre; value in this market from three to five dollars per ton. During growing season we had less rain than usual; it only rained on May 2, and a week's rain during early part of June, and no other until crop was harvested. Crop suffered from drouth after blooms. The cold nights in April and May served to retard growth; hot winds in June and July had bad effects, although affected less than sorghum or other field crops. The chinchbugs injured it some during the hot days.

(74) H. M. GLASS. *Post Oak, Jack county* (N. Tex.).

Broke with turning plow in the winter and harrowed until pulverized; has good drainage and was planted in corn during previous year. It is a light sandy loam of medium fertility; planted April 8 and germinated April 16; yielded about fifteen pounds of seed. Did not get a good stand. Cultivated three times with a cultivator. Like it very much and will plant again next year.

(75) E. L. HUTCHINS. *Alvin, Brazoria county* (S. E. Tex.).

Planted on a black sandy soil of moderate fertility, and fertilized with barnyard manure. Planted April 8 and germinated April 13. The yield was enormous and of first-class quality.

(76) JOHN DIERMAN. *Port Lavaca, Calhoun county* (S. Tex.).

Land was well broken prairie sod; broken last year and planted in cotton; well drained; rather dry when planted, about April 27; germinated about ten days later. Headed out during first of August, but no seeds matured. During September it put out more side heads but did not mature a seed. Season about normal. I found upon close examination a large brown bug with a very disagreeable odor was sucking the seeds while in the milky stage, which was, I suppose, the cause of the first crop not maturing, although I found no bugs on them. I think if the bugs had not destroyed the heads I would have had quite a lot of seed from the number of heads put out. I will try it again another year as I consider it a valuable food for poultry.

(77) G. G. HOOD. *China Springs, McLennan county* (C. Tex.).

Kaffir corn was planted on the same ground and by the side of alfalfa; planted on March 9; germinated March 13; seed had germinated and sprouted in four days and by the 19th was nearly all up. Had been very warm from time of planting until March 20, when a very cold norther set in, freezing on the night of the 20th and killing it all down to the ground. Some died out—probably one-tenth. Took it some time to start to growing again. The first blooms about the 23rd of June; last about July 6; harvested on the 8th day of August. I gathered 175 heads and threshed out twenty-seven and one-half pounds; for forage it is valued at about six dollars per ton here. The season was below normal, rainfall below normal. The Kaffir corn was very lousy with something like the cotton louse covering the heads. There was more or less blight on the first heads. I think it was caused by the continued dry and cold weather during April and May. I think four and one-half feet would be full height of highest stalk. Our highest corn here this year was not over five and one-half feet high.

(46) J. N. MILLER. *Brookshire, Waller county* (S. E. Tex.).

The condition of the soil was good at time of planting. Light sandy land, easy to pack at time of planting. Planted in beds about twelve by fifteen feet, ditches on every side; well drained and fertilized with nearly fresh manure. Good piece of land. Was second year's raw prairie land, and clay is from one foot to eighteen inches below the surface. Planted March 10, germinated March 17; maturity was very poor; seemed to blast all the blooms; a few heads blooming later matured very well. The suckers or sprouting crop did not mature. The

RED KAFFIR CORN:

quality of those that did mature did well—developing heads about ten inches long. The season here in this immediate vicinity was unsatisfactory, so much so that the watermelon crop was late, blasting the vines in April when they had to plant over—throwing the crop so late that the market was glutted and they are hardly able to pay the freight. The rain during the entire growing season was light. Showers were not very frequent and it was the longest and hottest summer I have ever witnessed in many years—about ninety degrees for about seven hours a day, which, of course, had bad effects on all such plants and nothing seemed to flourish but cotton.

(78) A. J. BROWN. *Seale, Robertson county* (C. Tex.).

Land was in good shape, and a good rich soil with good drainage. Planted May 20 and bloomed about August 1; yielded a good crop of medium quality, value medium.

(19) L. F. BROWN. *Runge, Karnes county* (S. Tex.).

Black sandy soil, rich but drouthy; previous crop cotton. Planted March 1, germinated March 10; first blooms appeared about middle of June; last blooms about middle of July; yield good. Stayed green until the latter part of September; I consider it a very valuable stock feed and stands the drouth well. Season, as compared with normal, very wet until the 10th of June; no rain since except a few late showers. I cut it green and fed it to horses, which seemed to relish it very much. Several heads seemed to blast; the birds were a great pest. Yielded well, stands drouth well, good forage plant; will plant it again.

(20) J. W. TAYLOR. *Hunt, Hunt county* (N. E. Tex.).

Kaffir corn made a good yield of fine quality.

(48) W. H. LOCKLAN. *San Gabriel, Milam county* (C. Tex.).

Condition of soil, good; pulverized fine; black loam; drained; yield perfect; previously cropped with cotton for some years, with good yield; a very fertile soil; planted April 8; germinated April 15; matured early; yield good; quality good; season about normal; rainfall about normal as to inches throughout the season, but not so well distributed. I am sure we will be pleased with this forage plant.

(2) R. E. MORRIS. *San Antonio, Bexar county* (S. Tex.).

Soil was finely pulverized with good season in it; black mesquite land (not waxy); well drained; previous crop was sorghum; well fertilized with vegetable matter. Planted March 1, did not mature a seed; rainfall was not sufficient for sorghum to mature seed. Kaffir corn did not stand the dry weather as well as sorghum, although light and of poor quality. It made very fair fodder; the corn made a very fair stalk—about five feet high—but did not mature seed; there seemed to be an insect which killed the seed while in the bloom. Cut it in July.

(79) J. J. HAWSBERGER. *Pearland, Brazoria county* (S. E. Tex.).

Soil in good condition; plowed deep and well harrowed; well drained; land previously cropped in cotton; soil fertile; black sandy; I used some fertilizers in hills; planted March 17; germinated March 28; matured about August 15; yield small and not as good as the sorghum or the large African millet.

(59) E. R. TAYLOR. *Houston, Harris county* (S. E. Tex.).

Good soil, black loam; previously used as garden. It was planted five or six days; cut in about eight weeks; yielded very well; quality good.

(80) THEO. BRASSIG. *Peters, Austin county* (S. E. Tex.).

Planted on a good, well fertilized, light sandy land with clay foundation; planted April 2; germinated April 6. This corn may be all right if a man can plant as much as twenty or twenty-five acres, but if you plant much less than this the birds will get all of it as they have done mine. I did not get the seed back. It grew rapid with cultivation, but in my opinion it is no good this far south.

RED KAFFIR CORN:

(81) M. A. CAULEY. *Moran, Shackelford county* (N. Tex.).

Soil a sandy loam with clay subsoil. Land with favorable seasons will make from thirty to forty bushels per acre. Soil before planting was finely pulverized and warm—a good deep season and subsoil is dry as deep as a year's drouth could make it. Planted March 7; I can only approximate yield, as I have not threshed the heads, but, considering the season, it was satisfactory. Spring season late and the summer unusually warm, unfavorable to plant growth except top season, not having rain enough at any time to wet the ground. Usually we have heavy rains in May and June, but July and August are usually dry. Growth was retarded in the spring by a frost chilling the ground about the time of germination.

(2) S. T. PRIEST. *San Antonio, Bexar county* (S. Tex.).

Sandy land; drainage good; previous crop cotton; land will yield about six hundred pounds cotton per acre. Planted March 5; germinated March 9; first blooms about June 14; yield and quality good; quantity good; second crop blighted.

(50) E. L. SCHUMM. *Temple, Bell county* (C. Tex.).

On a black land broken in the fall and harrowed twice in the spring and planted April 1; germinated April 9; cut the heads on August 1; yielded a good crop of very good and large grains; a few heads did not get seeded, could not find out the trouble; second crop was killed by frost in October. Aim to plant every seed I saved, as I consider it a fine forage crop.

(82) HERBERT TAYLOR. *Monaville, Waller county* (S. E. Tex.).

The soil had been well worked but not fertilized. The ground has a gradual slope from north to south—artificial drainage not necessary. Previous crop cotton and made three-quarters of a bale per acre. The soil is a prairie loam soil. Planted March 17; germinated March 26, yielded a fine large stalk, but no seed; one large rain from time of planting until time of blooming. It turned off too dry. Heavy continued rains still kept up which was injurious to its growth.

11. FIELD CORN.

(*Zea Mays.*)

In selecting from the many varieties of corn that are now available, the grower is often perplexed in his effort to secure a distinctive variety superior to the sort grown in his community. Many of the reports of the success, or failure, of varieties contain little instruction for him because his land and his rainfall are materially different from that upon which the other crop was grown. Through the work herein reported and that already printed in the publications of this Station, a systematic classification of varieties adapted to the various localities and soils of the State has been suggested.

The selection of *early maturing varieties,* to avoid the bad effects of the dry weather of June, is now quite familiar to our farmers, but they have not yet fully appreciated the necessity of studying the characteristics of the varieties offered that adapt them to his uses from the standpoint of (*a*) *stock feeding;* (*b*) *a meal making corn; and* (*c*) *the weevil proof varieties.*

The "weevil proof" varieties are not corns that are absolutely resistant to the attack of weevil, but by this expression is meant those varieties that have a long shuck that grows early entirely over the end of the ear and largely protects the variety against the deposit of the weevil's egg, while the corn is in the field. Throughout a large portion of this and adjoining States the corn, or grain, weevil, is an important factor. In many instances the greater part of the crop has been known to have been destroyed in the field before being gathered. One of the difficulties in assuring ourselves that a certain variety will always protect its grain thoroughly from an excessive shuck growth is due to the fact that with changing rainfall conditions the length and amount of shuck will vary so that a variety that will protect itself in this manner in East Texas will fail to do so when carried west of that rainfall belt. This is a matter upon which we have no satisfactory experimental information that bears upon all of the common varieties in use in the State, and needs further investigation.

Many persons assume that the yellow corns are superior to the whites for stock feeding purposes because "richer" in some material. Careful investigation in this matter has shown that there is no material difference in varieties due to *color;* therefore, in selecting corns, we should pay little attention to the color as indicative of its food value, while, for bread making purposes, this will of course materially influence the selection. On the other hand, the flint varieties of corn are often so hard that they are not well masticated by work stock and a considerable loss results because the whole grains eaten are not digested.

The varieties of corn are classified by Sturdevant into

I. The Pod Corns, *Zea tuncita.*
II. The Pop Corns, *Zea everata.*
III. The Flint Corns, *Zea indurata.*

FIELD CORN:

IV. The Dent Corns, *Zea indentata.*
V. The Soft Corns, *Zea amylacea.*
VI. The Sweet Corns, *Zea saccharata.*

This classification is based on differences in the shape of grain and the ear. The "flint" corns are composed of thick "corneous" growth, covering the crown of grain and the starchy portions, while the "dents" possess an excess of the starchy matter and less of the transparent flinty covering. The shrinkage of the starch portion at maturity causes the "dents" to wrinkle at the crown of the grain and hence the name assigned them. The "shoe-peg" and "gourd-seed" fall in this group. These several classes of corn are found distributed over a wide range of latitude in the Americas almost regardless of the groups into which they have been classified.

[The number appearing before each report refers to the map number, page 48.]

(a)—MOSBY'S PROLIFIC.

(107) L. C. MOATS. *Hulen, Galveston county* (S. E. Tex.).

Soil was in good condition; first crop; land had been broken two years before; plowed twice; drainage good; fertilized with barnyard manure. Planted March 19; germinated March 29; matured June 20. One row one hundred yards long made fifteen pounds of good corn.

(68) SAM MOSS. *Devine, Medina county* (S. Tex.).

Soil was in good condition at planting time and very fertile; drainage good; previous crops were all good. Planted March 3; germinated March 8 to 10, bloomed May 20, corn grown June 21, matured July 10. The yield was good and quality best I have ever planted—two good ears to each stalk. Season below normal, rainfall was short and below normal. Spring was cold and wet, summer hot and dry. Budworms were numerous and did much damage. I think I will adopt this corn for my general planting as I think it is a hardy and quick-maturing variety. Mosby's Prolific corn was the best corn you sent me.

(108) A. M. HILL. *Hill, Bastrop county* (C. Tex.).

Soil was in good condition; previous crop onions; well manured. Was planted March 8, germinated March 17. This corn did well here but ears are small compared to our common field corn. Only a few stalks matured two ears. Season here some better than usual—more rain during summer than usual.

(45) W. E. DEVINE. *Louise, Falls county* (C. Tex.).

Planted on black waxy soil; physical characteristics good; previous crop sorghum; drainage good; planted April 18; germinated April 28; matured about June 15; yielded at the rate of twenty bushels per acre; valued at about forty cents per bushel; this is a good corn for this country.

(4) C. J. TORRO. *Lexington, Lee county* (C. Tex.).

The soil was in good condition; broken broadcast about seven inches deep; the soil is a deep sand with a clay subsoil, well drained; previously cropped with melons; about eight tons per acre of cow lot manure was used on this ground last season; planted March 17; germinated March 23; was in good roasting ear June 28; the yield was good, the ears averaged about eight inches long, while some were eleven inches long, but they were not well filled out; stalks averaged about seven and one-half feet high; had only one ear to the stalk—sometimes two were found, but one usually proved to be a nubbin. I do not know how much the yield would be; value about like common corn.

FIELD CORN:

(5) O. C. PHILLIPS. *Terrell, Kaufman county* (N. E. Tex.).

Soil is what is commonly known as rawhide in this locality, with sufficient lime in it to cause it to crack; cropped in cotton two years previously; this is the third crop since put in cultivation. Soil is dark, subsoil; some of this has made one-third of a bale of cotton this season per acre, and promise much better the coming season; land was broken here in March; harrowed twice and laid off three and one-half feet with sweep and planted between sweep furrows; opened drill with six-inch shovel and covered with harrow. Planted April 8th; germinated 18th to 20th; June 20 was in full tassel; July 7 was in full silk; matured August 5; yielded at the rate of thirty bushels per acre; quality fair to good; value about twenty-five cents per bushel; the ground was in a good state of cultivation and moisture was sufficient when planted; cultivation was regular, say every ten or twelve days unless rain prevented and as soon after the rain as the ground would admit plowing. Mosby's Prolific grew very high stalks and most of the stalks put out shoots, but very few matured two ears.

(63) EUGENE McDANIEL. *McGregor, McLennan county* (C. Tex.).

Soil was very deep, but had been broken early last fall, drainage good; previously cropped in cotton. Planted March 9, germinated March 19; yielded about twenty-five bushels per acre. I am satisfied that it would have made a large yield if the planting had been made earlier; however, *I do not think it superior to the common varieties grown in this section.*

(83) B. F. PARKER. *Content, Runnells county* (C. Tex.).

Mosby's Prolific corn produced very poorly, planted on the same soil and at the same time as other corn; *it made nothing but nubbins;* had a very tall stalk.

(7) MRS. CATHERINE HORD. *Dallas, Dallas county* (N. E. Tex.).

Good garden soil, lime rock, planted March 25, germinated fifteen days later; grew very fine stalks, averaging twelve feet; had long cobs, but only a few of them had a dozen grains on the cob.

(109) E. C. BUELL. *Roanoke, Denton county* (N. Tex.).

The soil had been winter plowed and was mellow and in good tilth; it is black land, slopes to the east; previously cropped in cotton; an extra rich land. The spring was very dry; planted March 17, germinated March 27 to a very uneven stand. The pollen was falling the last days of June. I do not think it will prove a good variety for this section owing to its late maturity, and the ears did not fill out well.

(12) R. P. BROOK. *Bedias, Grimes county* (E. Tex.).

I am very favorably impressed with the appearance of the few stalks of Mosby's Prolific planted on my place; however, there was not enough to determine the yield.

(11) J. E. COX. *Southerland Springs, Wilson county* (S. Tex.).

Black sandy soil, broken broadcast ten inches deep; planted in drills four feet apart and two feet in the drill. Planted March 8, germinated to good stand. Matured August 10, yielded about twenty bushels per acre; season not as good as normal; rainfall above normal; high winds almost destroyed corn in the fall—about the first of October.

(13) T. D. GIESECKE. *Columbia, Brazoria county* (S. E. Tex.).

Mosby's Prolific was planted on land that has yielded thirty bushels of corn per acre; black sandy with slant to land; plowed deep and well drained and is extra fertile. Planted April 7, germinated April 15; very good yield.

(108) A. P. LONGLEY. *Milano, Milam county* (S. Tex.).

Sandy loam soil; had been in cotton previous year; well fertilized. Planted March 16, germinated March 23; most of it was killed by a cold rain while in the ground.

FIELD CORN:

(110) DR. F. M. CHANDLER. *Rodgers, Bell county* (C. Tex.).

Previous crop cotton; dark, Little river bottom land, sandy soil; planted the corn in January, but only a little of it came up; replanted in March and on the 18th of same month planted 180 grains in ninety hills two feet apart in three and one-half foot rows and covered grains two or three inches deep with well pulverized dirt; after this planting twelve additional stalks came up and matured ears of medium size. A heavy wind passed over my place in July, blowing the corn down and several ears were blown off so I only gathered eight ears. Gathered *corn in October and every ear was badly damaged by weevil. Quality was only* medium; quantity was reduced by storm; *value less than my regular field corn.* My large white corn that my renters grow on my place is far superior to it in quantity and value and fully as fine in quality.

(86) ARTHUR W. BEVERLY. *Copperas Cove, Coryell county* (C. Tex.).

Soil in good condition previous to planting; good drainage; previously cropped in oats; black waxy soil; planted February 8, germinated February 18; matured September 1. Yield about twenty-five bushels per acre; value about twenty cents per bushel.

(4) R. P. SELMAN. *Lexington, Lee county* (C. Tex.).

Soil in fine shape; red prairie; good drainage; previously cropped in Irish potatoes. Corn was planted April 1, matured a little later than our native field corn; value was good, quality and quantity fair.

(111) F. A. ATKISSON. *Sodom, Hunt county* (N. E. Tex.).

Condition of soil previous to planting was very good; loose black land; good drainage; previously cropped in cotton; planted March 1, germinated March 5, matured first of August; bloomed last of June and first of July; yield very good. Every stalk had two large ears on it. The stalks were large, well rooted. and ears were well grained and are in a close shuck. Yield at the rate of forty bushels per acre. I think this variety of corn is well worth a trial on any man's farm. *I will plant as much as I can next year.*

(72) JOHN A. YOUNG. *Prairie Hill, Limestone county* (C. Tex.).

Black gravely soil, previously cultivated in potatoes; in good condition; well drained; corn planted in rows four feet apart, two feet in the drill; soil medium; planted February 26, germinated March 11; tasseled March 10, matured June 1. Yielded about thirty-five bushels per acre; quality good; value nine dollars. Mosby's early corn suffered in common with all other varieties from cold and drouth.

(112) TOM WILBANKS. *Morales, Wilson county* (C. Tex.).

Land in good state of cultivation; sandy land; good drainage; previously cropped in cotton; good fertility; planted March 6, germinated March 15; matured late; yield good; quality good—about twenty-five bushels per acre; value of corn at present thirty cents.

(113) W. B. YEARY. *Farmersville, Collin county* (N. E. Tex.).

Soil rich loam; previously cropped in pumpkins; planted March 16, germinated March 25; matured about August 1. Each stalk made one good ear of heavy corn; very few had more than one ear.

(114) J. L. DURHAM. *Alvin, Brazoria county* (S. E. Tex.).

Good sandy land in good state of cultivation; previously cropped in cabbage; well drained; fertilized with barnyard manure. Planted March 15, germinated April 1. Yield thirty bushels per acre; good quality. Corn is worth here about forty cents per bushel. *This is a good corn for this country.*

(79) JOHN DRUTH. *Pearland, Brazoria county* (S. E. Tex.).

Dark sandy land; previously cropped in sweet potatoes; drainage good; planted April 15, germinated April 25. Corn was ripe in August; however, all of the corn

FIELD CORN:

did not mature on account of the wet weather, and that which did mature, matured one ear to each stalk—from ten to twelve inches long. I believe this corn is a good producer for this climate and soil. I have thirty ears saved that have no weevils or fungus on it and I will plant this next year. *I would recommend this corn* and believe that it will make a success in this part of the country.

(35) J. L. PITTS. *Pasadena, Harris county* (S. E. Tex.).

Soil was in fair condition; drainage good; previously cropped in sorghum. This land would make about one bale of cotton per acre under favorable circumstances. Planted March 18, germinated March 26, matured August 6. Yield very light; quality poor; the worms damaged the ears badly; poor stand.

(18) C. B. McGREGOR. *Millican, Brazos county* (C. Tex.).

Land well broken five inches deep in January. In January laid off in six foot rows and bedded them with disc, leaving each bed in good condition. Good black land of second year's working; well drained; planted March 21, germinated to a good stand in ten days; matured late; very good yielder; every stalk eighteen inches in drill; had a good ear, averaging five inches in length; some few had considerable nubbins.

(114) E. L. HUTCHINS. *Alvin, Brazoria county* (S. E. Tex.).

Soil was black sandy; fertility medium and in good condition. Planted March 14, germinated March 20. The yield was very good—about twenty-five bushels per acre; quality first class.

(20) J. W. TAYLOR. *Hunt, Hunt county* (N. E. Tex.).

All varieties of corn planted on same plot of ground; quality good, but small yield as only a few of the seed came up.

(48) W. H. LOCKLAN. *San Gabrael, Milam county* (C. Tex.).

Land mellow and in good condition; black loam soil; well drained; previous crop cotton; planted March 10, germinated March 17 and matured the last of July. Yield was good, but cannot estimate the quantity per acre; quality good. I am well pleased with this corn. It matures well, yields well and is a fine corn for this climate and in this soil.

(82) HERBERT TAYLOR. *Monaville, Waller county* (S. E. Tex.).

Land well worked and in good condition; just before planting well broke and fertilized. Planted March 11, germinated March 18, tasseled May 18, silked May 28, matured June 15. Made very good yield.

(70) J. J. JAMES. *Alvarado, Johnson county* (N. Tex.).

Good black land; soil well prepared, and in fairly good condition; previously cropped in cabbage. Planted April 9, germinated April 17; shuck was dry June 28; tasseling and silking June 1. Yield at the rate of forty-eight bushels per acre; quality good; eighty picked ears made a bushel. The amount of seed was so small that many of the stalks were a blank, otherwise the yield would have been better—perhaps twenty per cent. better. Mosby's Prolific corn is a good corn, making a larger ear and has a longer grain than the Iowa Silver Mine. It is also a softer corn than the Iowa Silver Mine, therefore, preferable as a stock feed.

(80) THEO. BRASIG. *Peters, Austin county* (S. E. Tex.).

Planted March 7 on good land, which had been in cotton during previous year; broken broadcast, then listed; germinated March 23; matured about July 30; yield sixty bushels per acre. This corn is much better than Adams' Early corn. The ears were well developed and also well closed, which gave the birds and insects no chance to ruin same.

(81) M. A. CAULEY. *Moran, Shackelford county* (N. Tex.).

Soil a light sandy loam ten or fifteen inches deep, with red clay subsoil; pul-

FIELD CORN:

verized and loose; subsoil had been dry several months. Planted March 7, germinated March 17. It did not reach maturity as a very severe drouth prevailed during its growth. I think this crop will do well here in ordinary seasons. I gave it careful cultivation as an unfavorable season would permit—plowing it and keeping down the grass and weeds—but we had no rains during the season and the farmers were unfortunate.

(109) H. C. DIXON. *Roanoke, Denton county* (N. Tex.).

Condition of land was not good as the land was not broken until early spring; reasonably fertile; a close compact mixture of sand, etc.; well drained; previously cropped in cotton. Planted March 18, germinated March 27; bloomed, matured and gathered exactly with our native corn. Has a long ear, but the corn was shriveled and shrunken on the cob.

(21) G. W. L. SPEARS. *Alto, Cherokee county* (E. Tex.).

Land in good state of cultivation; last year cropped in watermelons; character of soil gray sand; well drained; planted March 20, germinated March 31. Matured some earlier than our native varieties; quality good. The ears filled out to the ends and some of the stalks had two ears. You can recommend this corn to farmers as being one of the very best to plant for general purpose corn, it being a pure white and making an extra fine bread.

(22) JOHN W. KIRBY. *Buttfield, Jefferson county* (S. E. Tex.).

Corn planted May 1, germinated May 6, matured about August 1; yield one to two good ears to each stalk; quality good. *I think this is a good variety of corn for this locality.*

(51) P. M. JOHNSON. *Richland Springs, San Saba county* (C. Tex.)

Ground dry, no rain since February 9; fertile black sandy soil; well drained; planted March 18, germinated March 29. Averaged one small ear to each stalk. When I came to gather it I found nothing but cobs left.

(59) E. R. TAYLOR. *Houston, Harris county* (S. E. Tex.).

Soil in fine condition previous to planting; previously used as a cow lot. Planted first of April, germinated to a good stand; yielded well; good fine ears and fine season.

(10) J. E. CHAMBERS. *May, Brown county* (C. Tex.).

Soil on which I planted corn was sandy with clay subsoil; had no crop the previous year; broken in February and was in fair condition. There has never been any fertilizer put on the land since it was cleared; drainage perfect; planted March 13, germinated March 20; first blooms on June 15; fully matured by August; had a frost March 22 and 23 which injured the corn badly, but it lived and did well; it made a good size stalk and one good ear to a stalk, and if there had been a good stand would have made thirty-five or forty bushels per acre; the quality was good.

(97) C. W. VAN NESS. *Jines, Ochiltree county* (N. W. Tex.).

Soil in poor condition, having run idle for several years and being very dry; the land is dark sandy soil; well drained with sufficient moisture; very fertile; planted April 17, germinated May 2. First blooms July 16. Hot winds during latter part of July which fired the corn. I did not get but very little from the planting; yield about three bushels; of a poor quality; no material value. I sent off and bought some seed of the variety called Prehistoric, which proved a valuable variety for this country, standing the drouth and hot winds very well.

(69) CHARLES HODGE. *Nelsonville, Austin county* (S. E. Tex.).

Soil in good condition when planted; prairie land, light sandy soil; previously cropped in sorghum; land not very fertile. Planted March 9, germinated March 30; matured about the latter part of July; ears not very large. I have made a half-bushel from the seed you sent; quality very good. I believe it will require better land.

FIELD CORN:

(b)—ADAMS' EARLY CORN.

(68) SAM MOSS. *Devine, Medina county* (S. Tex.).

The soil was in very good condition, loose and moist and well drained; sandy hillside and very fertile; the previous crop being very good. Planted March 3, germinated March 8, bloomed April 13 and roasting ears May 31. The yield was very good and quality extra fine, about one good ear and one small one to each stalk; very valuable corn for the early market as it is so early. The spring during March and April was very cold and dry; the rainfall was below normal. Bud worms were very numerous in the corn, but did not injure it much. Corn was clear of smut and rust. Adams' Early corn is a very fie corn for market and this season it was especially so.

(67) D. J. THOMAS. *Glidden, Colorado county* (S. E. Tex.).

I gave the corn two plowings previous to planting; the rows run north and south with a gradual drainage to the south. Previous crop cabbage. Planted March 1, germinated March 8. I had *roasting ears May 17*. Yield was good, being an earlier variety than most we have here. As I wrote you at the time, the package came to me in bad condition with but few seeds in any of them, but I prefer this variety to any other varieties you sent me.

(45) W. C. DAVIS. *Louise, Falls county* (C. Tex.).

Soil previous to planting was very wet; black waxy; good drainage; and previous crop sorghum. Planted April 18, germinated April 28. Yield about twenty-five bushels per acre. Good quality, worth about forty cents per bushel. This is a good corn for this part of the country.

(4) C. J. TORRO. *Lexington, Lee county* (C. Tex.).

The soil was in fine condition, had been broken broadcast about seven inches deep. The land had been well manured last spring a year ago with cow lot manure at the rate of eight tons per acre. Previous crop watermelons. The land is a deep loose sand with red clay subsoil. Planted March 17, germinated March 22. The corn was in roasting ear by June 1. Yield was very light; longest ear was about five inches. The stalks were about four feet high and most of the ears came out at the end of the shuck. I do not think it is of any value here.

(5) O. C. PHILLIPS. *Terrell, Kaufman county* (N. E. Tex.).

Adams' Early corn planted April 8, germinated to good stand April 18, May 24 was in tassel, June 10 silked out, June 20 in roasting ear, July 7 the corn was hardening; yield one to two ears to stalk; quality fair to good.

(11) J. E. COX. *Southerland Springs, Wilson county* (S. Tex.).

Black sandy soil broke with 8-inch turning plow ten inches deep. Planted in rows four feet apart, two feet apart in the row. Planted March 8, germinated March 18, first blooming May 1, matured June 18; yield about fifteen bushels per acre. Adams' Early corn is a good variety for this locality as it makes before the drouth of summer sets in.

(111) J. A. ATKISSON. *Sodom, Hunt county* (N. E. Tex.).

Soil very good black land; drainage good; previous crop cotton. Planted March 1, germinated March 5; yield, quality and quantity good; value good, especially for early roasting ears.

(70) H. L. GRIGGS. *Alvarado, Johnson county* (N. Tex.).

Soil was plowed twice before planting and was in good condition; black waxy rolling land; made sixty bushels oats last year. Planted March 28, germinated to good stand; yield good. Am well pleased with this as an early table variety.

(106) F. B. KIMBLE. *Chilton, Falls county* (C. Tex.).

Warm and damp when planting; light sand, clay subsoil. Previous crop cotton; fertility above the average; planted February 24, germinated March 10 to

FIELD CORN:

15. This is earlier than other Northern grown varieties. The yield was very poor, almost a failure; quality poor; would have to be at least fifty per cent. better to be of any value. This may be a good early variety to grow for table use, but I do not think it would pay to plant it extensively as a field corn.

(112) THOMAS WILBANKS. *Morales, Jackson county* (S. Tex.).

The soil a good light sandy loam in a good state of cultivation; good previous crop—cotton. Planted April 6, germinated April 15; matured and was dry by the first of June. Yield was good and of not much value. It made a very fair ear to each stalk, hence I say a good yield.

(36) A. J. SCHULZ. *Iowa Park, Wichita county* (N. Tex.).

Soil very mellow at time of planting; sandy soil, chocolate loam with a hard pan subsoil. Planted March 4, germinated March 17, matured July; yield very poor as our soil is not fit for corn on account of lack of rain. The season was generally very dry. Heavy frost March 22 and 23, thermometer going down ten degrees below freezing point. The corn was badly damaged by worms.

(107) H. C. SEIGIER. *Border, Colorado county* (S. E. Tex.).

Soil light sandy loam in good condition and moderate fertility; broken broadcast and bedded into four foot beds; rows opened with a shovel and covered with turning shovel and harrowed afterwards; plowed three times, first with small shovel, afterwards with 18-inch sweep; hoed twice. Planted April 4, germinated April 14, matured about June 20. Adams' Early corn yielded at the rate of fifteen bushels per acre; value about fifty cents per bushel.

(48) W. H. LOCKLAN. *San Gabrael, Milam county* (C. Tex.).

Land in good condition, mellow and well pulverized; black loam; very fertile; previously cropped in cotton. Planted March 10, germinated March 17, matured toward the last of June. Quality not good; quantity small; value small. I do not think this corn will do anything on this soil.

(49) J. W. TAYLOR. *Hunt, Hunt county* (N. E. Tex.).

Quality of this corn good, but came up to a very poor stand.

(114) H. R. LAMPTON. *Couch, Karnes county* (S. Tex.).

On account of hard rain and wind while the tassel was in bloom, this corn was a total failure. Do not like the corn.

(18) C. B. McGREGOR. *Millican, Brazos county* (C. Tex.).

Light sandy soil; previously used as a garden; well broken six inches deep in January and bedded with long bull tongue in February. Rows thirty inches apart, twenty inches in drill. Planted March 1, and germinated to a good stand in seven days; first roasting ears May 20, running from five to nine inches in length and well matured; made a large yield, and a fine corn for early garden.

(109) H. C. DAVIS. *Roanoke, Denton county* (N. Tex.).

Soil was very fertile; had been fertilized with stable manure during the previous winter; black sand, clay subsoil; melons had been planted on same during previous year; planted April 22, germinated April 28, matured July 3; yield, quality and quantity good.

(21) G. W. L. SPEARS. *Alto, Cherokee county* (E. Tex.).

Rich gray sandy land, third year's crop. Last year in Irish potatoes. Planted on March 20, germinated on March 30, bloomed fifty days after germination. It matured the earliest of any field variety that I have ever planted; corn very small, but well filled; value and quality good; the season was very unfavorable for garden corn. This variety is not valuable in this section except as an early roasting ear or for market gardening, but is entirely too small for general purposes.

FIELD CORN:

(80) THEO. BRASIG. *Peters, Austin county* (S. E. Tex.).

Condition of land was good; had been well broken and listed into rows four feet apart and planted about twelve inches in the row. Prvious crops Irish potatoes and beets. Planted March 15, germinated March 22, matured about the 20 of July; yield average about fifty bushels per acre. We consider this extra good in this section. The season was above normal. The only objection to this corn that I have is that the ears grew out of the shuck, which gave the birds an opportunity to damage them. I am now trying to keep the weevils out and will plant some next year, *as I believe that it is the best corn that I have had for a long time.*

(115) D. E. ROBERTSON. *Smithville, Bastrop county* (C. Tex.).

Planted on a good loose soil March 12 and germinated to a good stand. Had corn for table use the 29 of May.

12. CHUFAS.

(*Cyperus esculentus.*)

This plant resembles cocoa and nut grass more than it does any recognized crops. The sweet nuts that are formed at the base of the roots are much appreciated by hogs and are fattening in their tendency. On account of the fact that they are rarely dug in large quantities, it is difficult to indicate the yield of nuts per acre.

This crop, together with the peanut, is one of the most reliable that can be grown for hogs where a root crop is wanted. The Chufas mature during August or September and are usually recommended for cultivation on loam soils.

(40) J. H. BURKETT. *Curtis, Eastland county* (N. Tex.).

Chufas were planted March 17 in same soil as alfalfa and germinated to a poor stand. Yield estimated at about one hundred bushels per acre. They grew to a height of fifteen inches, spreads rapidly, and I will save several of the nuts to plant next year. The grass or tops make excellent grazing for stock.

(46) J. N. MILNER. *Cade, Navarro county* (N. E. Tex.).

I desire to say that Chufas are splendid for this country and great abundance of vines. I gathered more than one peck from eight hills when planted in hills, after my chickens and rabbits had eaten a great many before I knew of their theft. I am strictly for Chufas and I will plant all the seed I have another year for my hogs.

(53) F. W. BETTS. *Marietta, Cass county* (N. E. Tex.).

Soil in which Chufas were planted had been used some twenty-five years as a garden; moderately rich, rather loose wet sandy soil; hill land and dry; was well and deeply plowed and pulverized; usually productive. Planted April 12, germinated April 26 and harvested August 15, the tops being dead. Some bunches produced one-half gallon; quality very good; very large and plump. Season to plant in to June 1 was very dry, though from that time on the rainfall was above normal. Wood lice destroyed some bunches, eating the Chufas. The cause was perhaps due to such early maturity by being crowded and somewhat smothered by tomatoes.

(31) W. J. RODGERS. *Bowers, Polk county* (E. Tex.).

Chufas were planted in rich sandy, pine land. Planted April 15, germinated April 23, and continued to grow and mature until killed by frost. Yield was about one pint per hill; cannot say about value. Hogs have been running on them for two weeks, but have not noticed them as yet.

(54) H. M. VIMON. *Kosse, Limestone county* (C. Tex.).

Chufas were planted on a sandy loam soil; seconds years' timber land. Land is fairly good and drained very well. Planted about May 10, germinated about the 19; cannot say as to the quality and value, but is of the very best quantity. This locality seems to favor the growth of Chufas splendidly.

CHUFAS:

FIG. 9. SEED, HEAD AND ROOT OF CHUFA.

(55) J. H. STONE. *Deberry, Panola county* (N. E. Tex.).

Condition of soil was good, and on sandy soil with clay subsoil; well drained and had been grown in peanuts during previous year; planted April 4, germinated April 14; failed to mature, but matured about October 1. The yield was excellent, of good quality and large quantity. Do not know their value, but I prize them very highly. The season was splendid with excess of rainfall. I am well pleased with them and have saved about one peck of seed to plant next year.

(25) L. C. WORLICK. *Childress, Childress county* (N. W. Tex.).

Chufas were planted on new ground April 1 and about two weeks later they germinated; they grew off nicely; yield poor on account of dry weather.

(56) E. T. HUNTLEY. *Vernon, Wilbarger county* (N. Tex.).

Soil in first class condition; physical characteristics very poor. Planted April 15, germinated about April 25, matured about the 20 of September; no blooms; yield about one pint of good Chufas. Nothing interfered with the growth of chufas except moles and rats commonly called kangaroos in this country. I do not think it will pay to grow Chufas in this country on account of the rats and moles and also on account of so little rain during the summer.

(57) JOB DAVIS. *Ballinger, Runnells county* (C. Tex.).

Condition of soil previous to planting was good; sandy soil, from six to eighteen inches, clay foundation; natural drainage good. Had not been previously cultivated; fertility good as shown by vines grown, but nothing else. Planted April 19, germinated to a good stand; apparently good yield, but when died nothing but the shell was left. I think for this part of the country Chufas would be of little value, even if they should make a good yield, as the ground is, as a rule, too hard for the hogs to root.

CHUFAS:

(4) ROBERT E. WOOD. *Lexington, Lee county* (C. Tex.).

Chufas planted March 15, germinated March 26; very poor yield, but of good quality.

(58) G. W. WAGNON. *Mt. Enterprise, Rusk county* (N. E. Tex.).

Chufas planted March 16, germinated March 29; made good yield.

(59) E. R. TAYLOR. *Houston, Harris county* (S. E. Tex.).

Chufas planted on new land, black loam, broken in winter; was put in good condition; planted during May, germinated eight to ten days after planting. I would think they would be good hog feed. The party who planted same for me kept no record. The plant resembles very much cocoa grass.

(?) L. F. BROWN. *Runge, Karnes county* (S. Tex.).

Chufas planted March 10 and germinated March 20. There was any amount of young tubers by July 1, but none seemed to mature.

(60) R. M. LESESNE. *Henrietta, Madison county* (N. E. Tex.).

Planted on new land which had been cleared of timber—heavy postoak and small undergrowth of oak. First planted in corn and two years in vegetables. Chufas planted April 11, germinated April 20; matured about August 30; yield one-half or three-fourths pound per hill, or about six gallons to eighty-two hills. Quantity about one-third what the tubers will yield on warm natured sandy land. Valuable for poultry and hogs, no salable value except as seed. The season was too wet, then too dry, causing sudden check to plant growth producing inferior tubers. Rainfall was excessive. The plant is not very sensitive to a varying temperature. Chufa nuts were injured in March by some insect feeding on the nuts, destroying the kernel and leaving the empty shell. I planted eighty-two hills of Chufas and about three nuts to the hill, growing three pints of the seed. A great many of them did not germinate. I transplanted, but failed to get a stand, still I regard Chufas as a very fine food for hogs and profitable on land suited to it. I planted it about eighteen years ago on a red sandy upland and had an abundant yield, averaging nearly two pints per hill. They are fine for poultry. I think they will seed themselves if the hogs and poultry will permit, and they are easily exterminated.

(13) D. A. KNOX. *Columbia, Brazoria county* (S. E. Tex.).

Soil well pulverized, not well drained; cultivated in cotton the year before; medium fertility. Planted May 1, germinated May 15. Yield very small; do not think the crop worth anything in this section.

OTHER FORAGE CROP WORK.

In addition to the results herein published we have in hand much valuable data bearing upon the crops grown in many sections of Texas under our supervision for some five years past. These results we have not yet been able to prepare for print, but a report containing this matter will be published in the near future.

Besides the purely varietal work, the station has under way at several points fertilizer experiments with cotton, corn and tobacco, and has also made arrangements with a large rice growing concern for the testing of imported varieties of rice. Fertilizer work will also be instituted with this crop.

The station has recently entered into an agreement with the Department of Agriculture at Washington, D. C., to investigate grass and forage plants on a larger scale. Circular No. 8 from the office of Secretary Wilson, comments on this work as follows:

"THE NATIONAL DEPARTMENT'S OPINION.

"On account of its large size and great variety of soil and climatic conditions included within its boundaries, Texas presents a variety of forage problems, some of which are exceedingly complicated. The stock industry is by far the most important one in the State and is carried on in all the different ways, from the open ranging of large herds in the western part of the State, the large areas of fenced lands in the middle and northern parts to the more intensive methods of the closely settled sections in the southern and western parts. In this State are to be met the problems of range improvement: drouth resistant forage crops, annuals for rotation with the cotton crop, winter annuals for winter and spring pasturage, formation, cure and management of permanent meadows and pastures, and crops suited to alkali soils, and for the overflowed lands of the coast and river bottoms.

"At the Experiment Station the value of alfalfa and the sorghums has been well demonstrated. An excellent plan of co-operation between the station and the farmers of the State has been devised and put into successful operation, and a considerable amount of preliminary work has been done in the improvement of the native pastures by the use of Bermuda grass, burr clover and other introduced varieties. After a long conference with the director and argiculturist of the station, there seems to be four lines of investigation along which co-operative work might be arranged, and they are here given in what seems to be, under the present conditions, their relative importance.

"The first question is that of improvement of meadows and pastures, particularly in the middle and southern portions of the State, including annual and winter-growing varieties of grasses and forage plants, as well as the more permanent perennials. The diversity of soil and climatic conditions included make it necessary to consider this question from a number of different directions, although the general problem may be the same. In part, this work has to do with the actual formation of meadows and pastures, and in part with the changing of the natural fields to better and more productive ones through the addition of improved and more hardy varieties. The second question has to do with the drouth resistant grass and forage crops, and is essentially the same here as in the other Southwestern States; so likewise the third problem—that of range improvement, and also the fourth—alkali resistant crops.

"After going over the whole matter with Director Connell, and conferring also with our special agent at Abilene, and many stock raisers and farmers in different sections of the State, I am confident that the most important problem, and one in which most good can be accomplished by co-operative investigation, is that of the improvement of meadows and pastures. Moreover, the conditions are espe-

FIG. 11. SEED ROOM OF THE EXPERIMENT STATION.

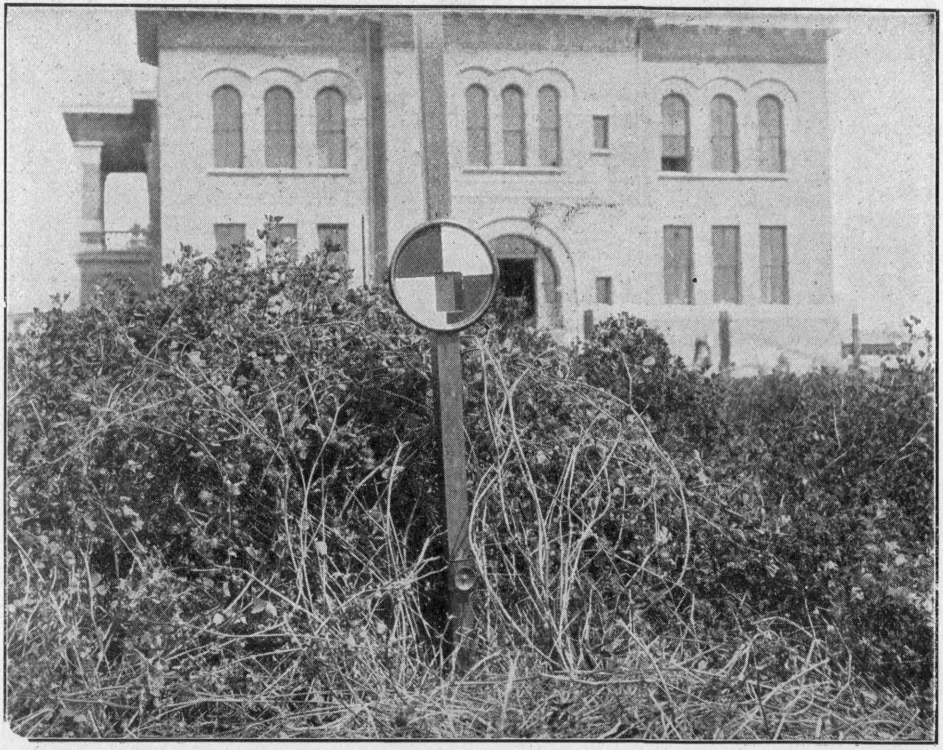

FIG. 10. WINTER GROWTH OF BURR CLOVER.