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## Sugar Beets in South Dakota

J.H. Shepard

*South Dakota Agricultural College*

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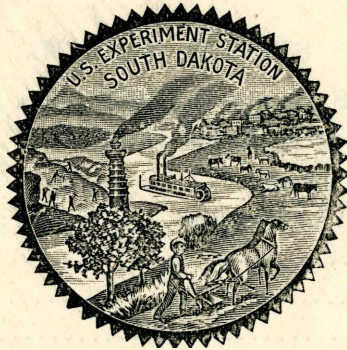
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**January, 1898.**

**Bulletin 56**

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U. S.  
EXPERIMENT STATION,  
SOUTH DAKOTA.



IN CONNECTION WITH THE  
SOUTH DAKOTA AGRICULTURAL COLLEGE.

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Sugar Beets in South Dakota.

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Departments of Chemistry,  
  
BROOKINGS, SOUTH DAKOTA.

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DUTCHER, BREED & STORGAARD, BROOKINGS, S. D.

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
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 Any farmer of the state can have the Bulletins of this Station free upon application to the Director.

# Sugar Beets in South Dakota.

SEASON OF 1897.

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JAS. H. SHEPARD, Chemist.

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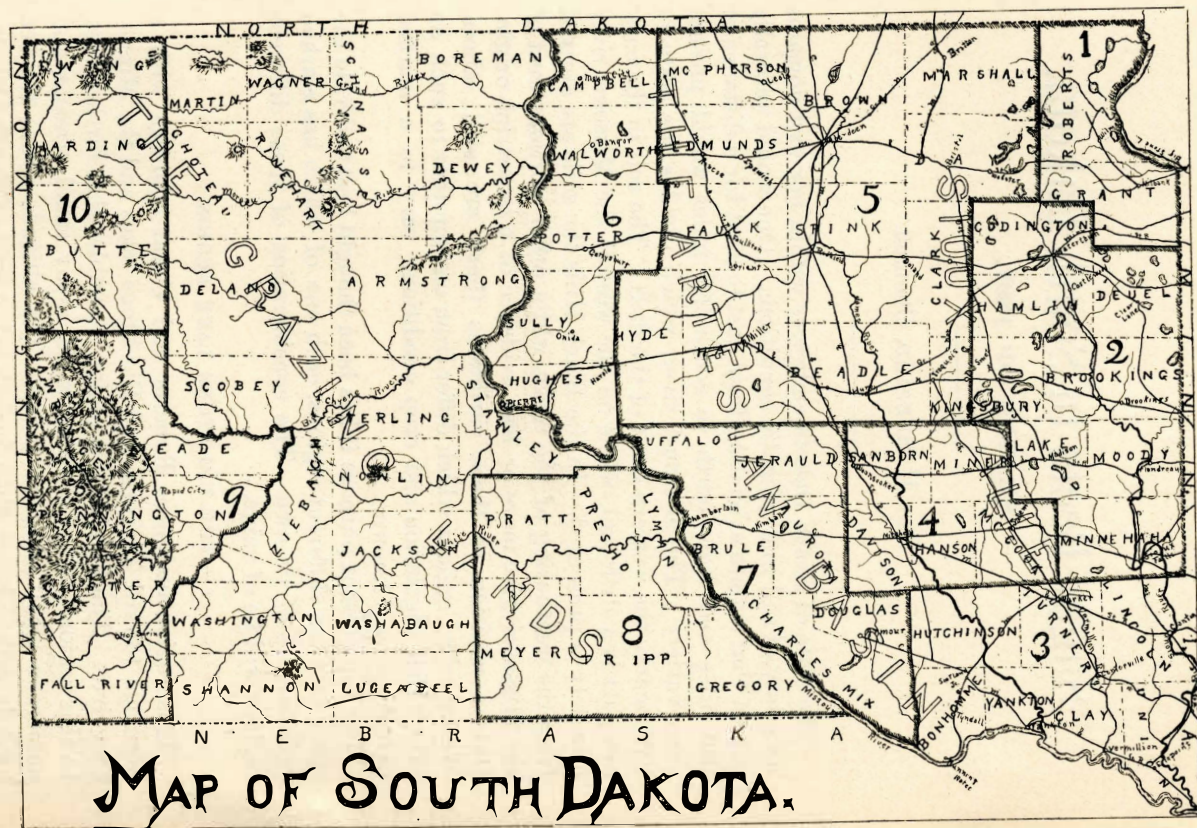
The state of South Dakota embraces within her vast domains a variety of soil and climatic conditions. One would naturally expect that a state extending from east to west for a distance of 380 miles and from north to south 200 miles would present some variety. The Missouri river, which divides the state in half, marks the western limit of the drift. The soil in the eastern part is a drift soil, while on the west of the Missouri river a variety is presented. In the Black Hills the soils are derived from the weathering of the rocks, while other portions west of the Missouri give more or less evidence of a lacustrine origin. But in addition to these variations there are still others. Well marked regions which differ from one another to such an extent that vegetation and crop conditions vary to a marked extent are well known.

For the present purpose it has been thought best to divide the state into ten different regions, each one of which has marked peculiarities of its own. The consideration of these different regions will be of value.

## I.—THE BIG STONE LAKE REGION.

This region embraces Roberts and Grant counties with a drainage toward Traverse and Big Stone lakes and the Minnesota river. The flora of this region resembles that farther east. In this region shallow artesian wells, many small streams and numerous small lakes are found. The altitude above the sea level is rather lower than in any other part of South Dakota. This region is bounded on the west and south by a range of hills marking the extremity of a vast terminal moraine. The





soil is a fertile, sandy loam. Some fruits, corn, small grains and live stock are the principal productions.

## II.—THE UPPER SIOUX RIVER REGION.

This region extends from Grant county on the north to Lincoln county on the south and embraces the greater part of the Big Sioux valley. It is bounded on the east by Minnesota and on the west by a range of hills separating the Big Sioux river from the James river. This region has numerous small streams and lake beds. Some of the lakes are of considerable size. This is a fertile region and usually abundantly supplied with rain during the growing season. The soil is a black, sandy loam, with a sub-soil of yellow clay carrying much marl. Along the valleys of the smaller streams the soil is sometimes from five to six feet in depth. Many of these valleys are from one to two miles in width. The streams, as a rule, have an under flow, consequently they are liable to run dry in a part of their course during the dry seasons. This region embraces Codington, Deuel, Hamlin, half of Kingsbury, Brookings, Moody, Lake and Minnehaha counties. Raising corn, small grains, and live stock are the leading industries.

## III.—THE LOWER RIVER REGION.

This region embraces within its confines Lincoln, Turner, Hutchinson, Bon Homme, Yankton, Clay and Union counties. It lies on the lower waters of the Big Sioux, Vermillion and James rivers. The southern boundary is the Missouri river itself. This is the portion of South Dakota first settled, and the soil is a sandy loam, with perhaps more silt than any other region. In this region corn and many fruits, in addition to small grains, are staple products. This region has manifested much interest in sugar beet culture. It lies mostly in the great artesian belt. Turner county contains two shallow artesian basins not connected with the large basin. This is the wealthiest portion of the state devoted to agriculture.

## IV.—THE CENTRAL JAMES RIVER REGION.

This region embraces Sanborn, Miner, Davison, Hanson and McMook counties. A large portion of these counties lies within the artesian belt, and portions of Sanborn, Miner, Davison and Hanson have areas of shallow artesian wells, probably con-

nected with the big artesian system. There are fewer small streams and lakes in this section, and the soil is usually a rich, sandy loam. Corn, small grain and live stock are produced.

#### V.—THE UPPER JAMES RIVER REGION.

This extensive region embraces Marshall, Brown, McPherson, Edmunds, Day, Clark, Spink, Faulk, Hyde, Hand and Beadle counties. Most of this region lies in the Great Artesian Basin. The soil is a sandy loam, becoming somewhat more clayey in the north. The most powerful wells in the world are flowing in this region. Some of these wells develop an enormous horse power when applied to driving machinery. A large portion of this region can be irrigated by means of these wells. The small streams are few. Nutritious grasses, small grains and stock have been the principal products. All root crops thrive under cultivation.

#### VI.—THE UPPER MISSOURI RIVER REGION.

This region embraces Campbell, Walworth, Potter, Sully and Hughes counties. This region is bounded by the Missouri river on the west, and a range of hills separating it from the James river valley on the east. It is characterized by a wealth of native grasses. Good melons, corn, and all sorts of vegetables thrive, as well as small grains. The principal industry is stock raising, and, incidentally, more corn is raised in this region than in the same latitude in any other portion of the state. Along the river is a fertile, silty bottom averaging one-half mile in width, and in some places heavily timbered, while in other places it produces heavy crops of hay. Adjoining the bottom are high bluffs, cutting through which extend deep fertile valleys, finally broadening into rich open plains. Between these valleys exist high rolling table lands of extreme fertility.

#### VII.—THE CENTRAL MISSOURI RIVER REGION.

This region includes Jerauld, Buffalo, Brule, Aurora, Douglas and Charles Mix counties. This region is bounded on the south-west by the Missouri river and on the north-west by the Ree hills, and on the north-east by the Wessington hills. Among these hills are many fine valleys abounding in springs and affording excellent grazing for large herds. The central



portion is a high, sandy loam plain of great fertility. Some famous artesian wells are found in Brule county, furnishing immense volumes of water. Irrigation is carried on more extensively in this county than in any other in the state. Further south this region closely resembles the Upper Missouri River region. In these two latter regions excellent conditions exist for stock feeding and sugar beet culture.

#### VIII.—THE WHITE RIVER REGION.

This region embraces Presho, Pratt and Gregory counties. It is essentially a rough and broken stock region, containing some fertile valleys well adapted to farm purposes.

#### IX.—THE BLACK HILLS REGION.

This region includes Meade, Pennington, Custer and Fall River counties. It is occupied by a broken and mountainous range of hills clothed with trees and cleft with many valleys. In these hills are the famous mining regions, rich in gold and tin. The higher central portion is cleft with valleys and nearly surrounded by a valley-like depression. In nearly every one of these valleys is found a small stream and moisture is abundant. In the valleys the soil is a reddish, silty loam, capable of raising sugar beets of the finest quality. This region is abundantly supplied with the purest lime stone rock; and fuel, both wood and soft coal, are in immediate proximity. Tributary to this region are the vast range regions extending toward the east. On these vast herds of cattle are annually herded. This region would have a large home market and afford ideal conditions for combining sugar beet raising with stock feeding and dairying.

#### X.—THE BUTTE REGION.

This region embraces Ewing, Harding and Butte counties. It is mostly a level plain, broken by various ranges of buttes, rising abruptly from the surrounding plain. The soil is rather light and sandy, and at present is chiefly used for range purposes. It is well watered and produces a scant but nutritious grass. This region has furnished the richest sugar beets grown in this year's test. It has at present no railroad facilities and is tributary to the Black Hills district.



## RESOURCES AND FACILITIES OF SOUTH DAKOTA FOR BEET SUGAR MANUFACTURING.

**MARKETS.**—In addition to the home market this state is in direct communication with St. Paul, Minneapolis, Chicago, Sioux City and Omaha. It would require a short haul only to place the finished sugar in the principal trade centers of the Great Northwest.

**FUEL.**—The soft coal now burned throughout the state is obtained from the coal fields of Iowa, Illinois and Ohio. The anthracite coal comes from Pennsylvania and the far east. Duluth is the terminus of the water haul for this western fuel. The prices at present charged for fuel are very high and fictitious and are controlled by the freight rates charged by the railroad companies. But it must be remembered that there are comparatively speaking, no manufacturing industries at present in the state. A roller mill here and there, with an occasional machine shop, and a few steam heating plants, are the principal consumers of soft coal in the eastern portion of the state. With the advent of sugar factories, the state would thoroughly utilize the immense lignite coal beds lying along the Missouri river in North Dakota. This coal could be delivered at all of the Missouri river points for distribution at simply a nominal cost of transportation for floating it down the river on flat boats. In addition to this, there is no doubt but the railroad companies would be able to furnish fuel in large quantities for sugar beet factories at very low rates for transportation, bringing it from Iowa coal fields. The Black Hills region lies close to the Wyoming coal fields and fuel is cheap.

**LIME STONE.**—The eastern part of South Dakota lies close to the lime stone beds of Minnesota. In the Black Hills region immense deposits of the purest lime stone is found. What this state needs is railroad transportation between the Black Hills and the eastern portion.

WATER.—All portions of the state are well supplied with water for sugar factory purposes. In the eastern part, as previously mentioned, nearly all streams have an under flow. This under flow is a never failing source of water supply, which would be well adapted for diffusion battery purposes. Any of the flowing streams would furnish ample water for washing. The nature of the water from the under flow is shown by the following analysis from a well in the Big Sioux valley:

#### SHEPARD WELL.

*From Under Flow.*

Salts.	Parts per 1000
Sodium chloride, NaCl.....	.0096
Sodium sulphate, Na <sub>2</sub> SO <sub>4</sub> .....	.1458
Magnesium sulphate, MgSO <sub>4</sub> .....	.4311
Magnesium carbonate, MgCO <sub>3</sub> .....	.0147
Calcium carbonate, CaCO <sub>3</sub> .....	.3427
Silica, SiO <sub>2</sub> .....	.0408
Total.....	.9847
Total solids by evaporation.....	.9856

In the James River valley the artesian wells would not only furnish power but also water for all purposes. The Whiting well at Yankton, the analysis of which is appended, has a closed pressure of 49 pounds to the square inch, and although a small well, furnishes from 300 to 400 gallons per minute.

#### YANKTON (WHITING) WELL.

Salts.	Parts per 1000
Sodium chloride, NaCl.....	.1643
Sodium sulphate, Na <sub>2</sub> SO <sub>4</sub> .....	.1172
Magnesium sulphate, MgSO <sub>4</sub> .....	.3160
Calcium sulphate, CaSO <sub>4</sub> .....	.8700
Calcium carbonate, CaCO <sub>3</sub> .....	.1246
Silica, SiO <sub>2</sub> .....	.0070
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub> .....	.0032
Total salts.....	1.6023
Total solids by evaporation.....	1.6052

The Huron well has a closed pressure of 165 pounds to the square inch, and a flow of 2,250 gallons per minute. This well is supposed to be capable of developing one hundred horse power. The analysis follows:

## HURON (RISDON) WELL.

Salts.	Parts per 1000
Sodium chloride, NaCl .....	.2046
Sodium sulphate, Na <sub>2</sub> SO <sub>4</sub> .....	.6083
Magnesium sulphate, MgSO <sub>4</sub> .....	.4261
Calcium sulphate, CaSO <sub>4</sub> .....	.6020
Calcium carbonate, CaCO <sub>3</sub> .....	.1554
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub> .....	.0290
Silica, SiO <sub>2</sub> .....	.0080
Total Salts .....	2.0334
Total solids by evaporation .....	2.0328

For further information the reader is respectfully referred to Bulletins 41 and 49 of the United States Experiment Station of South Dakota.

As before mentioned, the Black Hills is abundantly supplied with water. No analyses of these waters are at hand.

In regard to the effect of the salts shown by the analyses of the foregoing waters upon sugar solutions; according to A. Marshall and LaGrange (Manual of Sugar Analysis, Tucker, page 69 et seq.) it seems that sodium chloride and sodium carbonate exert no mellasigenic effect. Magnesium sulphate is an actual aid to crystalization. Sodium sulphate probably does prevent small quantities of sugar from crystalizing while the action of the lime ought to be indifferent.

STOCK FEEDING, ETC.—Perhaps no state is so well situated as South Dakota for stock feeding purposes. Located as it is in the center of the great grain producing belt, and blest as it is with its wondrous wealth of native grasses, and capable of producing an immense supply of corn, root crops and other coarse forage crops, it is ideally situated. Moreover, it is within easy reach of the large ranges further west and is raising sufficient small grain to feed more stock than the state now produces. But its own range regions are by no means pushed to their full capacities, and, as a consequence, thousands of acres are lying idle.

Dairying is rapidly increasing its interests in this state. Upwards of one hundred and forty-five creameries are now in active operation and more are constantly building. The beet pulp furnished by factories would be a welcome addition for

fall and winter feeding as it would supplement the vast amount of grain crops annually produced.

**LOCATIONS FOR FACTORIES.**—The localities which have manifested the greatest interest in sugar beet culture in this state are Sioux Falls, Yankton, Huron, Aberdeen and Brookings. Organized efforts are at work in Sioux Falls and Yankton at the present time. Aberdeen, as a center of the northern portion of the James River valley region, has exhibited a large amount of interest for several years past. Huron is making preparation for the culture of from 6 to 8 acres of sugar beets in a scientific manner for the coming year.

**ORGANIZATIONS.**—Parties desiring to communicate with organizations in the different localities may address communications to the secretary of the Sioux Falls Commercial Club, Sioux Falls, South Dakota; secretary of the Yankton Sugar Beet Company, Yankton, South Dakota, and secretary of the Beet Sugar Factory Committee, Aberdeen, South Dakota. For any other localities, any communications sent to the Director of the Experiment Station, Brookings, South Dakota, will receive due attention and parties may be placed in communication with responsible people at the desired point.

**NATURAL FACILITIES.**—The rain fall for the eastern portion of the state is usually sufficient to raise fine crops of sugar beets without irrigation. This rain is in the early spring and during the growing season. In the James River valley and other sections, irrigation may be practiced if necessary. Dakota has been rightly called "The Land of Sunshine," and it possesses the desirable climatic feature of having little or no rain fall during the ripening period of the sugar beet. In the warm, sunshiny days and the cool nights there is very little danger of a second growth in the fall. At the same time the roads all through the state are in the best possible condition for hauling heavy loads. This feature will certainly become a potent factor in delivering sugar beets from a distance to the factory.

And then again the vast stores of plant food in the immense tracts of virgin soil, and the great ease with which that soil can be cultivated will certainly be alluring inducements to the sugar beet industry.

During the present season some portions of the state have



had a larger rain fall than usual and it continued until later in the fall. Especially in this true of the eastern portion of the state. Reports from some observers in the Black Hills state that the season has been dryer than usual in that region. The following table, giving the temperature and rain fall for the growing and ripening months at Brookings, Huron, Pierre, and Rapid City has been furnished by Mr. S. W. Glenn, Director of this section of the United States Weather Service:

### METEOROLOGICAL CONDITIONS, 1897.

#### May.

Station.	Mean temperature.	Max. temperature.	Date.	Mini. temperature.	Date.	Total precipitation.
Aberdeen .....	57.7	96	16	25	24	.33
Brookings .....	56.1	89	19	26	24	.83
Huron .....	56.8	87	5	27	24	.46
Pierre .....	61	90	16	31	14	.45
Rapid City .....	60	88	25	31	14	1.82
Yankton .....	60	86	19	32	24	.78

#### June.

Aberdeen .....	66.2	100	15	50	6	4.40
Brookings .....	63.6	91	13	29	7	3.86
Huron .....	64.7	92	12	32	6	3.81
Pierre .....	67.2	98	12	39	7	3.11
Rapid City .....	63.2	90	12, 13	40	1, 3	2.67
Yankton .....	68	95	22	41	6	2.49

#### July.

Aberdeen .....	71.2	98	8	49	12	4.81
Brookings .....	71.3	95	8	46	20	4.32
Huron .....	73.2	100	7, 8	47	12	2.32
Pierre .....	75.6	99	13	53	5	3.79
Rapid City .....	71	99	28	50	10	.71
Yankton .....	75	100	13, 31	53	12	4.14

#### August.

Aberdeen .....	64.2	89	7	42	16	3.61
Brookings .....	63.6	91	28	37	30	3.59
Huron .....	65.8	93	28	40	16	2.69
Pierre .....	70.1	99	25	48	16	2.12
Rapid City .....	69	101	25	49	29	2.15
Yankton .....	69	93	31	44	16	1.71

## METEOROLOGICAL CONDITIONS, 1897.—CON'T.

*September.*

Station.	Mean temperature.	Max. temperature.	Date.	Mini. temperature.	Date.	Total precipitation.
Aberdeen .....	67.6	102	3	29	17	2.19
Brookings .....	66.4	94	3	31	17	3.17
Huron .....	69.4	99	7	33	17	1.14
Pierre .....	72	102	7	37	17	.14
Rapid City .....	68.8	98	7	34	16	.08
Yankton .....	73	97	5	37	17	.89

*October.*

Aberdeen .....	47.7	91	2	20	15	.70
Brookings .....	49.8	85	2	23	9	1.48
Huron .....	50.6	90	1	23	9	2.13
Pierre .....	53.1	92	1	28	20	.40
Rapid City .....	51.5	87	1	28	18	.15
Yankton .....	54	89	1	32	9	1.20

**SOILS.**—In that portion of South Dakota lying east of the Missouri river there is a greater uniformity of soil than one would expect. In the northern portion of the state there are relatively larger amounts of clay, but over nearly the whole region the soil is a sandy loam. In most localities a yellow clay subsoil is found, carrying large amounts of marl. The present configuration is largely due to the erosive action of water, consequently on the high land the soil is thinner, averaging from nine (9) to fourteen (14) inches. Below this to about a similar depth is a mixed soil consisting of portions of the black surface soil intermixed with clay. Beyond this depth the yellow clay subsoil proper begins.

At a comparatively recent geological time, an extension of the Wessington hills toward the east, or some similar agency, created a gorge in the James river valley, thus forming a lake which extended from the southern part of Beadle county to the extreme northern part of the state and from the high lands of the east to the range of hills on the west; consequently, a large portion of the upper James River Valley region was once a lake

bed, occupied by Lake Dakota. The eastern and western shores were bluff and steep, but the northern and southern limits were shallow. Near the center of the lake the deposit was rich in clay and silt, while the northern and southern shores were more sandy. On the eastern and western shores this sandy belt was narrower, owing to the abruptness of the hills which were formerly terminal moraines of great glaciers. It is from these moraines that the soils of the Upper James River valley were derived. From the southern part of Beadle county following down to the Missouri bottom there has been a gradual erosion, consequently artesian wells are found at a small depth. Along the Missouri river the loess formation exists.

No systematic examination of the soils of South Dakota has yet been made. This Station, however, is now carrying on a complete investigation. The following analyses are taken from the uncompleted work. The mechanical analysis is kindly furnished by the department of Soil Physics, and the chemical analysis by the department of Chemistry. The mechanical and chemical analyses of the first sample is that of an upland prairie soil. The chemical analysis of some bottom land along the Big Sioux river is also shown. The first sample was taken from the Station plats adjoining those on which the sugar beets were grown. The second sample was taken from the Big Sioux bottom. These analyses will be typical, subject to variations already mentioned. The analyses follow:

## MECHANICAL ANALYSIS OF SOILS.

*From Station Plats.*

Number.	Designation of particles.	Diameter in mm.	Hydraulic value in mm.	Surface soil per cent.	Intermediate soil per cent.	Sub-soil per cent.
1	Coarse grits.....	1-3	3	1.54	5.18	3.91
2	Fine grits.....	3-1	1	6.88	2.82	2.70
3	Coarse sand.....	.50	64	7.36	8.57	5.28
4	Medium sand.....	.30	32	.35	2.38	2.60
5	Fine sand.....	.16	16	4.64	9.81	12.89
6	Finest sand.....	.12	8	7.36	5.47	4.07
7	Coarse silt.....	.072	4	4.87	5.09	5.88
8	Large silt.....	.047	2	6.06	5.99	9.04
9	Medium silt.....	.036	1	5.68	4.46	3.08
10	Fine silt.....	.025	.5	10.53	3.58	7.29
11	Finest silt, separated by elutriator.....	.016	.25	18.08	17.42	16.74
12	Finest silt, separated by sedimentation.....	.010	.25	.39	1.62	2.09
13	Clay.....	.0001	.0023	13.39	20.84	16.11
	Organic matter.....			9.64	4.95	7.66
	Total.....			96.77	98.18	99.34
	Water free sample.....			100	100	100
	Loss.....			3.23	1.82	6.6

## CHEMICAL ANALYSIS OF SOILS.

*From Station Plats.*

Names.	Average per cent surface.*	Average per cent mixed.*	Average per cent subsoil.*	Average per cent surface.†	Average per cent mixed.†
Insoluble matter.....	81.5310	81.8800	76.9345	58.3860	81.3190
Potash, K <sub>2</sub> O.....	.3523	.5989	.2124	.0907	.4807
Soda, Na <sub>2</sub> O.....	.4311	.7796	.5645	2.6095	.4205
Lime, CaO.....	.9325	2.9945	6.7750	12.3445	3.8726
Magnesia, MgO.....	.7727	1.0565	1.7567	1.8558	1.6304
Ferric oxide, Fe <sub>2</sub> O <sub>3</sub> .....	2.9342	3.3130	2.9528	5.0085	2.6595
Alumina, Al <sub>2</sub> O <sub>3</sub> .....	4.0258	4.9251	4.7742	1.390	3.6009
Phosphoric Pentoxide, P <sub>2</sub> O <sub>5</sub> .....	.0160	.1919	.2430	.2750	.1321
Sulfur trioxid, SO <sub>3</sub> .....	.1484	.1156	.1047	.4936	.1774
Organic matter.....	8.3600	4.1150	5.3130	14.5900	4.0001
Loss, CO <sub>2</sub> and chlorine.....	.4960	.9099	.3692	4.2164	1.7068

\* Samples from Station plats, upland prairie soil.

† Samples from Big Sioux bottom, bottom land soil.



## EXPERIMENTS WITH SUGAR BEETS FOR 1897.

The United States Department of Agriculture furnished this Station five hundred (500) pounds of sugar beet seeds of the original Kleinwanzlebner variety. This seed was distributed to 954 farmers residing in 59 counties. Instructions for cultivating the beets were sent with each sample, directing the experimenter to plow his ground twelve inches deep; to firm and fine his seed bed; to sow the beets in nine rows, twenty-two inches apart, and covering four square rods. He was instructed to sow the seed the last week in April or the first week in May. He was also instructed to thin the beets to from four to six inches and keep the ground well cultivated.

It was necessary to plow these plats in the spring. In many places the ground was trashy, and, as a subsequent effect, proved to be badly infested by cut worms. The land should have been prepared and kept clean the preceding fall.

Of these 954 experimenters, 140, or about 15 per cent, reported failures. In some instances this was partly due to a heavy frost on the night of the 24th of May, and partly due to the action of the cut worms. The thermometer fell to 25 degrees over some portions of the state at that time and some of the plants, which were in a very tender stage just then, were killed; some that were further along simply lost their leaves and grew again, while others that were just breaking through the ground were not injured at all.

Others of these 140 failures were due to a failure of the seed to germinate because the seed-beds were not firmed. Still others were destroyed by stock. There are very few fences in South Dakota.

434, or about 45 per cent of the experimenters, did not report at all. Some pains were taken, in several counties where movements were on foot to erect sugar factories, to ascertain the reason why these delinquents did not report. It was found to be mostly due to carelessness, although a few had failures.

380 experimenters, or about 40 per cent, sent in samples for analysis. These samples came from 51 counties.

Of the 380 samples received, 37 were rejected at this Station because the experimenters disobeyed instructions. Some of these plowed the ground only four inches deep. One man

simply disced it. These beets grew above ground and were deformed, coarse and necky. Some planted the seeds in one row; others planted the rows too wide, and others gave the beets little or no cultivation. When it was ascertained at this Station that cut worms were working on the plats, circulars were sent out advising the experimenters to transplant a few of the beets around three or four which were growing close together in order to procure a sample for analysis. Some failed to do this and left their beets growing several feet apart. Others sent in poor samples.

Of the 37 samples which were rejected, however, 13 gave over 12 per cent sugar in the juice. The highest rejected sample gave 13.3 per cent sugar in the juice. This man sowed his seed all in one row. The lowest rejected sample gave 8.8 per cent sugar in the juice. This man mulched his beets with hen manure and raised 38 tons per acre.

Fearing that some plats were planted late and owing to the fact that it was impossible to collect preliminary samples from such widely scattered regions, notices for harvesting the beets and taking samples were not sent out until about the middle of October. This was thought to be preferable in order that any late sown plats might reach maturity. There was little danger of a second growth starting for reasons elsewhere stated. Some of the experimenters became uneasy and harvested their plats before directions had reached them; consequently, these could give no tonnage per acre, except in a few cases where the whole crop was weighed.

VALUE OF THE TESTS MADE IN 1897.—From some of the foregoing considerations it will be seen that many reasons exist why the tests just made did not actually represent the capacity of the soil and climate in South Dakota. A personal inspection of many of the sugar beet plats in various parts of the state revealed the fact that the beets were grown under the poorest possible conditions. A large number of the experimenters utterly failed to grasp the correct conception of what is necessary to the highest development of the sugar beet. For instance, some planted in rows as wide as eight feet apart; again, others planted in rows from three to four feet apart, and when the fact was called to their attention that their beets would grow too large, they endeavored to compensate by crowding

them in the rows. This was certainly not an ideal condition. Again, others allowed their beets to grow up and struggle with weeds as best they could. In short, it would be safe to say, that the majority of all the samples grown would have done better had better care been given them. Many of the samples had been carelessly dug. Some of the beets in very many samples were broken in two and the lower half in numerous instances was missing.

NOTES ON ANALYTICAL METHODS AND DATA.—Upon receipt at the laboratory the samples coming from the different parts of the state were cleaned; the necks were cut off, and after this the whole beet was grated for analysis. The average weights given for the beets in the tables are the net weights, with the necks removed. The per cent solids in the juice was determined by means of an accurately graduated Brix spindle. In some cases where the samples were so small that enough juice could not be obtained for that method, the specific gravity was determined by means of a Westphal balance. The per cent sugar in the beet was obtained by multiplying the sugar in the juice by 95 per cent. The ash was obtained by incinerating the juice with sulphuric acid, and deducting one-tenth from the weight of the sulphated ash. The tonnage was estimated by harvesting a fraction of an acre and weighing the same. In all cases, unless otherwise indicated by the experimenter, the tonnage obtained was multiplied by the per cent of stand in order to show the exact tonnage obtained. Some enormous tonnages have been reported. Where the returns give any evidence of mistakes, these results have been suppressed. In case, however, no evidence of error could be found, results have been given just as reported by the experimenter, who must become responsible for the yields reported.



## YIELDS AND PERCENTAGES.

*Big Stone Lake Region.*

Station number.	No. beets analyzed.	Av. weight—grams.	Growers.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
711	3	375	ROBERTS COUNTY—							
751	3	470	P. H. Emery.....	18	95	17.4	15.7	14.82	90.2	.88
882	3	316	Fred Supple.....	26	100	18.4	17	16.15	92.4	.81
			L. L. Stewart.....	30	75	19.4	15.8	15.01	81.4	.86
	9	387	Average and totals.....	24.6	90	18.4	16.2	15.33	88	.85
679	2	480	GRANT COUNTY—							
772	3	320	James McDowell.....	15	75	18.6	16.6	15.77	89.2	1
780	3	313	John Hardy.....	8	60	18.8	16.6	15.77	88.9	.97
782	3	450	John P. Muller.....	30		15.2	12.7	12.07	83.6	.88
865	4	340	Francis Kidman.....	10.3	75	17.2	15.3	14.54	89	.81
878	2	535	J. F. Cooskie.....			15.6	13.8	13.11	88.5	.88
899	3	323	A. L. Honck.....			15.8	14	13.30	88.6	.67
			Abram Tuttle.....	18.7	75	16	13.6	12.92	85	1.10
	20	397	Average and totals.....	16.4	71	16.7	14.7	13.93	87.5	.90
	20	392	Region average and totals.....	20.5	81	17.6	15.5	14.63	87.8	.88

*Upper Sioux River Region.*

546	5	228	CODINGTON COUNTY—							
560	2	800	C. Arthur Edwards.....	----	----	17.2	14.5	13.78	84.5	1.03
588	2	375	A. B. Henry.....	----	----	14	12.3	11.69	87.9	.96
594	2	457	J. H. Rogers.....	18.7	----	15.8	13.5	12.83	85.4	.79
			N. A. Skogstad.....	12.9	60	17	14	13.30	82.4	.71
	11	473	Average and totals.....	15.7	60	16	13.6	12.90	85.1	.87
583	3	320	DEUEL COUNTY—							
604	3	376	Henry Mikkelsen.....	5.5	----	17	15	14.25	88.2	.58
642	3	433	F. E. Cadwell.....	14.4	90	17.4	15.5	14.73	89.1	.76
678	2	562	Andrew Allan.....	4	----	16.5	14.6	13.87	88.4	.47
			P. V. Troupe.....	10	75	17.7	16.1	15.30	91	.59
	11	423	Average and totals.....	8.5	83	17.2	15.3	14.54	89.2	.60
582	4	163	KINGSBURY COUNTY—							
595	3	376	W. S. Bowes.....	44	95	18	14.4	13.68	80	.52
600	3	330	M. J. Heneghen.....	24.8	90	19.3	16.3	15.49	81.7	.99
601	3	248	Mrs. O. Pease.....	----	50	16.3	14.5	13.78	89	.61
620	2	440	Mrs. O. A. Curby.....	----	----	16.5	14.2	13.49	86.1	.76
698	3	328	Fremont Nelson.....	27.8	90	17.3	13.6	12.92	78.1	1.10
700	2	350	Lyman A. Dunklee.....	27.5	75	17.2	15.9	14.11	92.4	1.01
718	2	395	Henry Coulson.....	24	100	19.2	16.5	15.68	85.9	.68
736	3	415	H. R. Folsom.....	----	----	16.4	14.1	13.40	86	.61
749	3	313	Henry E. Falconer.....	13.8	50	15.8	13.5	12.83	85.4	1.35
783	2	565	Erland Johnson.....	19.8	90	16.2	13.8	13.11	85.1	1.10
830	3	388	G. W. Foster.....	18.4	80	15	13.4	12.73	89.3	1.82
896	4	320	Howard Rottluff.....	25	98	17.8	16.1	15.30	90.4	.93
919	3	390	C. A. Carlson.....	10.9	95	18	15.5	14.73	86.1	1.26
			John Armstrong.....	18	100	17.2	15	14.25	87.2	1.34
	40	359	Average and totals.....	23.1	85	17.2	14.8	13.96	86.2	1



## YIELDS AND PERCENTAGES.—CONT'D.

## Upper Sioux River Region.—Cont'd.

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
<b>MOODY COUNTY—</b>										
721	3	323	Chas. H. Loucks.....	10.2	60	16.3	15.5	14.73	95.1	.56
818	3	438	E. H. Campbell.....		80	18.2	15.6	14.82	85.7	1.26
873	2	600	J. H. Sherburne.....	16	80	17.1	14.3	13.59	83.6	1.18
884	3	420	Christian Lee.....	16.2	93	18.5	16.4	15.58	88.6	1.12
898	3	373	James Troup.....			14.8	12.7	12.07	85.8	1.64
14	431		Average and totals.....	14.1	79	17	14.9	14.16	87.8	1.15
<b>LAKE COUNTY—</b>										
609	3	323	John S. Anderson.....	8		16.5	14.6	13.87	88.5	1.20
630	2	432	James Weeks.....	27	90	18.2	13.2	12.54	72.5	1.06
713	3	258	Clarence L. Homes.....	21	50	17.5	14.2	13.50	81.1	.80
925	2	682	O. H. Eggebraaten.....	10.4	75	19.4	16	15.20	82.5	1.31
10	424		Average and totals.....	16.6	72	17.9	14.5	13.78	81.2	1.09
<b>BROOKINGS COUNTY—</b>										
543	4	226	R. M. Crawford.....	26	100	18.4	15.4	14.63	83.9	.73
544	5	324		26	100	18.7	16.4	15.58	87.9	1.04
552	3	330	Exp. Station.....	15.6	65	17.2	14.6	13.87	84.9	.81
556	3	430	Hogan Anderson.....	17.1	90	16	15	14.25	93.8	.63
564	3	378	August Schirmer.....	22	80	15	14	13.30	93.3	.75
573	2	460	Iver E. Steen.....		50	15.6	13	12.35	83.5	.72
575	2	590	J. A. Hammer.....		50	15	12.3	11.69	82	.84
577	3	373	P. Peterson.....	16.2	90	19	16.7	15.87	87.9	.78
597	3	318	W. S. Harseim.....	16.7	75	18.4	16.3	15.49	88.8	.88
603	3	318	David Johnson.....	15.2	80	16.7	14.5	13.78	86.8	1.12
617	2	520	W. K. Reeves.....	21	80	17.2	15	14.25	87.2	.70
663	3	403	A. D. Coleman.....	28.5	95	16	13.7	13	85.6	.74
666	2	497	A. W. Henry.....	22	100	15.6	14	13.30	89.7	
670	3	468	O. H. Thompson.....		50	16.6	14.2	13.49	85.5	1.25
689	2	475	Thomas Towey.....	7.5	65	16	14.2	13.49	88.8	.67
694	2	542	Henry Slater.....	42	100	15.8	13	12.35	82.3	1.68
701	3	426	G. W. Saunders.....		25	15.2	13.4	12.73	88.2	1.79
730	3	441	G. J. Collier.....	19.5	100	16.2	14.6	13.87	90.1	1.19
733	3	436	F. E. Bushnell.....	17	60	14.5	13	12.35	89.7	1.29
773	3	393	James Banc.....	10	50	14.4	12	11.40	83.3	1
775	2	752	D. D. Sage.....	15.7	75	16	13.2	12.54	82.5	1.32
778	2	810	J. H. Biggar.....		10	15.6	12.5	11.88	80.4	.73
794	2	557	J. B. Messerschmidt.....		80	17.2	15	14.25	87.2	.50
842	5	221	G. J. Collier.....	19.5	100	16.4	14.7	13.97	89.6	.74
844	2	472	H. C. Halvorson.....	19.2	80	14.4	12	11.40	83.3	
880	2	672	A. Thompson.....			16.2	14.4	13.68	88.9	.70
72	453		Average and totals.....	19.8	74	16.3	14.1	13.41	86.7	.88
<b>MINNEHAHA COUNTY—</b>										
562	3	255	W. A. Wilkinson.....	11.7	90	19.4	17.8	16.91	91.8	1.32
574	2	500	H. L. Schweppe.....	18		20.5	18.2	17.29	88.8	.88
580	2	487	W. S. Jones.....		50	19.5	16.6	15.77	85.1	1.09
612	2	447	John R. Foster.....	25	100	19.5	17.3	16.43	88.7	1.46
652	3	455	T. J. Cuckow.....	6.4	40	17	15	14.25	88.2	.52
664	3	521	Dana R. Bailey.....	25	85	19	17.5	16.63	92.1	.50
681	3	371	Daniel Hayward.....	19.3	80	18	16.5	15.78	91.7	1.36
682	3	391	Geo. F. Webster.....	28	50	17.6	15.2	14.44	86.4	.58
688	3	325	William Bailey.....	38	100	17	12.7	12	74.7	1.48
709	3	351	Leonard J. Crisp.....	14	100	20.1	17.6	16.72	87.6	.92
726	3	408	Geo. K. Rockwood.....		100	19.4	17.6	16.72	90.7	.86
764	3	365	C. P. Helstadt.....	32.4		17.6	15.5	14.73	88.1	1.19
793	4	343	Walter Crisp.....			17	14	13.30	82.4	1.05

## YIELDS AND PERCENTAGES.—CONT'D.

*Upper Sioux River Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
MINNEHAHA COUNTY—Cont'd.										
809	3	450	J. B. Peterson.....	25	17.2	15	14.25	87.2	.....	.....
813	3	672	W. F. Kelley.....	26	95	17.3	15	14.25	86.7	.....
814	3	330	D. A. Page.....	22.5	100	19	17	16.15	89.5	.....
843	3	380	L. D. Lacey.....	9.5	34	15.8	13	12.35	82.5	.....
845	3	531	J. W. Muchow.....	6	40	19.2	15.5	14.73	80.7	1.07
857	3	562	Mrs. M. A. Scott.....	100	20	16	15.20	80	1.48	.....
893	3	356	J. Stride.....	21.3	85	22.3	19.6	13.62	87.9	.94
906	4	355	G. W. Tyler.....	19.1	17.3	16	16.44	90.6	1.17	.....
908	2	430	Albert Quale.....	16	19	16.4	15.58	86.3	1.90	.....
910	4	475	W. H. Bryan.....	28	17.4	13	12.35	74.7	1.71	.....
912	3	366	Wm. Connolly.....	12.2	66	17.6	14.6	13.87	83	.80
68	423		Average and totals.....	20.2	77	18.6	16	15.20	86.1	1.08
226	427		Region average and totals.....	16.9	76	17.1	14.7	13.90	86	.95

*Lower River Region.*

LINCOLN COUNTY—										
615	2	417	L. A. Syverud.....	6.3	50	16	13.4	12.73	83.8	1.15
624	3	383	T. O. Strand.....	9.6	80	19.2	17.1	16.25	89.4	1.11
660	3	373	J. E. Holter.....	19	100	17	12.3	11.49	72.4	1.17
672	3	338	Syvert Iverson.....	18.3	100	19.6	17	16.15	86.7	1.03
674	3	373	E. W. Norton.....	27.6	60	18.8	15.7	14.92	83.5	1.28
716	2	307	H. C. Johnston.....	7.5	60	19.5	16.6	15.77	85.4	.91
725	3	373	Andrew A. Marken.....	17	100	19.5	18	17.10	92.3	1.17
768	2	602	Chas. Schmaley.....	18.2	14.5	13.78	79.7	1.65	.....	.....
771	3	456	J. H. Moore.....	26	95	20	18	17.10	90	1.05
24	402		Average and totals.....	16.4	81	18.6	15.8	15.03	84.8	1.17
TURNER COUNTY—										
559	3	461	Jacob Hough.....	14.5	34	17	13	12.35	76.5	1.18
586	2	595	D. W. Fairchild.....	10	16	13.5	12.83	84.4	.81	.....
592	2	560	T. Hanson.....	32.5	100	15.6	13	12.35	83.3	.81
695	2	575	F. W. Downing.....	39	100	17.4	15.5	14.73	89.1	.56
769	3	380	John M. Downer.....	16.2	63	17.8	14.5	13.78	81.5	.98
788	2	285	B. Holland.....	12.3	60	21	16.3	15.49	77.6	2.02
819	3	531	C. A. Near.....	80	20	18.9	17.96	94.5	.99	.....
824	4	267	S. R. Short.....	3	10	17.3	15.7	14.92	90.8	1.92
840	4	277	Eldon Bartle.....	10	40	19.3	17	16.15	88.1	.77
25	437		Average and totals.....	18.2	55	17.9	15.3	14.51	85.1	1.12
HUTCHINSON COUNTY—										
823	3	333	N. J. Scarritt.....	19.5	80	23.2	20.5	19.48	88.4	1.20
3	333		Average and totals.....	19.5	80	23.2	20.5	19.48	88.4	1.20
BON HOMME COUNTY—										
683	3	346	Geo. W. Cook.....	60	21.2	17.3	16.44	81.6	1.39	.....
727	3	366	S. C. Conrey.....	20.5	17.6	16.72	85.9	.66	.....	.....
738	3	333	Mathias Klinkner.....	50	18.4	16.2	15.39	88	1.52	.....
759	2	647	T. L. McCrea.....	10	100	17.6	15.5	14.73	88.1	.60
784	2	580	Fred J. Oelrich.....	16.5	14.6	13.87	88.5	1.13	.....	.....
805	3	516	Christopher Heins.....	22.8	63	19.5	16.2	15.39	83.1	.....
806	3	533	William Abbott.....	20	100	18	15.6	14.82	86.7	.....

## YIELDS AND PERCENTAGES.—CONT'D.

## Lower River Region.—Cont'd.

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
BON HOMME COUNTY—Cont'd.										
825	3	521	C. J. Byer.....	—	—	17.8	16.4	15.58	92.1	.96
829	3	281	Orton P. Haight.....	20.3	90	19.5	18	17.10	92.3	.68
839	3	371	M. Donovan.....	14.5	75	17.8	15.2	14.40	85.4	.94
28	449	—	Average and totals.....	17.5	77	18.7	16.3	15.44	87.2	.99
CLAY COUNTY—										
589	3	296	R. H. Goding.....	34.2	90	17.4	15.8	15	90.8	.34
629	3	490	W. H. Montague.....	33	95	16.4	14	13.30	85.4	.63
645	3	750	Daniel E. Oursland.....	19	100	18.8	16.2	15.39	86.2	1.09
655	3	417	Henry Hammer.....	18.4	80	20.2	17.4	16.53	86.1	.81
668	3	677	L. A. Anderson.....	47.5	100	16.4	14.7	13.97	89.6	1.08
669	3	722	J. L. Anderson.....	52.5	100	16.2	13.3	12.64	82.1	.95
685	3	492	Mary E. Skinner.....	—	80	15.5	13.2	12.54	85.2	1.04
735	3	511	Lars Mortensen.....	33	75	16.4	15	14.25	91.5	1.29
743	3	575	A. M. Edgerton.....	12	25	14.6	12.6	11.97	86.3	1.89
745	3	380	L. A. Larson.....	33	100	16.5	14.6	13.87	88.5	.90
746	3	416	J. H. Parsons.....	13	—	17.8	15.4	14.63	86.5	1.46
810	3	396	J. F. Harvey.....	48	100	18	16.9	16.06	93.9	—
812	3	491	James N. Palmer.....	48	—	16.5	13.5	12.83	81.8	—
817	3	225	Herman Peterson.....	18	75	—	18	17.10	—	1.58
822	4	241	D. W. C. Nichols.....	26.2	95	20.4	16.7	15.87	81.9	1.40
867	3	572	Lee & Prentiss.....	22.3	100	21.5	18.5	17.58	86	1.21
882	3	455	J. M. Cleland.....	—	100	18	14.6	13.87	81.1	1.37
914	3	356	Hans Myron.....	30.2	90	21	17.5	16.63	83.3	1.35
46	475	—	Average and totals.....	30.5	88	17.7	15.4	14.67	86.2	1.15
YANKTON COUNTY—										
578	2	792	Frank Hefner.....	34	80	17	15	14.25	88.2	.81
611	3	308	Wm. Leaning.....	14.7	70	19.6	17.6	16.72	89.8	.77
626	2	612	Andrew Simonson.....	19.5	65	16.7	12.6	12	75.4	1.46
627	2	405	Julius Berkley.....	30	86	17.8	14	13.30	78.7	.99
628	3	363	S. G. Gilleland.....	10	50	20.3	18	17.10	88.7	.77
637	3	325	Jennie J. Langdal.....	22	100	21.2	17.3	16.44	81.6	1.40
638	1	1245	Michael Noonan.....	—	75	19	16	15.20	84.2	1.05
644	3	398	John Aten.....	—	—	17.5	15	14.25	85.7	.85
647	2	367	William Walpole.....	—	—	18	16.3	15.49	90.6	.65
651	3	428	James M. Walsh.....	20	90	18.3	15	14.25	82	.90
675	2	412	E. A. Fickling.....	14.1	40	15	13	12.35	86.7	1.22
680	3	431	William Strunk.....	25	—	16.6	14.5	15.87	88	1.37
710	3	435	H. H. Smith.....	17.8	75	15.5	13.7	12	88.4	.67
715	3	345	Torger Nelson.....	14.5	—	21.2	17	16.15	80.1	1.24
734	4	286	J. R. Hanson.....	22.5	75	18.3	15.8	14	86.3	2.03
741	2	592	D. F. Jencks.....	20.2	90	14.6	12.7	12.07	87	1.23
744	2	742	Peder Hanson.....	—	100	16.3	14.7	13.97	90.2	.70
777	3	440	Geo. L. Gilman.....	—	—	14.3	12.8	12.16	89.5	.85
808	2	780	W. E. Hedelson.....	—	—	17.2	16	15.20	93.0	—
879	3	445	W. H. Ball.....	16.5	75	18	16	15.20	88.9	.66
889	3	410	Ekward D. Gray.....	15.3	67	21.8	18.5	17.58	85.1	1.07
901	2	395	John P. Bryhu.....	—	90	18.6	15.5	14.73	83.3	.88
56	498	—	Average and totals.....	19.7	77	17.8	15.3	14.56	86	1.03
UNION COUNTY—										
547	4	262	Sol. K. Allen.....	20.3	100	18.7	17	16.15	91.1	.59
569	3	275	Allison Peck.....	13	80	19.6	18.7	17.77	95.4	.67
571	3	158	Sol. K. Allen.....	20.3	100	16	14.5	13.77	90	.22
602	3	298	Chas. Stickney.....	—	—	16.7	13.6	12.92	81.4	.99
618	2	605	D. R. Pennel.....	26.7	75	17.2	15	14.25	87.2	1.12



## YIELDS AND PERCENTAGES.—CONT'D.

*Lower River Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
UNION COUNTY—CONT'D.										
619	3	230	Frank Swanson .....	18	90	20.7	19	18.05	91.8	.48
646	2	402	Henry Manning .....	25	80	20.8	19.3	18.34	92.8	.39
649	3	400	E. A. Ronning .....	30	95	18.5	17	16.15	91.9	.49
703	3	440	Albert Omdahl .....	25.7	90	17.8	14.4	13.68	90.9	.76
740	3	398	Edward D. Woods .....	25	100	17.2	15.4	14.63	89.5	1.03
748	2	587	Elk Point .....	.....	.....	14.6	13	12.35	89	1.17
796	3	403	J. L. Tuttle .....	15	.....	17.3	15	14.25	86.7	.....
816	3	301	W. M. Vinson .....	19.6	80	18	15.2	14.44	84.4	1.33
826	2	435	H. Knudson .....	.....	.....	15.5	13.5	12.83	87.1	1.10
833	3	350	Wm. Hazen .....	.....	10	18.2	16	15.20	87.9	1.04
870	4	376	C. Brabander .....	7.2	.....	20	77.2	16.34	86	.92
900	2	575	Andrew Th. Solem .....	15	50	20.6	18	17.10	87.4	.81
917	2	502	O. E. Lawson .....	10	75	18.2	16.7	15.87	91.8	.65
50	388	Average and totals.....		19.3	79	18.1	16	15.23	88.5	.81
232	425	Region averages and totals.....		20.2	77	18.9	16.4	15.56	86.6	1.06

*Central James River Region.*

MINER COUNTY—										
567	3	295	H. E. Photteplace.....	6.8	25	15.8	13.3	12.64	84.2	1.22
671	4	350	Fingar Anderson.....	30	.....	19	16.4	15.68	86.3	.....
707	3	291	Harry L. Homes.....	21	50	17	13.4	12.73	78.8	1.27
799	3	378	Frank Ingalls.....	28	66	20	17.8	16.91	89	.....
13	329	Average and totals.....		21.5	47	18	15.2	14.49	84.6	1.25
SANBORN COUNTY										
565	2	407	C. E. Fitch .....	12.2	80	15.4	14.1	13.35	91.6	.85
581	2	402	G. S. Lewis .....	8.4	40	18.9	15.5	14.73	82	1.12
613	3	338	S. A. Gere .....	.....	25	17	15.7	14.92	92.4	.59
648	3	335	M. M. Price .....	14.6	75	23.4	21.5	20.43	91.9	.92
723	3	336	Henry M. Mill3.....	17.6	80	19.5	16.2	15.39	83.1	.80
821	3	431	C. E. Sanford.....	10	90	18.8	16.4	15.58	87.2	1.28
848	2	362	M. A. Reeves.....	22.2	60	18	15	14.25	83.3	.89
18	373	Average and totals.....		14.2	64	18.7	16.6	15.52	87.4	.92
DAVISON COUNTY—										
549	4	318	H. B. Beall .....	.....	20	16.4	.....	15.58	82	1.00
563	2	575	H. S. Bennett.....	.....	.....	14.4	12.8	12.16	88.9	.79
699	2	477	Arthur V. Hall .....	25.4	90	18.4	16	15.20	87	.28
739	2	517	E. B. Bracy .....	50	.....	15	13	12.35	86.7	1.17
770	3	368	Ole Hendrickson .....	19.5	75	18.8	16	15.20	85.1	.76
795	2	567	Joseph Jacobs .....	.....	.....	18.3	15.4	14.63	84.2	1.68
798	3	408	H. Beall .....	.....	80	18.6	15.6	14.82	83.9	.....
803	2	617	Fred Moeller.....	.....	75	18	16.4	15.58	91.1	.....
916	3	381	F. S. Clark .....	25.4	87	20	17.8	16.91	89	.68
23	470	Average and totals.....		30.1	81	17.9	15.5	14.71	86.4	.91
McCOOK COUNTY—										
731	3	398	M. J. Cross .....	22.5	75	20	17.8	16.91	89	.69
864	2	447	P. N. Schultz.....	.....	.....	15.4	13.7	13.02	89	1.36
5	423	Average and totals.....		22.5	75	17.7	15.8	14.97	89	1.03
59	399	Region average and totals.....		22.1	67	18.1	15.7	14.92	86.9	1.08



## YIELDS AND PERCENTAGES.—CONT'D.

*Upper James River Region.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
MARSHALL COUNTY—										
587	2	335	J. A. Richardson			15.2	13	12.35	85.5	.60
705	3	393	August Walgren		90	16.6	14	13.30	84.3	.92
815	6	237	Edward Phillips			18.6	16.2	15.39	87.1	
	11	322	Averages and totals		90	16.8	14.4	13.68	85.6	.76
BROWN COUNTY—										
585	3	388	N. V. Brothers			15.6	13.3	12.64	85.3	.83
623	2	775	R. A. Canning	11.4	60	17.4	14.1	13.40	77.2	1.08
656	4	188	C. J. Neuhauser		90	16.5	15.2	14.44	92.1	.77
728	3	243	C. A. Lindekugel		100	18	14	13.30	77.8	.96
753	3	353	J. A. Lovelace	18.9	90	17.4	15.5	14.73	89.1	.85
755	3	423	Fred Froelich		25	17.4	14.2	13.49	81.6	1.08
785	3	376	J. K. Low	5.2	15	16.6	12	11.40	72.3	.96
800	4	423	S. W. Narregang	25	98	15	12	11.40	80	
858	2	242	Miss Anna Rhodes				14	13.30		.54
860	2	220	James O'Hare		17	13.7	13.02	80.6	.76	
863	2	212	Mrs. E. Rhodes		16	13.1	12.45	81.9	1.26	
869	2	237	Mrs. L. J. Ives				15.5	14.73		.83
874	2	502	G. E. Merten		25	16.6	13	12.35	78.3	1.78
876	3	290	C. E. Hite			18.8	15	14.25	79.8	1.43
902	3	466	Wm. E. Maynard			16.5	14.4	13.68	87.3	1.12
903	3	493	S. M. Ingram			15	12.7	12.07	84.7	1.52
911	3	500	Unknown			16	13.1	12.45	81.9	1.26
918	5	138	H. B. Shafer		50		17.9	17.01		.65
923	3	331	C. M. Shaddock			18.2	14	13.30	76.9	1.25
	55	364	Average and totals	15.1	61	16.8	14	13.34	81.7	1.06
MC PHERSON COUNTY—										
607	3	278	W. A. Dennis	22		22.2	18.4	17.48	82.9	.56
890	3	350	W. M. Hunt	30.5	100	22.8	20	19	87.7	.90
	6	314	Average and totals	26.3	100	22.5	19.2	18.24	85.3	.73
EDMUNDS COUNTY—										
852	2	417	P. A. Decker	29.3	75	18.4	14.6	13.87	79.3	.90
901	3	250	C. E. Plann			20.5	18.5	17.53	90.2	.99
926	2	380	Peter Hansen	6.0	75	17.4	14.5	13.78	83.3	1.66
	7	349	Average and totals	17.7	75	18.8	15.8	15.08	84.3	1.18
DAY COUNTY—										
676	3	256	Mrs. E. H. Betts			17.4	15.1	14.35	86.8	1.21
690	3	226	Lars A. Stavig	4.8		18.5	16.8	15.96	90.8	.54
714	3	501	M. W. Reese	33	75	17.1	15.2	14.44	88.9	.43
763	3	331	T. E. Sveum	10.9	75	15.6	13	12.35	83.3	.95
774	2	325	T. J. Fosse	17	65	18	16	15.20	88.9	1.54
802	3	371	L. J. Langeland	20	80	17.5	15.6	14.82	89.1	
827	3	273	N. J. Lindgren	7		16	14	13.30	87.5	.90
828	3	433	F. L. Ihrike			13.3	12	11.20	90.2	.90
838	3	578	W. J. Casson		50	16.5	14.2	13.49	86.1	1.03
850	2	375	S. J. Reed			16	14.6	13.87	91.3	.67
	28	367	Average and totals	14.5	69	16.6	14.7	13.90	88.3	.91
CLARK COUNTY—										
568	2	372	L. L. Kloster		20	14	12.3	11.69	87.9	1.05
634	3	245	A. G. Aldrich			16	14.8	14	92.5	.72
640	2	370	Ernest I. Underwood	31.7		16.8	14	13.30	83.3	1.28
673	3	466	M. J. Miller	66.7	100	19	16.4	15.58	86.3	1.32
702	3	331	Unknown			16	17	16.15	89.5	.88
729	2	320	Paul Willenberg	12	80	17	15	14.25	88.2	1.06

## YIELDS AND PERCENTAGES.—CONT'D.

*Upper James River Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
CLARK COUNTY—Cont'd.										
804	2	387	Geo. B. Reid.....			15.2	14	13.30	92.1	
847	4	318	S. A. Coe.....	21.4	100	17.5	13.6	12.92	77.7	1.24
	21	351	Average ond totals.....	22.8	75	16.8	14.6	13.90	87.2	1.08
SPINK COUNTY—										
697	3	291	A. R. Fryer.....	18	88	19.3	17	16.15	88.1	1.03
722	4	270	B. F. Bixler.....	28.8	80	20	18.8	17.81	94	.74
750	3	143	W. F. Sander.....	10.5	70	17	15	14.25	88.2	1.27
754	3	440	I. H. Darling.....			19.3	17.5	16.63	90.7	.94
915	3	665	Irrigated farm.....		60	15.9	13.4	12.73	84.3	1.48
	16	362	Average and totals.....	19.1	75	18.3	16.3	15.51	89.1	1.09
BEADLE COUNTY—										
557	2	650	F. W. Keryn.....		75	19.3	17	16.15	88.1	.50
558	2	620	N. T. Smith.....	45	80	18.8	14.8	14.06	78.7	1.19
570	3	280	L. Van Voorhis.....	18	80	19.4	17.3	16.44	89.2	.85
635	3	460	J. D. Van Delinder.....		50	17.8	16.3	15.59	91.6	.72
654	3	290	W. D. Johnson.....	18	75	16.6	14	13.30	84.3	.81
687	2	615	C. A. Phillips.....		17	14.6	13.87	85.9	1.51	
693	2	530	J. W. Smith.....		75	18	15.3	14.54	85	1.08
807	2	695	John H. Miller.....	61	100	15.8	13.4	12.73	84.8	
811	2	582	N. T. Smith.....	42.5	100	15.3	14.2	13.49	92.8	
849	2	257	Mary A. King.....		16	14.8	14.06	92.5	1.37	
891	3	480	J. K. Pease.....	16.8	90	19.4	17	16.15	87.6	.79
920	3	370	Frank Young.....		25	17.5	14.5	13.78	82.9	1.43
922	2	540	Fred Zoller.....	34	100	17	14.4	13.68	84.7	1.37
	31	475	Average and totals.....	33.6	77	17.5	15.2	14.45	86.8	1.06
FAULK COUNTY—										
661	4	260	J. B. Vinnedge.....	17.5	100	18.4	16.5	15.68	89.7	.89
752	3	348	J. W. Honneberry.....	8.1	90	24	21.4	20.33	89.2	1.66
	7	304	Average and totals.....	12.8	95	21.2	19	18	89.5	1.28
HYDE COUNTY—										
561	2	475	G. L. F. Robinson.....			14.4	12.4	11.78	86.1	1.03
894	3	501	Sam'l Wright.....	14.3	50	22	18.3	17.39	83.2	.97
	5	488	Average and totals.....	14.3	50	18.2	15.3	14.58	84.7	1
HAND COUNTY—										
606	3	378	Theodor Matter.....	13.6	90	18.4	13.3	12.64	72.3	1.57
905	4	140	Gust. A. Salomo.....	10		23.2	21	20.90	90.5	.97
	7	259	Average rnd totals.....	11.8	90	20.8	17.2	16.77	81.4	1.27
194	360		Region averages and totals.....	18.8	78	18.6	16	15.22	85.8	1.04

*Upper Missouri River Region.*

CAMPBELL COUNTY—										
886	3	490	H. K. Rorgo.....	4.3	20	22.8	21	19.75	92.1	1.03
909	3	373	A. Aube.....	20.3	90	19	16.4	15.58	86.3	1.36
	6	427	Average and totals.....	12.3	55	20.9	18.7	17.66	89.2	1.20

## YIELDS AND PERCENTAGES.—CONT'D.

*Upper Missouri River Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
712	2	407	WALWORTH COUNTY—							
851	4	371	F. W. F. Welsh.....	14	100	17.2	15.4	14.63	89.5	1.06
			James R. Howell.....	19.1	90	20	16	15.20	80	1.16
	6	389	Average and totals.....	16.6	95	18.6	15.7	14.91	84.8	1.11
566	2	465	POTTER COUNTY—							
593	3	426	Edward Mancher.....	7.6	40	18.2	16.5	15.68	90.7	1.07
650	3	375	A. E. Beaudoin.....	22.1	85	18	14	13.30	77.8	1.25
892	3	350	James Naylor, Jr.....	22	100	18.2	17	16.15	93.4	1.03
			W. E. Scanlon.....		10	21.8	19.6	18.62	90.1	
	11	409	Average and totals.....	17.2	59	19.1	16.8	15.94	88	1.12
885	2	525	SULLY COUNTY—							
			J. I. Rein.....	12.5	90	17.3	15	14.25	86.7	1.12
608	3	408	HUGHES COUNTY—							
616	2	462	J. P. Youngberg.....	5.4	60	16.5	13.7	13	83	1.14
767	3	328	E. Schultz.....		25	19.2	16	15.20	83.3	.86
			Wm. S. Martin.....	11.2	80	19	17	16.15	89.5	1.26
	8	399	Average and totals.....	8.3	55	18.2	15.6	14.79	85.3	1.09
33	430		Region averages and totals.....	13.4	71	18.8	16.4	15.51	86.8	1.13

*Central Missouri River Region.*

572	3	316	JERAULD COUNTY—							
659	2	435	C. M. Yegge.....	18.4		21.5	16.8	15.96	78.1	1.57
704	3	96	Joseph Hainy.....	11.5	85	17.1	13.2	12.54	77.2	1.48
708	3	261	L. G. Wilson.....	2.5	50		17	16.15		1.12
820	6	253	W. R. Eastman.....			15	13	12.35	88.7	.75
854	3	378	H. A. Frick.....			80	20.4	17.10	88.2	1.55
			Mrs. E. J. Stickley.....	11.7	90	20.7	18.7	17.70	90.3	1.23
	20	290	Average and totals.....	11	76	18.9	16.1	15.30	84.5	1.28
835	3	308	BUFFALO COUNTY—							
913	3	450	A. S. Cruson.....			20.2	17.7	16.82	87.6	1.25
			A. J. Woledge.....	44	85	20	16.2	15.39	81	1.08
	6	379	Average and totals.....	44	85	20.1	17	16.11	84.3	1.17
596	2	547	BRULE COUNTY—							
598	2	445	John Lally.....	31	100	20.5	16.5	15.68	80.5	1.15
677	3	473	S. A. Phillips.....	20.7	90	19.5	15.8	15	81	1.33
789	3	340	C. C. Lowe.....			19.6	15.7	14.92	80.1	1.20
853	5	228	John H. Rowe.....	12	75	21.2	18.2	17.29	85.8	1.94
872	3	441	Wm. Farnsworth.....			19.8	16.5	15.68	83.3	1.38
888	3	153	Ferdinand Baatz.....			60	18.4	14.25	81.5	1.44
			Geo. A. Fry.....	5	50	26	22	20.90	84.6	1.24
	21	375	Average and totals.....	17.2	75	20.7	17.1	16.24	82.4	1.38

## YIELDS AND PERCENTAGES.—CONT'D.

*Central Missouri River Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Grower.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
657	2	350	AURORA COUNTY—							
760	3	198	J. P. Oppel.....	23.5	50	19.8	17	16.15	85.9	1.07
797	3	253	Guilf Mullen.....			20	17.5	16.63	87.5	1.21
868	2	270	W. C. Wood.....	6	95	19.4	17.5	16.63	90.2	
907	3	400	Jacob Swartz.....	14.5	95		18.5	17.58		.76
			C. L. Mott.....		50	20.4	17	16.15	83.3	1.34
	13	294	Average and totals.....	14.7	73	19.9	17.5	16.63	86.7	1.10
			DOUGLAS COUNTY—							
662	4	287	Joseph Lester.....	18.5	90	21	17.7	16.82	84.3	1.48
667	3	285	Halbert Eaton.....	15	50	18.4	16.8	15.96	91.3	.50
	7	286	Average and totals.....	16.8	70	19.7	17.3	16.39	87.8	.99
			CHARLES MIX COUNTY—							
665	4	246	H. Adkins.....			18.8	15.8	15	84	1.04
831	2	560	W. A. Prather.....	28.8	90	17.7	14.9	14.16	84.1	1.22
861	2	375	E. L. Senn.....	19	80	19.6	16	15.20	81.6	1.48
	8	394	Average and totals.....	23.9	85	18.7	15.6	14.79	83.2	1.25
	75	336	Region averages and totals.....	21.3	77	19.7	16.8	15.91	84.8	1.19

*White River Region.*

834	3	421	PRESHO COUNTY—							
			Geo. A. Calkins.....	45		18.9	15.7	14.92	83.1	.90
			PRATT COUNTY—							
837	3	445	J. W. Leet.....	33	100	18.3	15	14.25	82	1.07
			GREGORY COUNTY—							
692	3	263	J. L. Strait.....			21.4	17.3	16.44	80.8	1.22
	9	376	Region averages and totals.....	39	100	19.5	16	15.20	82	1.06

*Black Hills Region.*

658	3	313	MEADE COUNTY—							
747	2	415	L. Matteson.....	11.3	75	22.8	18	17.10	78.5	1.33
751	3	441	A. P. Rose.....			60	19	15.5	14.73	81.6
781	3	411	Unknown.....	30	85	22	20	19	90.9	1.14
786	3	463	J. D. Hale.....			20	15.8	15.01	79	1.27
791	4	360	Louis Coisteaux.....	22.8	80	20.2	17.8	16.91	88.1	.83
792	3	381	J. W. Elliot.....			20.7	15.7	14.92	75.8	1.20
856	5	220	Joseph Torrence.....			22.5	18.3	17.39	81.3	1.15
871	3	536	Otto Hammerle.....	7.4	70	25.4	21	19.95	82.7	1.68
875	4	470	W. Frank Gardner.....			19.3	16.5	15.68	85.5	.93
			Charles Froescher.....	8.9	80	23.4	18.2	17.21	77.8	1.21
	33	401	Average and totals.....	16.1	75	21.5	17.7	16.79	82.1	1.19



## YIELDS AND PERCENTAGES.—CONT'D.

*Black Hills Region.—Cont'd.*

Station number.	No. beets analyzed.	Av. weight—grams.	Growers.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beets.	Purity coefficient.	Per cent ash in juice.
PENNINGTON COUNTY—										
614	3	323	Jno. L. Weaver.....	.....	18.7	15.8	15	84.5	1.27	
684	3	438	A. S. Merrin.....	.....	40	17.4	13.7	13.02	78.7	1.44
724	3	333	M. W. Truax.....	.....	100	17.5	15	14.25	85.7	1.04
841	3	293	Henry E. Luke.....	12	95	26	22.8	21.66	87.7	1.62
924	2	262	Wm. H. Hutchinson.....	7	80	24.4	18.8	17.86	77	2.02
	14	330	Average and totals.....	9.5	79	20.8	17.2	16.36	82.7	1.48
CUSTER COUNTY—										
632	8	67	J. W. Fuson.....	10	80	20	15.6	14.82	78	.47
FALL RIVER COUNTY—										
579	3	346	James Bradley.....	21	100	20	16.2	15.39	81	1.17
636	3	201	H. Robins.....	6	90	21.5	18	17.10	83.7	1.10
776	3	366	Fred Norenberg.....	19.3	80	17	15	14.25	88.2	1.38
787	2	385	S. H. Tomlin.....	.....	21.5	17.6	16.72	81.9	1.75	
	11	325	Average and totals.....	15.4	90	20	16.7	15.86	83.7	1.35
	66	281	Region averages and totals.....	12.8	81	20.6	16.8	15.95	81.6	1.12

*Butte Region.*

HARDING COUNTY—										
545	4	411	G. W. McCoid.....	.....	25.8	22.9	21.76	88.7	1.09	
866	3	481	P. B. Gilbert.....	.....	20	22.1	18	17.10	81.4	1.17
877	6	163	David Willett.....	.....	26.2	22.8	21.66	87	1.08	
887	4	315	Henry McCoid.....	.....	50	27	23.4	22.23	86.7	1.87
	17	343	Average and totals.....	.....	35	25.3	21.8	20.69	86	1.30
BUTTE COUNTY—										
737	3	486	Jas. H. Garr.....	.....	18.8	15.5	14.73	82.4	2.33	
742	2	652	Alva Young.....	54.8	85	18.4	17.1	16.25	92.9	.50
756	3	286	Chas. Makings.....	12.7	100	22	21	19.95	95.5	.87
766	3	460	P. P. Vallery.....	.....	50	18.4	16	15.20	87	1
	11	471	Average and totals.....	33.8	78	19.4	17.4	16.53	89.4	1.18
	28	407	Region averages and totals.....	33.8	57	22.4	19.6	18.61	87.7	1.24

*State Averages and Totals.*

No. beets analyzed.	Av. weight—grams.	Regions.	Tons per acre.	Per cent stand.	Per cent solids in juice.	Per cent sugar in juice.	Per cent sugar in beet.	Purity coefficient.	Per cent ash in juice.
29	392	Big Stone Lake region .....	20.5	81	17.6	15.5	14.53	87.8	.88
226	427	Upper Sioux River region .....	16.9	76	17.1	14.7	13.99	86	.95
232	425	Lower River region .....	20.2	77	18.9	16.4	15.56	86.6	1.06
59	399	Central James River region .....	22.1	67	18.1	15.7	14.92	86.9	1.23
194	360	Upper James River region .....	18.8	78	18.6	16	15.22	85.8	1.04
33	430	Upper Missouri River region .....	13.4	71	18.8	16.4	15.51	86.8	1.13
75	336	Central Missouri River region .....	21.3	77	19.7	16.8	15.91	84.8	1.19
9	376	White River region .....	39	100	19.5	16	15.20	82	1.06
66	281	Black Hills region .....	12.8	81	20.6	16.8	15.95	81.6	1.12
28	407	Butte region .....	33.8	57	22.4	19.6	18.61	87.7	1.24
951	383	Average and totals .....	21.9	77	19.1	16.4	15.55	85.6	1.09

## CULTURAL NOTES.

**VARIETY TESTS**—During the present year this Station has tested five varieties of sugar beet seeds at the request of foreign growers.

Wohanka & Co., Prague, furnished two varieties of seed, as follows: Sta. No. 550, Wohanka, Rich in Sugar; Sta. No. 551, Wohanka, Rich in Produce.

Florimond Desprez, Cappelle, France, furnished three varieties, as follows: Sta. No. 553, Longer Rich in Sugar; No. 554 Rich in Sugar; Sta. No. 555, Very Rich in Sugar.

None of the varieties grown on the Station plats gave a full stand owing to the heavy frost on May 24th, and some injury caused by cut worms. There was a tendency noted towards too large a growth.

The analyses of the five varieties follows:

Station No. ....	550	551	553	554	555
Per cent sugar in juice.....	13.5	13	13.7	13.9	15
"    sugar in beet .....	12.8	12.4	12	13.2	14.3
"    solids in juice .....	16	15.7	15.6	16.3	17
Purity of juice.....	84.4	83	87.8	85.5	88.2
Per cent ash in juice.....	.79	.82	.89	.90	.89
Tons per acre .....	16.3	18.9	25.9	23.5	22.5
Per cent stand.....	88	70	86	73	67
Av. weight—grams.....	300	323	273	291	345

**TESTS IN PREVIOUS YEARS.**—In the seasons of 1888 and 1889 some tests were made at this Station with seeds from American seedsmen. In reality the varieties were simply species of Mangels. The percentages were low. The results are given in Bulletins 14 and 16 of this Station.

In 1890 trials were made using genuine sugar beet seed imported from France and Germany. Samples were grown at the Station and at various points in the state. The results obtained at the Station are as follows, stated in terms of per cent sugar in the juice. A variety furnished by the Oxnards, 18.8; Pajaro Valley, 15.4; Simon LeGrand's White improved, 10.3; Florimond Desprez, 13.7; Dippe's Kleinwanzleben, 16.9; Bulteau Desprez, Richest, 15.4. Further details are given in Bulletin 19.

In 1891 over a thousand samples of sugar beet seed were distributed throughout the state.

At this Station mother beets, after analysis, were planted for

seed bearing purposes. A fatal mistake was made at the Station this year by selecting a rich bottom land having a black mucky soil over six feet in depth. The returns from the state at large were good. Two samples gave over 18 per cent sugar in the beet; 37 gave over 15 per cent; 41 gave over 13 per cent, and 38 gave over 12 per cent, while 34 samples gave over 12 per cent sugar in the juice. Owing to poor cultivation and other avoidable causes the remaining samples, about 100 in number gave under 12 per cent sugar in the juice. The details are re-cited in Bulletin 27.

In 1892 this Station imported and distributed 400 samples of Aug. Knoche's varieties of the Vilmorin and Kleinwanzlebner types. In addition, plats were sown to home grown seeds produced the previous year. From the latter the following results were obtained: Kleinwanzlebner, 19.7 per cent sugar in the juice; Pajaro Valley, 16.2; Simon LeGrand, 19.3.

Of the Knoche strains the Kleinwanzlebner variety gave 16.3 per cent sugar in the juice; the Vilmorin variety, 16.1.

Over the state the results were excellent. Of the 160 samples analyzed only about 16 fell below 12 per cent sugar in the juice, and these were so close that they would have been purchased by any factory at a slight reduction. Of the remaining samples most of them gave from 14 to 18 per cent sugar in the beet while a few gave 19 to 20. The results were so good, notwithstanding the inevitable poor cultivation given by many experimenters, that the experiments were discontinued. Adverse legislation followed soon and no results were reaped from the fine showing made. The details are given in Bulletin 34.

The experiments were renewed in 1897 at the request of Secretary Wilson, owing to the enactment of more favorable laws.

RESULTS FOR 1897.—37 samples were rejected this year because the growers violated instructions to a fatal extent. The following results were secured from the state at large expressed in terms of per cent sugar in the juice:

68 samples gave between 12 and 14 per cent.						
127	"	"	"	14	"	16
99	"	"	"	16	"	18
28	"	"	"	18	"	20
10	"	"	"	20	"	22
7	"	"	"	22	"	24



## CONCLUSION.

A review of the bulletins issued by this Station will reveal the fact, that under adverse circumstances, even, sugar beets do exceedingly well in South Dakota. It will also show that failures can be made by neglecting the fundamental principles governing sugar beet culture.

Again such a review will demonstrate the fact that if proper seed be used, good land be selected, and proper attention be given to planting and cultivation, most excellent results will follow.

ACKNOWLEDGMENT. — Thanks are due the departments of Soil Physics and Physics for assistance rendered in the analysis of the samples of beets received during the campaign just closed. Much credit is also due to experimenters over the state who have grown samples for this year's test.

The generous interest shown by the U. S. Department of Agriculture in aiding the people of this state in this work will be highly appreciated by her citizens.