

TEXAS AGRICULTURAL EXPERIMENT STATIONS.

BULLETIN NO. 94.

Horticultural Section, March, 1907.

Horticultural Survey of Gulf Coast

By Edward C. Green



Setting Bermuda Onions

POSTOFFICE
COLLEGE STATION, BRAZOS COUNTY, TEXAS.

TEXAS AGRICULTURAL EXPERIMENT STATIONS

OFFICERS.

GOVERNING BOARD.

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

K. K. LEGGETT, President	-	-	-	-	-	Abilene
T. D. ROWELL, Vice President	-	-	-	-	-	Jefferson
A. HAIDUSEK	-	-	-	-	-	LaGrange
J. M. GREEN	-	-	-	-	-	Yoakum
WALTON PETEET	-	-	-	-	-	Dallas
R. T. MILNER	-	-	-	-	-	Austin
L. L. MCINNIS	-	-	-	-	-	Bryan
W. B. SEBASTIAN	-	-	-	-	-	Breckenridge

STATION OFFICERS.

H. H. HARRINGTON, LL. D., President of the College.

J. W. CARSON	-	-	-	-	-	Vice-Director
M. FRANCIS	-	-	-	-	-	Veterinarian
E. J. KYLE	-	-	-	-	-	Horticulturist
F. R. MARSHALL	-	-	-	-	-	Animal Husbandry
R. L. BENNETT	-	-	-	-	-	Cotton Specialist
O. M. BALL	-	-	-	-	-	Botanist
G. S. FRAPS	-	-	-	-	-	Chemist
A. F. CONRADI	-	-	-	-	-	Entomologist
EDWARD C. GREEN	-	-	-	-	-	Assistant Horticulturist
C. E. SANBORN	-	-	-	-	-	Co-Operative Entomologist
JOHN C. BURNS	-	-	-	-	-	Assistant Animal Husbandry
C. O. MOSER	-	-	-	-	-	Deputy Feed Inspector
M. S. CHURCH	-	-	-	-	-	Deputy Feed Inspector
H. E. HANNA	-	-	-	-	-	Deputy Feed Inspector
C. W. CRISLER	-	-	-	-	-	Clerk Feed Control
C. A. POFFENBERGER	-	-	-	-	-	Chief Clerk
Miss M. H. WATKINS	-	-	-	-	-	Stenographer

STATE SUB-STATIONS.

S. A. WASCHKA, Superintendent	-	-	Beeville, Bee County
W. S. HOTCHKISS Superintendent	-	-	Troupe, Smith 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 and bulletins are sent free upon application to the Director.

A HORTICULTURAL SURVEY OF THE GULF COAST.

The writer has been fortunate in having enjoyed the experience of watching the rapid and remarkable development of that vast region of South Texas generally known as the Gulf Coast, through the three years which, from a horticultural standpoint, cover its history. Three winters ago the towns named on the time card, the fields of cotton and corn, the gardens and orchards, existed only in the inspired imagination of the advance agents of progress, while today all these exist in veriest reality. Three years ago the inspecting party took meals in surveyors' tents or enjoyed the hospitality of the ranchmen, while at the present time the traveler finds hotel accommodations along the line equal or superior to those of any other rural part of Texas. The growth and development of the whole region has been marvelous, and the results obtained by the farmers and truck growers have been very satisfactory. During the last visit to the Gulf Coast country the writer has taken occasion to investigate with considerable care the records of the achievements of the truck growers of this new and most interesting section of our state, even going so far as to obtain and copy the original bills of sale returned from commission men, and by cross-checking the reports made by the growers with the book records of the local Truck Growers' Association, the results from given acreage of various crops have been obtained.

The scope of the inquiry was not merely the determination of the accuracy of reports of extraordinary yields of various truck crops, but included the more important matters of determining what varieties and methods of culture, rotation and irrigation had proven most advantageous; what classes of crops were most profitable under the varied soil and climatic conditions of different localities; what were the dates of planting that experience had shown most desirable with the number of days required to bring the crops to market maturity; what insects and diseases, if any, had appeared and to what extent did they threaten the truck industry. The methods employed in harvesting, packing and marketing, came in also for their share of investigation. Information was most freely given, it being generally agreed that could all the facts concerning practical details be put in printed form and placed before the hundreds of new arrivals in the Coast country who begin operations for the first time the coming season, each and every recipient of such information would be saved from some at least of the blunders which even an experienced trucker is likely to make when starting in a new country under conditions with which he is not wholly familiar. The truck growers who have pioneered in the Coast country these past two years, if they did not already possess it, have imbibed the broad, generous spirit of the west to that extent that they wish to share freely with the new-comer all the benefits that have accrued from two years of what has been in some instances, serious and costly experience. These men are the salt of the earth and the equals of the most liberal and intelligent of the gardening profession. The home builder in South Tex-

as is not only fortunate in his new soil, fortunate in his new climate, but most fortunate in his new neighbors.

As to general advice to new-comers who are now clearing land preparatory to their first year's operations, the consensus of opinion of those who have passed this stage is, that it is not wise to attempt special truck crops on the new land, but rather to plant cotton and corn or sorghum the first season and in this manner subdue the wild land by plenty of culture with team tools. Land from the brush can seldom be economically prepared for truck crops the first season, and disappointment is likely to result from the attempt. On the other other hand cotton will flourish on new soil and produce returns which, labor considered, are fairly proportionate to those obtained from truck. Corn with favorable rains or timely irrigation will make two crops a year, while the nature of the plant allows a system of culture which is most beneficial to the new land.

As to the crops for the various localities visited, the successful truckers list them, in order of profitableness and certainty, about as follows:

Corpus Christi.—1st, cabbage; 2nd, cucumbers; 3rd, onions; 4th, beets.

Kingsville.—1st, carrots; 2nd, beets; 3rd, onions.

Sarita.—1st, Irish potatoes; 2nd, water melons; 3rd, cucumbers.

Raymondsville.—1st, water melons; 2nd, onions; 3rd, Irish potatoes; 4th, cucumbers.

Harlingen.—1st, water melons; 2nd, onions.

Brownsville.—1st, cabbage; 2nd, onions; 3rd, Irish potatoes; 4th, cucumbers.

Santa Maria.—1st, onions; 2nd, cucumbers; 3rd, beans; 4th, cabbage.

While there is some difference of opinion among individuals as to the relative value and profit in certain crops, still the above exhibit represents fairly the general opinion of each locality and the relative acreage planted this year at each place supports the arrangement. It is well for the stranger to forego for a season or two any preconceived notions he may have as to what crops will prove most profitable, and in his general planting follow very closely the crop plan in vogue in the section in which he settles. As a rule excellent reasons exist for the scheme of planting adopted in a locality.

The following paragraphs consist of notes secured from successful truck growers at points visited during the December survey of 1906:

CORPUS CHRISTI.

Owing to lack of irrigation facilities in this locality cabbage and onion seed are sown in the field direct. The variety of cabbage most popular with the truckers is the Early Flat Dutch. The seed is sown from Sept. 1st to Dec. 1st, with hand seed drills, and subsequently, "chopped out to a stand" with a hoe in a manner similar to the way cotton plants are thinned. A plant is left every eighteen inches or two feet in rows three and a half feet apart. Seed sown later than Dec. 1st, says Mr. Emmert, a successful and experienced Corpus trucker, produces plants which mature heads in March when the heat is likely to injure them, and when the price usually becomes too low to warrant shipping. A further



(5)

Harvesting Xmas Spinach at Corpus Christi

—Photo by Author

difficulty is experienced in that young plants are frequently killed in the cold weather often experienced in January and February, whereas older cabbage go through with little injury.

CUCUMBERS.

Cucumbers are planted from Feb. 15th to March 15th, in rows five feet apart, three to four feet apart in the drill, and the plants are subsequently thinned to three in a hill. The improved White Spine variety is most satisfactory. Buyers are usually on hand to purchase the crop delivered at the side track. Last season the prices ranged from 40 to 60 cents per bushel for straight cucumbers six to eight inches long. A good average yield runs about 200 bushels per acre.



Standard Size White Bermuda.

ONIONS.

Bermuda and Creole onions are equally popular at this place. The latter is a good "keeper", and may be held until the market is clear of Bermuda and then sold at good prices in Texas towns. Seed is drilled in rows 14 to 18 inches apart, about one or two pounds of seed per acre being used. Thorough preparation of the land before planting and good culture throughout is essential to success. From 8,000 to 12,000 pounds per acre is the usual yield, no irrigation being practiced.

BEETS.

The Crosby Egyptian variety is most commonly used as a winter crop. This beet has been replaced by other varieties such as Electric and Crimson Globe by growers at other points, and the writer believes, for excellent

reasons. (See Beeville Experiment Station Bulletin on Onions and Bunch Crops). The cultural notes for this crop will be found under the discussion of beets at Kingsville.

LETTUCE.

Big Boston and Florida Headere are the varieties commonly used. Seed sown in drills in November and December, thinned and given good cultivation, produce a marketable crop in about 100 days.

TOMATOES.

The Dwarf Champion and other dwarf varieties are planted almost exclusively. The seed sown in frames about Dec. 15th, or planted in the open field after Feb. 15th. The plants transferred from frames mature fruit about May 1st.

BEANS.

Several varieties of beans are popular among the truckers of Corpus. For earliest the California Pink, or Frijole, is very satisfactory for Texas markets. For northern shipment the Round and Flat Wax, Stringless Greenpod and Valentine are generally planted. From one-half to three-fourths bushel of seed per acre is drilled in rows two and a half feet apart. Much thinner planting is practiced than by northern growers of this crop. Quality and freedom from "rust" are thought to result from the thinner planting. Harvest begins from six to eight weeks from time of planting according to variety, and continues for a variable length of time. From one to two hundred bushels of pod beans have been harvested per acre. Returns are variable, but as a rule the crop is satisfactory and profitable.

CANTALOUPE.

Rockyford and Gem melons are produced, having excellent quality, and for Texas points in some instances it has paid to grow them. As a rule, however, this crop is not looked on with favor by the truckers.

KINGSVILLE.

Two years ago the Kingsville truckers were not, individually or collectively, as they are today, skilled gardeners. Their ranks were filled by business men, reformed engineers and brokers who came to the garden of the South and boldly and blindly plunged into truck growing. What they lacked in technical knowledge they made up in energy and enthusiasm. They read no books chiefly because there are no gardening publications which cover the subject for this climate, but they visited Laredo and other "educational centers" and absorbed all the information possible, then returned to Kingsville and put the same into practice as rapidly as the Mexicans got the cactus off the ground. The Agricultural faculty of the Texas Agricultural and Mechanical College visited their local Farmers' institute to discourse on their ideas and theories as to what would do well in the new country; ideas and theories that the professors themselves were far from sure about. These, together with many others of their own, the truckers speedily put into practice. History made rapidly, and within two short and hurried years the experimental field, with respect to vegetable varieties and kinds of crops, has been exhausted and a rational system of irrigation has been established. At present the energy and enthusiasm re-

(8)



"Icing" Radishes and Lettuce for Express Shipment

mains as at first, but the money making trucker has narrowed down his field of operations to three principal crops. The two years of active experimentation and investigation has accomplished for the community what would have required twenty years in an old staid section, and more, too, because certain innovations proved valuable and they will be copied by other older truckers when their value becomes known and appreciated. For example, the Kingsville trucker puts a common axle through two hand seed drills, removes one handle and steadies with a rod the remaining three. By hooking a good mule onto the coupled drills one man easily does the work which, with the old hand power method, could not be accomplished by four. Likewise he arranges a triangular orchard harrow by removing four teeth so that a mule and man can do the cultivating usually performed by hand labor alone. No matter where the home seeker locates in the Gulf Coast, he should stop off at Kingsville to visit the truckers about there and obtain in a few days a liberal education in truck gardening in the far South. The Kingsville Truckers' Association consisted last year of twenty-three members, and to these twenty-three were distributed over \$17,000.00 as net return for truck handled through the Association officers. To the truckers and farmers of the locality about \$30,000.00 was paid for cotton, much of which was raised on land from which a truck crop had been harvested. As above said, there have been many, but at present there are only three crops to which the average trucker pins his faith: carrots, beets and onions. They are grown in this manner:

CARROTS.

Chantenay and Oxheart varieties are considered standard. The rows are planted 14 inches apart, but every third row is skipped to allow space for the furrow through which irrigation water is applied. The furrow row is thrown out with a "middle buster," the seed planted with the coupled seed drills and the subsequent cultivation is performed with a mule and an orchard harrow from which the central side teeth have been removed. Cultivation is given every week and after each rain or irrigation. When carrots are allowed to reach the size adopted at Kingsville (5 to 6 inch roots) about 130 to 160 days are required to bring them from seed to maturity. They are bunched, washed and packed in cabbage crates, which hold about 170 pounds of carrots, and shipped in refrigerator cars to various markets. One grower raised three and one-half acres last year which produced an average of 80 crates per acre. He estimates the cost of growing and harvesting at \$30.00 per acre. Sales accounts from Chicago and other points show that those carrots which left Kingsville in good condition sold at from \$4.00 to \$5.50 per crate. The iced freight service from Kingsville to Chicago costs \$1.43 per crate on carrots and beets. This grower considers that his crop netted him over \$250.00 per acre f. o. b. Kingsville.

BEETS.

The varieties grown last year were chiefly the Eclipse and the Base Ball. The row arrangement was the same as for carrots, alternately 14 and 28 inches between rows. It is thought desirable that the seed should be sown between Nov. 1st and Dec. 15th, as it requires 3½ to 4 months to grow beets to the size used by Kingsville truckers, and the market for

beets usually fails in April. There is a further reason for avoiding planting much later than the middle of December; the beet plant, when old and well established, resists frosts perfectly and survives even sharp freezes, but while young it is rather tender to cold. "Northers" are to be expected in January and February and it is desirable to have the beets well grown before these cold winds are due.

When the plants are up they are thinned to a stand of two inches in the row by some, and left unthinned by others. In favor of thinning uniformity in size and an earlier general crop are the points gained. From thinned fields the entire yield may be gathered in ten days, while the harvest from unthinned patches may run from twenty to forty days.

The cultivation given beets is the same as for carrots and the same shipping package is used. Beets planted Nov. 1st, 1905, were harvested early in March 1906. They were washed, outer leaves pulled away, tied three or four in a bunch and shipped chiefly to Chicago. Beets prepared in this way sold as high as \$5.50 per crate. Similar beets from which the tops were largely cut away, sold at from \$1.00 to \$2.00 per crate, thus barely paying freight charges. Where tops were removed in this manner a further loss was sustained by those who experimented with this method of marketing in that fifteen dozen bunches were required to fill the crate which seven dozen bunches would fill with tops left on. As a matter of fact the writer believes that another equally serious blunder was made by the growers in regards to the size of the young beets shipped. This point will be referred to later in the paper.

ONIONS.

This crop is grown in the manner usual for Bermuda onions, being planted in seed beds the last of September or first of October, and subsequently transferred to the field. An acre of seed bed furnishes abundant plants to set ten acres. A full treatment of Bermuda onion culture may be had by writing the Texas Experiment Station, at College Station, Texas, for their bulletin on "Onions and Bunch Crops." The Kingsville onion grower uses the furrow system of irrigation, as with the bunch crops above discussed, and the same row system of planting. When the onions begin to swell the earth is moved toward the row in cultivation to keep the bulbs covered with soil. In this particular the Kingsville method differs from that generally used, but the peculiar treatment is said to be essential in their dark soil to prevent sun-scald. The crop is harvested by running a sweep under the rows after which the work is done by hand in the usual way. Sheep shears have been found more satisfactory for trimming than a knife, the work being done more rapidly and less injury resulting from neck tears, due to dull knife or carelessness.

About 90 acres of onions were raised about Kingsville in 1906, and 46 car-loads averaging 501 crates per car were shipped. Owing to the excellent service rendered by the Southern Texas Truck Growers' Association, good sales were made throughout the season, the average price being 85c per crate f. o. b. Kingsville. The average yield was high for a whole community and speaks well for the general skill and ability of the growers. Certain acres yielded as high as 24,000 pounds, or 480 crates per acre and

the best car sale during the season was for \$1.25 per crate f. o. b. Kingsville, but the high average of the whole community is more remarkable than the exceptional yields of a few acres or the sale of a car at an exceptionally good figure.

The cost of growing and harvesting an acre of onions varies with labor conditions, cost of irrigation, water, etc. It is probable that the price ranges from \$50.00 to \$75.00 per acre. At the Beeville Experiment Station under the skilful management of J. K. Robertson, the entire cost amounted to \$67.00 an acre exclusive of shipping package. So long as the returns average up 85c per crate net for a whole community, as they did last year for Kingsville, onion growing will remain an eminently satisfactory industry. A crop of cow peas is usually grown on the land after the onions are gathered.

CABBAGE AND OTHER CROPS.

Cabbage and other crops, such as okra, beans and spinach, are raised by some growers, but these crops have not enjoyed general favor. Some interesting facts have been observed by those who have experimented with them. For example, two fields of cabbage plants of equal size and same variety experienced the freeze of Jan. 25th, 1906, together. One field of three acres had been freely irrigated on Jan. 24th, the other a ten acre field was very dry the night of the freeze. The irrigated field came through with a loss of 10 per cent. of the plants killed; the dry field was killed out entirely. This would indicate that in the face of expected severe cold liberal irrigation would tend to protect crops liable to injury.

Valentine and Round Wax beans planted Feb. 10th, were ready for harvest seven and eight weeks later. From two acres a yield of 200 bushel hampers was obtained which netted about \$150.00. The crop held the land about three months.

SARITA.

At Sarita, though only a few miles south of Kingsville, an entirely different soil is found, and it is due to this circumstance that the most profitable crops are of a different class. The land at this place is a very fine loose sand, containing as a rule considerable humus. Those most familiar with the country advise the writer that the land is rich and upon applying water alone excellent crops are raised. Owing to the dry climate this is to be expected, as the accumulated nitrates of years have not been removed by washing rains. The experience of the gardeners substantiates these views, and it is believed that with careful use of irrigation water, and up-to-date farming methods, commercial fertilizer may not be necessary for several years.

IRISH POTATOES.

Last year 40 acres of Bliss Triumph potatoes planted Feb. 17th and later, were harvested from the middle to the last of May, the crop amounting to 2,775 bushels, an average of 69.4 bushels, per acre, and this without fertilizer and with an extra early type of potato whose habit of growth, in common with all extra early sorts, precludes the possibility of large yields such are obtained from late varieties. The crop, though late for this sec-

tion, averaged \$1.00 per bushel f. o. b. cars. The seven acres first planted yielded 800 bushels and this fact is an eloquent comment on Sarita soil when it is understood that the potato grown was an extra early variety, that only eight bushels of seed per acre were planted, that no irrigation was given, that no fertilizer was used and that three cultivations were all the crop received. The plants were injured severely over the entire 40 acres by an insect attack which gained serious headway before insecticides could be brought to bear.

The tubers were cut to two eye pieces and planted by machine about five inches deep. As the plants appeared above ground the land was worked over with a spike tooth harrow crosswise the rows. Subsequent culture consisted of running through the rows three times at intervals with a five-tooth cultivator. The crop was harvested with a machine digger, sacked and shipped to northern markets.

The "scab" injured some of the potatoes owing to the fact that no preventive treatment had been given the seed. A method for the control of this disease, together with a discussion of the insects attacking Gulf Coast crops, will be given in a later paragraph.

From the above and other potato experiences at Sarita the truckers are agreed that the potatoes should be planted in January to bring most profitable results. The Triumph potato "makes" in ninety days, and there appears to be no sufficient reason why the crop should not be planted earlier and harvested by the first of May.

As in East Texas at the Troupe Experiment Station, the experience at Sarita has shown that the popular Early Rose of northern gardens is most unsatisfactory and unprofitable in our southern climate. The Triumph potato appears to maintain its reputation as being the best red potato for Texas growers.

WATERMELONS.

The earliest comers appreciated at once the natural advantages possessed by Sarita for melon culture, and watermelons has been a popular crop from the start. A typical experience of one of the growers is as follows: In November and December the land was flat broken with a turning plow, bedding to lines eight feet apart on which the rows were to be planted. Instead of breaking to a "dead furrow," a foot strip was left, with such weeds and grass as were on it to break the force of the winds which prevail in March. As the gardener in mind grew for the St. Louis market, the Triumph and the Black Diamond were the varieties planted. For Texas markets, or where a melon of superior quality is appreciated, the Alabama Sweet is usually grown. Seed was planted March 1st, in check rows eight feet apart, and when established the plants were thinned to three in a hill. Occasional cultivation was given with the "five-tooth." On June 1st, the first car-load of 800 melons was shipped, though the load could have been harvested a few days earlier. Four other car-loads carrying from 800 to 1,400 melons each were shipped from the 20 acres grown, and the sales at St. Louis made a total of \$1,001.00, the first car bringing \$300.00, the last \$76.00. The yield was considered to be about one-half what could be reasonably expected, and the grower concedes that errors were made in growing the crop. This year he will plant the seed two weeks earlier, thin

his plants to two in a hill, and give more space between rows. More experienced growers in Texas leave only one plant each to hills spaced ten to twelve feet apart each way. Neither fertilizer nor irrigation was given the crop above described. Another grower at Sarita shipped 21 cars from 65 acres last year, still another obtained 10 cars from 40 acres. Different markets require melons of different sizes; for example, St. Louis demands melons which weigh from 35 to 40 pounds and pack 800 to 1,000 in a car, while El Paso, Dallas and Kansas City prefer 25 to 30 pound melons, but demand superior quality.

CUCUMBERS.

It is believed by an experienced grower at Sarita, that cucumbers would prove a very profitable crop provided sufficient acreage was grown to make car-load shipments possible. About 15 acres would be necessary to make car-load pickings every two or three days. The crop is grown here as at Corpus Christi, for the production of "slicers." Last year three acres of White Spine planted March 1st, produced "cucks" six inches long on May 5th, when first shipments were made. Packed in barrels, they sold on St. Louis market at from \$5.00 to \$5.50 per barrel. About 60 bbls. were shipped before competition with Corpus Christi bulk shipped "cucks" lowered the price to that extent that further express shipments were unprofitable. Over half the crop was not harvested for the above cause and for the further reason that the Mexican laborers could not be taught to pick with sufficient care. It is essential to success with the crop in question that all cucumbers of market size should be harvested every other day in such a thorough manner that few, if any, are left to grow too large. A six inch cucumber begins to draw very strongly on the vitality of the vine, and left two days too long in the growing season reaches an unmarketable size, hence by over-looking cucumbers that are ready a two-fold loss is experienced, vine vitality, which lessens the possible yield to come, and directly, the over-grown cucumbers themselves.

With earlier planting, say Feb. 15th, forward, larger acreage to make car-load shipments possible, and with the trained pickers which experience will develop, this crop should prove a desirable one in view of the fact that the soil conditions are especially suited to it.

OTHER CROPS.

Lettuce grows to perfection through the winter, but the writer found no extensive plantings nor any record of shipments or sales. Cantaloupes of most excellent quality are grown at this place as in attested by one of the most successful cantaloupe growers from Rockyford, Colo., now living at Sarita, but on account of the attacks of the melon louse the crop cannot yet be recommended as a commercial proposition. Cotton, corn and cow-peas may be planted to follow any of the crops above mentioned; the last named is especially well thought of by the truckers, as their experience shows that wherever cow peas are grown and plowed under greater yields result than from the best new land when cropped for the first time. This has been found true especially with watermelons.

RAYMONDSVILLE AND HARLINGEN.

The horticultural annals of the localities surrounding these towns are necessarily brief in-as-much-as there is little past experience to record. At Yturria, near Raymondsville, it is reported that last season 40 car-loads of Alabama Sweet watermelons were sold, bringing the growers approximately \$3,000.00. The time of planting and method of growing are practically identical with Sarita practice. Development work is progressing very rapidly and with much enthusiasm. It is reported that 300 acres of watermelons will be planted the present season beside a considerable acreage of Irish potatoes, cucumbers, and onions. Several thousand oranges, figs, pecans and European grapes have been planted, and the trees and vines look promising. The soil varies from Yturria to Harlingen, from sandy, approximating that of Sarita, to black, waxy loam, heavier than that of Kingsville.

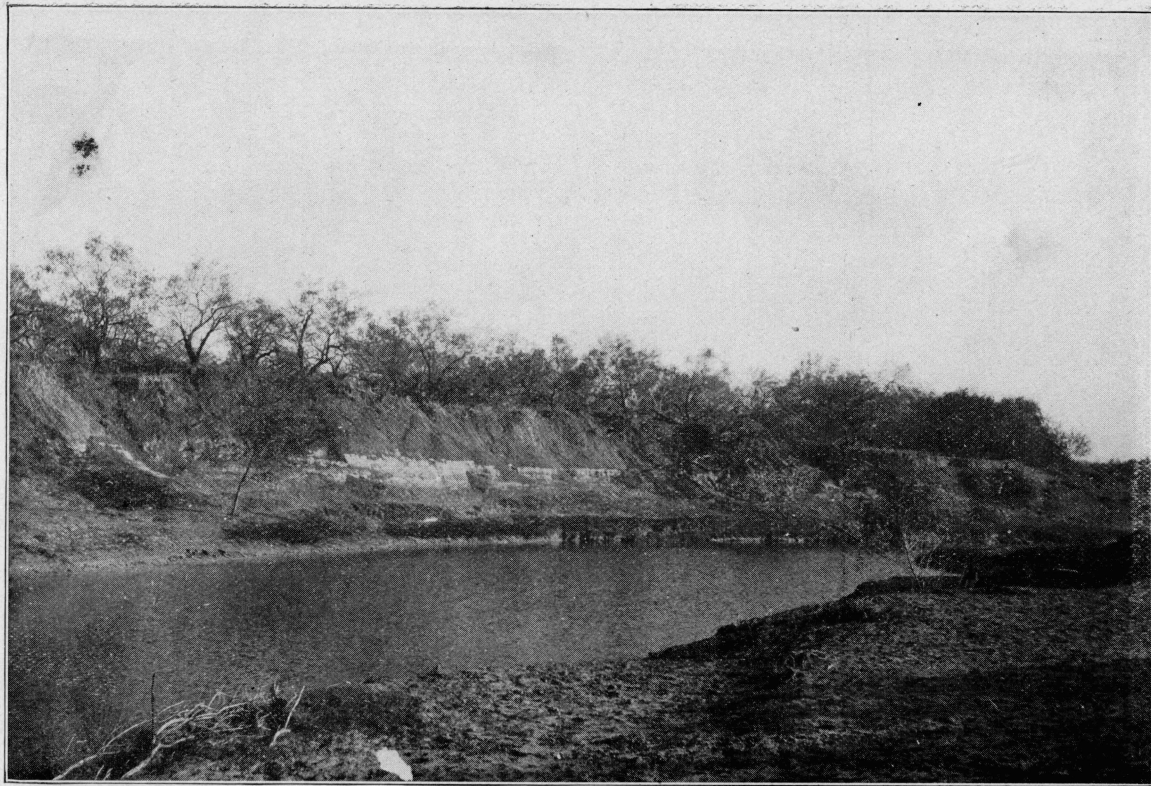
BROWNSVILLE.

At this old town gardening has been carried on in a small way for very many years, but the extent of operations was limited to what may be called kitchen gardens. It is only since the railroad came that extensive plantings have been made, and within this brief period some of the largest truck farms of the South have been developed. All manner of truck is grown through the winter and even the most tender vegetables, such as beans, are produced in December and January. Judging from this year's planting, however, it appears that the largest growers depend chiefly on the bulk crops which lend themselves to car-load handling. One company whose property the writer visited has 135 acres in Early Flat Dutch cabbage, 9 acres of cauliflower and 42 acres in onions, and plan to plant 50 acres of watermelons, 6 or 8 acres of beans and 5 acres of cucumbers during the coming February. Other growers also have extensive plantings.

Cabbage planted in seed beds Sept. 1st, were moved to the field Oct. 3d, and on Dec. 4th, the first head was taken from the field. Car-load shipments were possible the last part of December. Cauliflower suffered from black rot to a considerable extent, which was especially unfortunate in that a simple seed treatment might have entirely prevented the trouble. Onions are grown in the usual manner and irrigation is practiced similar to that employed at Kingsville, where the soil is inclined to be heavy. Where the lighter alluvial soils prevail the flooding method is employed. The other crops mentioned are grown in a manner practically identical with that described for other points further north. It is an interesting fact that the Bermuda onions raised in South Texas last year were shipped to Los Angeles, Cal., to Seattle, Wash., to Montreal, Canada, and to Halifax, Nova Scotia, as well as to other markets less distant.

SANTA MARIA.

For rapid development from brush and cactus to intensified profitable gardening Kingsville made a two-year record which probably had never been equalled up to that time, but the progress of Santa Maria since the completion of their canal, a year ago, has eclipsed even that of Kingsville. This is due, not to any greater energy or intelligence on the part of the Santa Maria growers, but to the presence among them of



(15)

Showing Depth of Alluvial Deposit in the Valley of the Rio Grande

—*Photo by Author*

men who had several years experience. J. K. Robertson and S. A. McHenry had made exceptional successes in winter gardening at Beeville and Cuero, and had enjoyed the advantages incident to conducting truck growing experiments at the State Experiment Station at Beeville, of which each in turn had been superintendent for several years. A. P. Wright also, and others had had several years experience with Texas climate and winter crops, hence Santa Maria has enjoyed from the start great advantages in the way of expert gardeners who were fully acquainted with Texas conditions, and whose long experience made costly experimenting unnecessary. The first season after the opening of the canal 86 car-loads of produce were shipped from this place. In point of acreage planted during this season (winter 1906-07) onions, as at Brownsville, appear to take the lead, about 100 acres being set. Cucumbers come next with 50 acres, followed by beans 40 acres, cabbage and cauliflower 20 acres, and lettuce, spinach, eggplants, peppers and beets about 10 to 20 acres each.

The Bermuda onions are grown in the usual way in broad beds and irrigated by flooding. At Santa Maria, as at Brownsville, the earliest onions of the country are produced, and in size and quality they are unsurpassed.

CUCUMBERS.

This crop may be planted here early in February, though commercial planting would not be recommended earlier than the 15th. The genial climate causes the plants to grow with unusual rapidity and thus the crop gains a few days on the time usually required for the "cucks" to reach market maturity. The wonderfully rich alluvial soil makes exceptional yields possible. Last year the best acre grown produced 425 bushels of "slicers," the field yield ranging from 200 to 400 bushels per acre. The net returns averaged for the entire season 25c per bushel to the growers. The White Spine is the popular commercial variety.

BEANS.

The varieties used by Santa Maria growers are Frijole (Cal. Pink) for early, with Valentine, Black Wax and Stringless Greenpod to follow. The Frijole is the hardest of the beans and reaches market maturity 45 days from planting. The ground for all beans is especially well prepared before planting, and cultivation after the plants are up is given only when the leaves are dry, as stirring the soil before the dew is off in the morning or while the foliage is wet from rain appears to cause an immediate and unusually serious attack of rust.

Black Wax and Stringless planted Feb. 17th, last year, were ready for picking April 4th, and the harvest continued until May 23rd, the bulk of the crop being gathered, however, between April 10th and 27th.

Between May 23 and Sept. 10th, this land produced a good crop of corn and on the last named date was again planted in beans. On Oct. 31st, the bean harvest was again ready and it continued until Nov. 21st, when the vines suffered from rust caused by a cold rain. They recovered later to some extent and more beans were being harvested from them Dec. 20th and 21st, when the writer visited the section.

Santa Maria growers plant their beans in rows two feet apart and use about one bushel of seed per acre. The best acres yielded about 150

bushels of string beans at each crop and the prices obtained ranged from 50c to \$2.50 per bushel hamper f. o. b. Santa Maria.

CABBAGE AND CAULIFLOWER.

Cabbage is grown as at Brownsville, variety same, time of planting, etc., being closely similar.

The skill of the Santa Maria gardeners is especially exemplified in the appearance of the cauliflower grown there. J. K. Robertson, who is widely recognized as an expert with this crop, was gathering the first heads Dec. 20th, from a field which was set Oct. 13th. The plants at date of harvest were three feet tall and their foliage nearly closed the four foot spaces between the rows. The field presented a superior appearance to any seen by the writer within the past two years. Cultivation had been perfect and there was no trace of the dreaded black rot to be found.

BEETS, ENGLISH PEAS AND OTHER CROPS.

Beets of the Electric and Crimson Globe varieties are popular with the Santa Maria growers, and at the time of the writer's visit bunch beets were being shipped for Christmas market. Ventilated sugar barrels were used for shipping packages, and from nineteen to twenty-one dozen bunches of beets (with tops) were packed in each barrel. English peas were being harvested for the Christmas trade also, the Alaska variety being the one observed. This crop, though profitable, is not in favor on account of the difficulty experienced in obtaining labor for picking. Other crops such as pepper, eggplants, okra, summer squash; etc., are grown with profit in a limited way. As at Brownsville, all tender vegetables can be produced slightly earlier than at other points further north along the Gulf Coast.

INSECTS AND DISEASES.

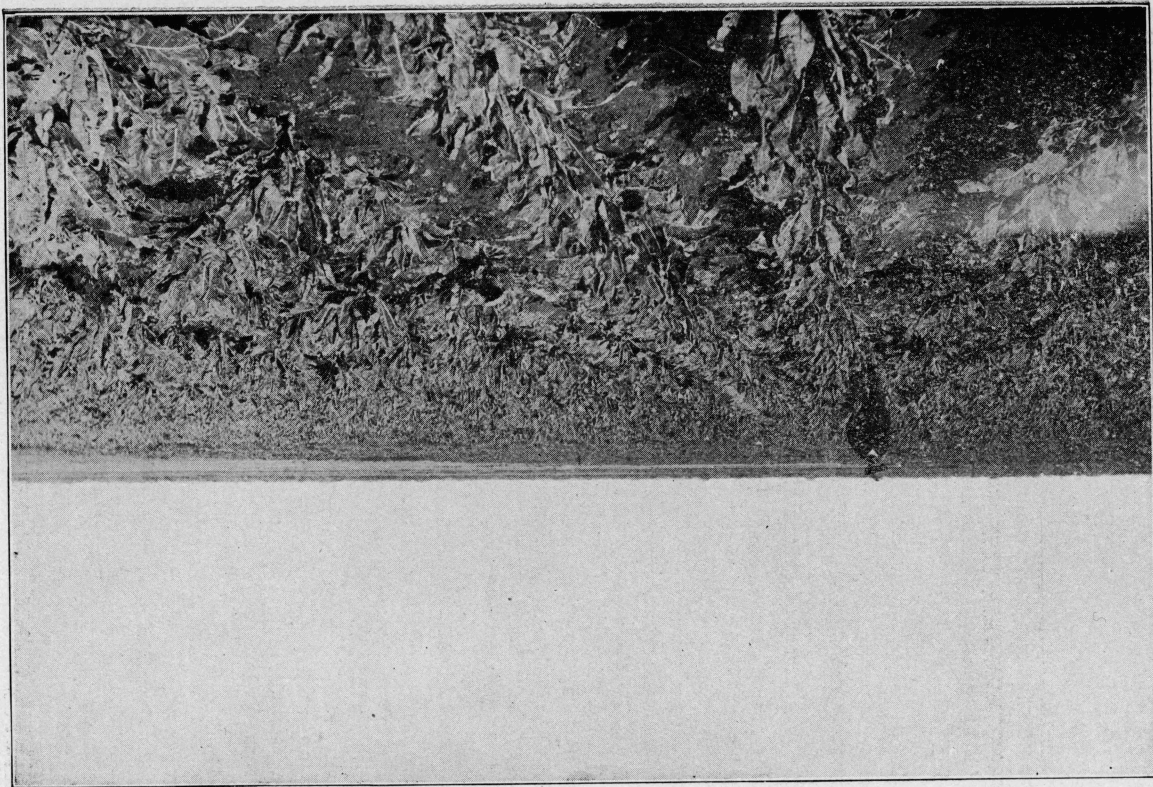
A peculiar and unusual insect attack on potatoes occurred last season at Sarita. About the time tomatoes were ripening the common tomato worm appeared suddenly and in great numbers. The tomato vines were eaten to the ground within a few days and the worms then invaded the Irish potato field, destroying some acres almost, and injuring the entire field to a considerable extent before poisons and spraying machinery could be obtained from Corpus Christi. The potatoes were sprayed with strong poison water, 1 lb. Paris Green to 100 gallons, and the worms were killed. A short time afterwards worms again appeared suddenly over the entire field and a second spraying was given. The worms were identified as the common tomato worm by Fred Vint, an experienced and expert trucker of Sarita. As far as has come to the writer's notice, this is the first instance of serious tomato worm attack on Irish potatoes. The sudden appearance of such enormous numbers of this insect in a newly opened country is somewhat clouded in mystery. It is an interesting fact that for yards around the hen house the field was cleared of worms by the chickens that fed on them freely. Great numbers of the white-breasted hawk were attracted to the field by the worms, which they appeared to relish.

The chief drawback to cantaloupe culture in the Gulf Coast exists in the prevalence of the melon louse, for which, up to the present time no effective remedy has been found unless it be the invention of Mr. C. E. Sanborn, Govt. Expert in Plant Lice, who claims to have found a remedy both efficient and practical. This device is fully illustrated and explained



Healthy Cauliflower Field at Santa Maria

—Photo by Author



(19)

Cauliflower Field Destroyed by Black Rot

—*Photo by Author*

in Bulletin No. 89, of the Texas Experiment Station, which can be obtained by writing the Director of the Station, College Station, Texas. The invention consists of a light, cheap frame covered with canvas. This is set over a hill and fumes of tobacco introduced underneath. The writer has seen the fumigator in operation and can vouch for the effectiveness with which it destroys lice, and it seems probable that with a dozen such covered frames, fumigation would be sufficiently economical to warrant the procedure. However, it remains for the practical grower to demonstrate this point to his own satisfaction. Certain it is that spraying is practically useless, as are all other methods recommended in the past by various entomologists, so the matter narrows down to Mr. Sanborn's plan as the only one offering enough promise to warrant investigation.

Onion thrips, cabbage lice and Harlequin bugs may become more or less common in the Gulf Coast within a few years. These insects, with remedies for them, are fully discussed in the Experiment Station bulletin above mentioned.

The only diseases of which complaint was heard were the potato scab and the black rot of cabbage and cauliflower, both of which may be entirely controlled on new soil or land not previously infected. The potato scab is introduced on the seed potatoes and by treating these with corrosive sublimate the fungus can be entirely destroyed, thus making impossible its future appearance in the crop. The seed potatoes are hung in sacks in barrels in which are thirty gallons of soft water holding four ounces of corrosive sublimate in solution. After being submerged $1\frac{1}{2}$ hours the sacks are lifted and allowed to drip a few minutes then emptied out to be dried, cut and prepared for planting.

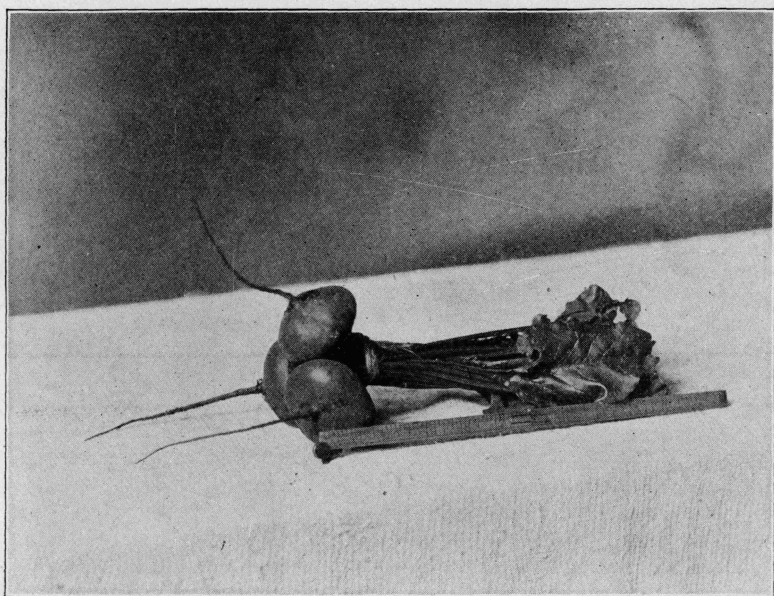
The black rot of cabbage and cauliflower may be prevented by submerging the seed in corrosive sublimate solution of the same strength. The seed should be stirred about under the solution for 15 minutes then spread out on news papers to dry. In this manner the spores on the seed are destroyed, and hence the disease cannot appear later in the crop unless the field has had at some previous time diseased cabbage or cauliflower raised upon it. *Too much emphasis cannot be laid on the importance of taking every precaution against the introduction of the black rot disease to the new truck growing localities along the coast.* In older sections as at Beeville, this disease has put the cauliflower grower out of business. Once established in the soil it is impossible to raise cauliflower on the infected land for years. This crop requires skill in growing and marketing and it is very profitable, and those who have healthy land on which to raise it possess a great advantage in being able to grow one thing in which competition is reduced to a minimum. The disease attacks cabbage and causes extensive losses at times, but the cauliflower suffers most seriously and cannot be grown to perfection where the disease prevails.

MARKETING METHODS.

It was noticed during the survey that the growers at different points have varying notions as to the most suitable package for given crops. For example cucumbers are shipped in all sorts of packages from a bean box to a sugar barrel. At Corpus Christi it is reported that early slicer cucum

bers are shoveled into box cars in bulk. Beans are shipped in bean boxes, in bushel boxes and in hampers. Beets are packed in sugar barrels at one place and in cabbage crates at another. In a similar manner confusion exists, especially with bunch crops, such as beets and carrots, as to the size of vegetable and number to be put in a bunch. At Kingsville beets are packed in cabbage crates whose capacity is greater than a sugar barrel, and and only from seven to nine dozen bunches can be put in, owing to the size of the beets. At Santa Maria the sugar barrel is the package employed and from 18 to 25 dozen bunches are required to fill the barrel.

It would seem that there is no standard in the way of sizes and packages, and this condition brings about confusion, especially at the market end, and operates against the standing and reputation of the whole Gulf Coast. It is believed by the writer that it would add much to the present and future welfare and prosperity of South Texas, if at an early date all the truckers could get together into some association, such as the Southern Fruit and Truck Growers' Association, and officially adopt standard shipping packages and uniform vegetable sizes for the various crops they produce.



Profitable Size for Bunches.