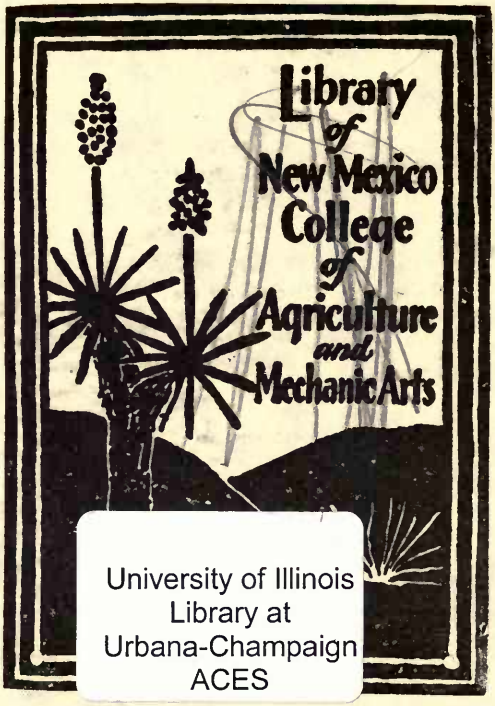
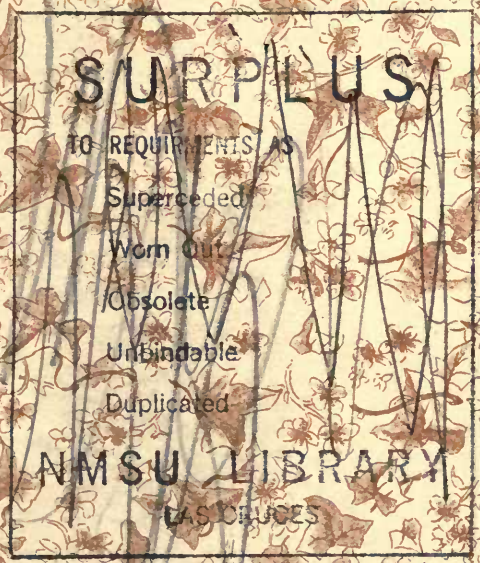




UNIVERSITY OF ILLINOIS

Agricultural Experiment Station

BULLETIN NO. 128

TEN GENERATIONS OF CORN BREEDING

By LOUIE H. SMITH

URBANA, ILLINOIS, SEPTEMBER, 1908

Summary of Bulletin No. 128

1. The results of ten years experiments in breeding corn to modify the composition of the grain and thereby adapting it to various special purposes are here reported.

2. Starting with a variety of average composition, it has been possible by selection and breeding, in ten generations: (1) to increase the average protein content from 10.92 to 14.26 percent; (2) to decrease the average protein content from 10.92 to 8.64 percent; (3) to increase the average oil content from 4.70 to 7.37 percent; (4) to decrease the average oil content from 4.70 to 2.66 percent. In other words, out of a single variety of corn two strains have been developed of which one is now almost twice as rich in protein as the other, and two other strains have been developed, one of which is now nearly three times as rich in oil as the other.
Page 468.

3. Variations among individual ears have been found ranging in protein content from 6.13 percent in the low-protein strain, to 17.79 percent in the high-protein strain, and in oil content from 1.60 percent in the low-oil strain to 8.59 percent in the high oil strain. Page 489.

4. Climatic conditions exert, in certain years, a marked effect upon the composition of the corn crop as regards its protein, oil, and starch content. Page 469.

5. Altering the composition of the grain has produced no very marked effect upon the composition of other parts of the corn plant. Page 476.

6. Continued selection appears to have induced a certain correlation between protein and oil content. Page 483.

7. Selection for the composition of the grain has resulted in characteristic types of kernel. Page 484.

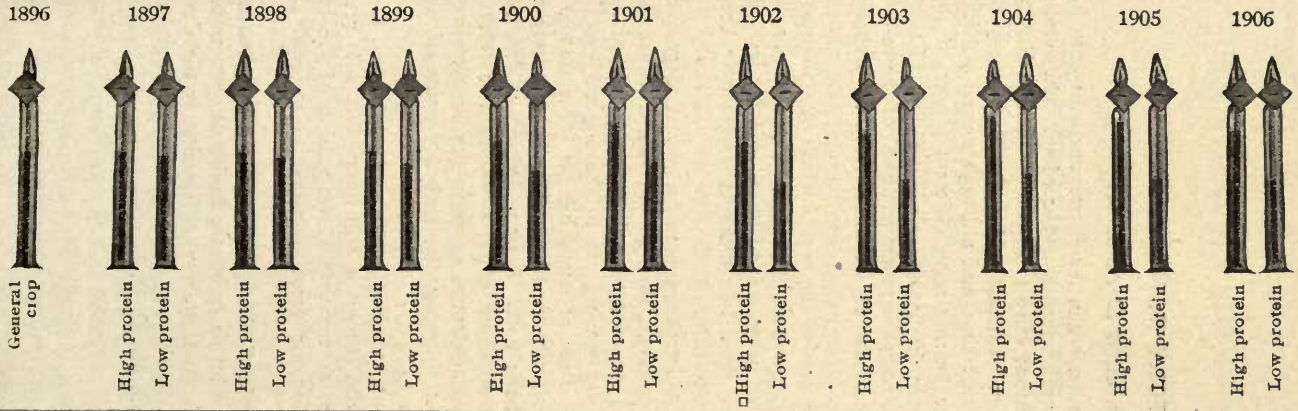
8. Perceptible modifications in the type of ear have likewise been wrought. Page 485.

9. Selection for high-protein is evidently accompanied by a reduction in yield. In the other strains the yields for the most part have been maintained in spite of the rigorous selection for the special chemical characteristics. Page 485.

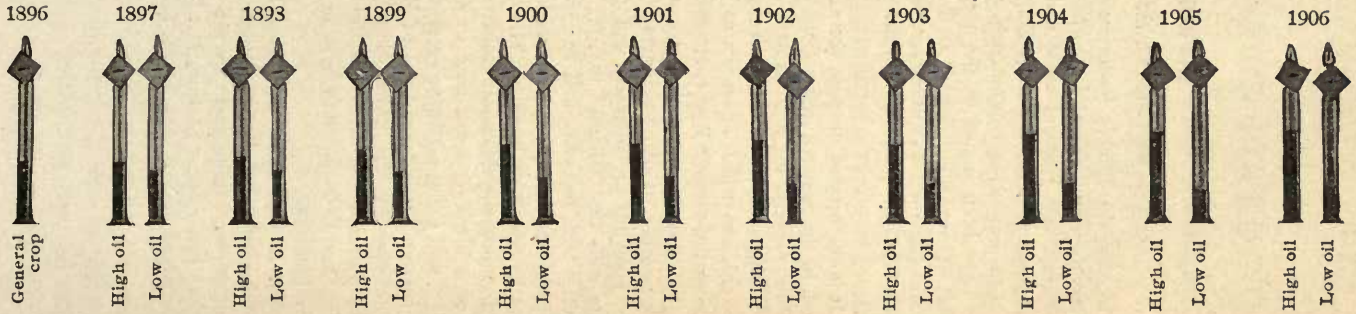
10. The detailed plot records of each of the four strains and the analytical results of nearly 5000 individual ears which have been analyzed during the ten years' work are placed on record in the appendix to this bulletin in such arrangement that the maternal pedigree record of every ear is shown. Page 490.

11. These four breeding plots are still being continued.

PHOTOGRAPH I. TEN YEARS CORN BREEDING FOR HIGH AND LOW PROTEIN



PHOTOGRAPH II. TEN YEARS CORN BREEDING FOR HIGH AND LOW OIL



Photograph I illustrates the results of breeding corn for increase and decrease of protein content; Photograph II, for increase and decrease of oil content. The bottles show the amount of protein or oil contained in one-tenth bushel of corn from the crop of the different strains each season for the first ten generations.

INTRODUCTORY NOTE

By Cyril G. Hopkins, Chief in Agronomy

In 1896 the Illinois Experiment Station began the improvement of corn by varying the composition of the grain through selection and breeding. The results of the first two years of these investigations were published in Bulletin No. 55 "Improvement in the Chemical Composition of the Corn Kernel." This same work has been carried on continuously since that time, and although several publications have been issued in the meantime bearing upon different phases of the subject of corn improvement as it has been developed, including Bulletins 82, 87, 100, and 119, there has, however, been no complete report published of the results obtained in the progress of this original line of work described in Bulletin No. 55.

It is the present purpose therefore to present the results which have been obtained, in the first ten generations, in improvement in composition in various directions, namely, for high protein, for low protein, for high oil and for low oil, of the single variety of corn from which these four different strains have been produced, and which is known as "Illinois" corn.

Since the discovery of the possibility of improving corn for special adaptation and the general recognition of its importance, this Station has extended its work to other standard varieties of corn best adapted to different sections of the state, applying the methods and principles worked out in the original experiments with the "Illinois" variety. This work of improving the other standard varieties both for yield and for special adaptation is being carried on largely in co-operation with seed corn breeders of the state. A large amount of data relating to this later work has already accumulated, but it is proposed to reserve this for future publication rather than to attempt to cover in this report all of the corn breeding work now in progress believing that such a division of the subject will allow a clearer presentation.

Inasmuch as the editions of Bulletins 53 and 55 are already exhausted and the demand for the information contained therein is still unsatisfied, it is proposed to make the nature of this report as complete a presentation of the investigation as is possible without making too great repetition of material already published.

For several years Professor Louie H. Smith has been largely responsible for the conduct of these investigations, valuable assistance having also been rendered during recent years by Doctor E. M. East, now agronomist at the Connecticut Experiment Station, Mr. R. W. Stark, now chief chemist for the Cuban Experiment Station, Mr. H. H. Love, and Mr. C. H. Myers.

TEN GENERATIONS OF CORN BREEDING

By LOUIE H. SMITH, Assistant Chief in Plant Breeding

IMPORTANCE OF CORN IMPROVEMENT

Aside from the purely scientific interest attached to this work, the practical importance of improvement of corn to adapt it for special purposes as well as for increased yield is now becoming generally recognized. The significance of improving the chemical composition of corn has already been pointed out in Bulletins 55, 82, 87, and 100 of the Illinois Experiment Station, and it is scarcely necessary to dwell upon this phase of the subject further than to refer briefly to some of the demands for corn improved along these particular lines.

No other crop is made to serve such a variety of purposes as corn, and in consideration of these many different uses is suggested the question of special adaptation.

Purpose of increasing the protein.—In the nutrition of man and beast protein is the most expensive nutrient. Of all of our American food stuffs corn is the cheapest, because of its economical production. But because corn does not contain sufficient protein for most purposes of feeding, it must be re-inforced by other more expensive food stuffs in order to obtain the proper ratio of this important nutrient. It is from these considerations that farmers, and especially stock feeders, recognize the importance of breeding corn for increase of protein content.

Purpose of decreasing the protein.—On the other hand, there is a demand from the manufacturers of those products which are derived from the starch of corn such as glucose, gum, dextrine, syrup, and alcohol, for a corn having a large proportion of carbohydrates and not so rich in protein. The practical effect of decreasing the percent of protein is to increase the percent of starch; therefore, for such purposes there should be a place on the market for corn which is bred for decrease of protein content.

Purpose of increasing the oil.—The oil of corn has in recent years found such a wide commercial use that under the present market conditions, it has become, pound for pound, by far the most valuable constituent of the grain, and whereas formerly in the glucose factories and corn mills the germs containing the oil were

almost a waste product, there is now an actual demand on the part of these industries for corn which is richer in oil. It is proposed to meet this demand by breeding corn for increase of oil content.

Purpose of decreasing the oil.—There is also a practical use for corn with a low oil content. It has been found by investigation that in feeding swine, the oil in the corn tends to produce a soft, flabby quality of flesh which is very undesirable, especially for our export trade where the demand of the market is for a hard, firm product. A remedy for this lies in the reduction of the oil content of the corn which is fed. Thus here we have a very important practical object for breeding corn for decrease of oil content.

These special purposes mentioned for which corn is being improved suggest the possibility of many others demanded by the various industries which utilize the corn crop and which require different qualities in it.

Corn improvement should, of course, embrace quantity as well as quality and in all practical work of selection looking toward improvement, the matter of increased yield per acre should be given first consideration. Recognizing the importance of this principle, the methods used in these experiments have been chosen with the view of maintaining or increasing the yield, and productiveness is made the basis of the first selection, even sometimes at a sacrifice in percentage of the desired chemical constituent.

FUNDAMENTAL PRINCIPLES

Before taking up this work of the improvement of corn by systematic selection and breeding, it was necessary to make a preliminary study of the subject such as is reported by Doctor Hopkins in Bulletin 53 "Chemistry of the Corn Kernel." In this study a large amount of valuable knowledge was gained which bears upon the technical side of the work, such as the chemical principles involved and the laboratory manipulations upon which the success of the entire work so intimately depends. Further, important data were obtained from which were derived the principles of selection upon which all of this work in improvement of the composition of corn is based. All improvement by selection and breeding depends, of course, upon variation, therefore it was necessary to make a preliminary study in order to learn how corn varies with respect to its composition. As the result of such an investigation the following data were obtained:

Analysis of parts of the ear.—In studying this question 30 duplicate analyses were first made on different parts of ears. Five ears were divided lengthwise into 3 samples each in the following

manner: If the ears were 12-rowed, 3 samples of 4 consecutive rows each were made; if 16-rowed, 3 samples of 5 consecutive rows each were made, one row being left, etc., etc.

Duplicate analyses of 15 samples thus prepared from 5 different ears gave the results shown in Table 1. The different ears are distinguished by the letters (a), (b), (c), (d), and (e).

TABLE 1.—VARIATION IN COMPOSITION IN SAMPLES FROM THE SAME EAR AND FROM DIFFERENT EARS

Sample & Ear.	Ash.	Protein.	Oil.	Carbohydrates.
1 (a)	1.42	10.79	4.57	83.22
	1.43	10.75	4.58	83 24
2 (a)	1.48	10.97	4.54	83.01
	1.47	10.94	4.51	83.08
3 (a)	1.50	10.66	4.53	83.31
	1.51	10.72	4.55	83.22
4 (b)	1.51	12.00	4.60	81.89
	1.52	11.98	4.59	81.91
5 (b)	1.49	12.01	4.57	81.93
	1.48	12.05	4.57	81.90
6 (b)	1.48	12.19	4.85	81.48
	1.47	12 08	4.80	81.65
7 (c)	1.37	10.09	5.24	83.30
	1.37	10.10	5.17	83.36
8 (c)	1.31	10.14	5.08	83.47
	1.34	10.18	5.18	83.30
9 (c)	1.36	10.15	5.20	83.29
	1.37	10.20	5.17	83.26
10 (d)	1.39	10.46	4.28	83.87
	1.38	10.46	4.29	83.87
11 (d)	1.43	10.25	4.22	84.10
	1.42	10.27	4.20	84.11
12 (d)	1.43	10.09	4.16	84.32
	1.45	10.06	4.15	84.34
13 (e)	1.34	11 19	4.80	82.67
	1.36	11.20	4.78	82.66
14 (e)	1.30	10.66	4.91	83.13
	1.28	10 62	4.89	83.21
15 (e)	1.36	10.81	4.83	83.00
	1.36	10.92	4.79	82.93

These results indicate uniformity in the composition of different parts of the ear. The following shows the greatest total variation in the 6 single determinations of each constituent in any one ear; and also the total variation between the different ears.

	Ash.	Protein.	Oil.	Carbohydrates.
In any single ear.	.09	.58	.28	.55
In five ears.....	.24	2.13	1.09	2.86

Another lot of five ears was selected and each of these was divided crosswise into 3 samples of approximately equal amounts, which for convenience are designated "tip," "middle" and "butt," the ears being lettered (f), (g), (h), (i) and (j). The results of the duplicate analyses are given in Table 2.

It is observed that in every case the tip is the lowest in protein and that usually the middle is lower than the butt, the average total difference in the ear being 0.73 percent and the widest 1.13 percent as shown in the total variations following Table 2.

The variation in ash and oil is small and shows no such peculiarity. The carbohydrates, being determined by difference, appear, of course, as the complement to the sum of the other substances and show in the opposite direction approximately the variation of the most variable determinable constituent.

Partial analyses of single kernels.—For the work on ash content several ears of corn were selected, and from each a sample of corn, consisting of a number of rows of kernels and believed to fairly represent the ear, was taken and its percentage of ash in the dry matter determined. Then for special investigation of ash content of single kernels four ears from the lot were chosen, of which two were high and two low, comparatively, in percentage of ash as previously determined. From each ear 10 kernels were selected at approximately equal distance throughout the length of the ear, the kernels being numbered from 1 to 10 and the order running from tip to butt. The data from the ash determination in single kernels and also percentage of ash in the large sample from the same ear are given in Table 3.

TABLE 2.—VARIATION IN COMPOSITION IN BUTT, MIDDLE AND TIP PORTIONS OF THE SAME EAR AND OF DIFFERENT EARS

Sample & Ear.	Ash.	Protein.	Oil.	Carbohydrates.
16 (f)	1.58	11.78	5.09	81.55
Tip	1.59	11.76	5.10	81.55
17 (f)	1.58	12.22	5.13	81.07
Middle	1.57	12.26	5.03	81.14
18 (f)	1.56	12.36	5.04	81.04
Butt	1.58	12.42	5.03	80.97
19 (g)	1.49	11.99	4.86	81.66
Tip	1.49	11.97	4.84	81.70
20 (g)	1.51	12.49	4.77	81.23
Middle	1.51	12.49	4.76	81.24
21 (g)	1.50	13.02	4.57	80.91
Butt	1.51	13.10	4.59	80.80
22 (h)	1.37	9.72	3.90	85.01
Tip	1.35	9.67	3.93	85.05
23 (h)	1.37	10.07	3.98	84.58
Middle	1.35	10.08	3.97	84.60
24 (h)	1.51	10.49	4.01	83.99
Butt	1.49	10.46	4.00	84.05
25 (i)	1.47	10.58	4.58	83.37
Tip	1.48	10.61	4.60	83.31
26 (i)	1.45	11.05	4.56	82.96
Middle	1.44	11.03	4.60	82.93
27 (i)	1.47	11.03	4.48	83.02
Butt	1.48	10.96	4.46	83.10
28 (j)	1.77	10.87	4.36	83.00
Tip	1.74	10.78	4.37	83.11
29 (j)	1.65	11.35	4.56	82.44
Middle	1.62	11.31	4.58	82.49
30 (j)	1.71	11.32	4.28	82.69
Butt	1.72	11.28	4.29	82.71

The following shows the total variation:

	Ash.	Protein.	Oil.	Carbohydrates.
In any single ear....	.16	1 13	.30	1.06
In five ears.....	.42	3.43	1.23	4.25

TABLE 3.—VARIATION IN ASH CONTENT IN KERNELS FROM THE SAME EAR AND FROM DIFFERENT EARS

Kernel No.	Ear No. 1	Ear No. 2	Ear No. 3	Ear No. 4
1	1.50	1.64	1.10	1.14
2	1.57	1.64	1.08	1.23
3	1.61	1.63	1.09	1.13
4	1.56	1.65	1.10	1.17
5	1.67	1.59	1.07	1.13
6	1.69	1.63	1.09	1.22
7	1.71	1.68	1 07	1.25
8	1.64	1.65	1.10	1.19
9	1.64	1.70	1.21	1.11
10	1.74	1.60	1.11	1.10
Composite of ear	1.73	1.65	1.10	1.11

These results confirm those of the previous experiments in indicating uniformity in the composition of the ear in all parts, although, of course, slight variations are found.

In the work on the protein content of single kernels, 5 ears, 3 of which were high and 2 relatively low in protein, were selected from a number of ears in a manner analogous to that described in the previous experiment. In Table 4 are shown the results of these protein determinations.

TABLE 4.—VARIATION IN PROTEIN CONTENT IN KERNELS FROM THE SAME EAR AND FROM DIFFERENT EARS

Kernel No.	Ear No. 1	Ear No. 2	Ear No. 3	Ear No. 4	Ear No. 5
1	12.46	12.17	11.53	7.45	7.72
2	12.54	12.94	12.32	7.54	8.41
3	12.44	12.51	12.19	7.69	8.37
4	12.50	13.42	12.54	7.47	8.31
5	12.30	13.12	12.14	7.74	8.02
6	12.49	14.59	12.95	8.70	8.76
7	12.50	13.21	12.84	8.46	8.89
8	12.14	13 43	.....	8.69	9.02
9	12.14	13.16	12.04	8.86	8.96
10	12.71	14.05	12.75	8.10	8.89
Composite of ear	13.06	13.87	12.96	7.59	8.40

Here in the protein content, as in the case of the ash, we find on the one hand comparative uniformity among different kernels of a single ear and on the other, marked variation among different individual ears.

The results of these analyses of different ears from a single variety together with analyses of different parts of single ears establish beyond question two important fundamental facts upon which all of this subsequent work of selection and breeding is founded.

The statement of these facts is as follows:

(1) *The ear of corn is approximately uniform throughout in the chemical composition of its kernels.*

(2) *There is a wide variation in the chemical composition of different ears of the same variety of corn.*

With these two principles established, we have a working basis for the chemical selection of seed corn. With uniformity in the individual ear, it is possible to determine very approximately the composition of the grain by analyzing a sample consisting of a few rows of kernels, and this is the actual practice in the examination of individual ears. If the ear represented by this sample is found to be desirable for seed, the remainder of the kernels of the ear may then be planted.

The wide variation in composition between different ears of the same variety is a very important factor in the selection of seed; as a starting point is thus furnished in each of the several lines of desired improvement.

It is to be observed that this principle of uniformity within the individual, and variation as between different individuals within the variety, holds not only for the chemical composition of the kernel but it applies as well to other characteristics such as the structure, for example, and whenever any such characteristic is related to productiveness or other utility of the crop, it should be taken into account in the breeding.

GENERAL PLAN OF THE EXPERIMENTS

In the general plan of these experiments, it was proposed to determine the influence upon the chemical composition of corn by selection and breeding in the four directions namely, (1) for increase of protein content, (2) for decrease of protein content, (3) for increase of oil content, (4) for decrease of oil content.

The method employed was as follows:

For the first selection a large number of ears were analyzed both for protein and for oil. In the high protein breeding, for example, the 24 ears highest in protein were selected for seed and planted in a plot isolated from other sorts of corn, each ear in a separate row.

These rows were harvested separately and the seed for the next planting was selected from ears of this crop which were found to be highest in protein, repeating this process each year. The breeding for low protein and for high oil and low oil was conducted on the same plan. Under this system each selection rapidly gave rise to a "pure" strain. As each original ear had its own register number and as all succeeding ears bore corresponding numbers the exact pedigree of each row (on the female side) was at all times fully known.

This general method has been maintained from the beginning, although some minor modifications of details have been made from time to time during the progress of the work as experience indicated as being desirable or as necessity demanded.

THE BREEDING PLOT

The size of the breeding plot has varied in the different plots and in the different years. The number of rows included in any plot is always given in the plot records.

The locations of these breeding plots have always been chosen with reference to their isolation from other corn fields in order to prevent cross fertilization from other kinds of corn. It is quite difficult with so many corn experiments as are carried on at this Experiment Station to obtain conditions that are ideal in this respect, but by taking advantage of tall hedge rows, and other barriers, prevailing winds, and other corn fields of the same strain, there has been but slight, if any, admixture in these breeding plots. A system of alternating the locations of the breeding plots of the opposite strains has been carried out. For example, after the first two years the locations of the high-protein and the low-protein plots were reversed; that is the high-protein plot was planted on the same ground that the low-protein plot had occupied the two preceding years and *vice versa*. After two years more these plots were shifted back to their original locations. The high-oil and low-oil plots were managed in the same manner. The design of this alternation of location of the plots was to provide something of a check upon the possible influence of soil upon the composition

of the crops. The plots have been changed to other locations in later years but this system of alternating has been maintained. For each of these breeding plots there is now provided a double area which makes possible a crop rotation system including clover and other legumes, for maintaining the productivity of the land.

CULTURAL CONDITIONS

The cultural methods, including the preparation and cultivation of the soil, planting, harvesting, and handling of the crop on these breeding plots have been such as is considered good practice in ordinary corn growing. The seed has always been planted in hills in preference to drills. The present practice is to plant the hills three feet apart each way and to allow two stalks to the hill.

Attention is paid to the matter of preventing the distribution of pollen from weak, barren or otherwise undesirable plants by detasseling all such plants at the proper time.

After discovering the great advantage to be gained by the method of detasseling alternate rows and taking seed only from such detasseled rows, as pointed out in Bulletin 100, this system has been applied to all of our regular breeding plots.

The method of harvesting has been that of cutting and curing in the shock.

SAMPLING AND SELECTING

In the earlier years of the experiments a sample from each of all of the rows was reserved by selecting a certain number of the choicest ears as judged from their physical appearance. But as the possibility of improvement became more clearly established, a system was adopted by which seed ears for the next year's planting are taken only from those rows which prove to be most productive as determined by the weight of ear corn produced, all other rows of the plot being rejected as a source of seed, and since the introduction of the system of detasseling alternate rows, only the best of the detasseled or "dam" rows have been selected. This method of selecting the choicest ears to represent the plot-row has been followed throughout the work although details of the system as regards the number of ears taken have been somewhat modified in the different years, as will appear in connection with the data which follow in the appendix.

The ears, thus chosen on account of their physical superiority, are then subjected to chemical analysis and from the results of these analyses is made the final selection of seed for the succeeding season.

In the sampling for these analyses two rows of kernels are taken lengthwise of the ear to represent the composition of the individual ear. At the same time composite samples to represent the selected plot-rows are taken by mixing together one row of kernels from each selected ear of the respective plot-rows. Each seed ear thus selected is given a permanent "Register Number" which designates that ear for all future reference.

REGISTERING

By our system of numbering the "Register Number" shows at the same time the number of the ear and the generation of the breeding. This is done by starting the first year in the 100 series numbering the ears to be planted in succession from 101, and the second generation starting with the 200 series running up from 201 and so on, starting each succeeding year of the breeding with a higher hundred. Thus Ear No. 1018 shows that this ear belongs to the tenth generation and was planted in row 18 of the breeding plot of that year. The "Dam No." is the register number of the parent ear and is useful in tracing the pedigree record from year to year. The "Annual Ear No." is simply a temporary number given to each ear to be used during examination for selection and as soon as the selection of the seed ears has been determined and the arrangement for planting has been decided the ears are given their permanent register numbers.

A description of the physical as well as the chemical characteristics of all the seed ears is kept on record including length of ear, tip circumference of ear, butt circumference of ear, number of rows of kernels, number of kernels in row, weight of ear, weight of cob, tip circumference of cob, and butt circumference of cob. Besides this numerical description a photograph record is also kept of every ear planted.

The performance record of each seed ear is shown by the weight and number of ears produced as well as the average composition of its progeny.

For a more detailed description of the system of registry used in our corn breeding work the reader is referred to Bulletin 100.

VARIETY

The variety of corn selected for this investigation was one of medium size and of safe maturity for this latitude. It has been grown upon the Experiment Station farm every year since 1887. Previous to that time it had been carefully grown for several years

by Mr. F. E. Burr of Champaign county, and it was known locally as Burr's White; and this name was used in our records until 1903, when it was decided to change the name to "Illinois." The fact that these strains of corn are no longer typical Burr's White, and the fact that this corn was carefully grown for several years prior to 1896 by the Illinois Experiment Station and that since that time it has been most carefully bred by this Station for improvement in both yield and quality, so that there have been developed from this variety four different strains of corn each of which has an established pedigree now covering ten generations,—these facts have seemed to justify giving this corn a name which shall be distinctive and which shall also show its Illinois breeding; and now it is known in the records and publications of the Illinois Experiment Station as "Illinois" corn, the four different strains being designated as:

1. "Illinois High-Protein."
2. "Illinois Low-Protein."
3. "Illinois High-Oil."
4. "Illinois Low-Oil."

FIRST SELECTION OF SEED

From the 1896 crop of Burr's White corn grown upon the Experiment Station farm about two bushels (163 ears) of good sound ear corn suitable for seed were taken. From each ear a sample consisting of three rows of kernels lengthwise of the ear was taken for analysis. The results of these analyses are given in the first table of the appendix (Table 15). The data obtained show remarkable variation in the relative proportions of the different constituents. The ash varies from 1.10 to 1.74 percent, the protein from 8.25 to 13.87 percent, the oil from 3.84 to 6.02 percent and the carbohydrates from 78.92 to 85.70 percent. This is a good illustration of the variation in composition existing among individual ears of the same variety and indicates something of the possibilities for selection.

According to these variations there were taken from the 163 ears four groups,—(1) a set of twenty-four ears whose percentage of protein was comparatively high, (2) a set of twelve ears each of which contained a low percentage of protein, (3) a set of twenty-four ears high in oil content, (4) a set of twelve ears low in oil content.

These ears were taken as indicated in the last two columns of Table 15, for the seed with which to start the four respective breeding plots.

It is believed that the interest in this investigation is such as to demand the publication of a complete record of the results in detail, but this data forms such a mass of material as to make it seem advisable to place it in an appendix to this bulletin and to summarize here only the yearly averages which show very well the general results of the work. The reader who may be interested in further detail of the experiments at any point is therefore referred to the appendix (pages 489 to 575) where will be found the complete data recorded in systematic arrangement. (If not attached to this copy, the appendix will be sent upon request).

BREEDING TO INFLUENCE THE PROTEIN CONTENT

In order to obtain a general survey of these experiments to influence the protein content of corn the following table is compiled from the general averages obtained each generation from the corresponding tables given in the appendix:

TABLE 5.—TEN GENERATIONS OF BREEDING CORN FOR INCREASE AND DECREASE OF PROTEIN

Year	High-protein plot, average percent protein.		Low-protein plot, average percent protein.		Difference between crops, percent.
	In seed planted.	In crop harvested.	In seed planted.	In crop harvested.	
1896	.....	10.92	....	10.92	.00
1897	12.54	11.10	8.96	10.55	.55
1898	12.49	11.05	9.06	10.55	.50
1899	13.06	11.46	8.45	9.86	1.60
1900	13.74	12.32	8.08	9.34	2 98
1901	14.78	14 12	7.58	10.04	4.08
1902	15.39	12.34	8.15	8.22	4.12
1903	14.30	13.04	6.93	8.62	4.42
1904	15.39	15.03	7.00	9.27	5.76
1905	16.77	14.72	7.09	8.57	6.15
1906	16.30	14.26	7.21	8.64	5.62

From this arrangement of the data we may compare the results of the different seasons and at the same time observe the relations between the two plots, thereby enabling us to follow the progress of the breeding from year to year.

Starting with the crop of 1896 with an average protein content of 10.92 percent, as represented by the original 163 ears, the average of the seed ears selected for the high-protein plot of 1897 was 12.54 percent while at the same time low-protein seed ears were

selected which averaged 8.96 percent. The crop harvested from the high-protein plot in 1897 gave an average of 11.10 percent of protein while the average of the corresponding low-protein plot was 10.55 percent. Then selecting again the highest-protein ears out of this year's crop from the high-protein plot, seed for the following year was obtained which averaged 12.49 percent. Selecting the lowest protein ears from the low-protein plot, the seed for this plot in 1898 averaged 9.06 percent.

Repeating this process each year the effect has been in a general way to gradually increase or decrease the protein content in the corn according to the selection.

In glancing over the records there are a few irregularities to be seen. Comparing the results of the season of 1898 with that of the preceding year we seem to have lost a little ground in the high-protein breeding, and in the low-protein plot there was no advance made.

The next year however, following a more favorable seed selection in each case, good gains were made in both directions in 1899, and the same is true of the year 1900.

In 1901 the results are abnormal and here we have a striking illustration of the effect which may be produced by the climatic conditions of the season upon the composition of the crop. This year the protein rises abnormally high in the high-protein crop gaining 1.8 percent over that of the year before and in the low-protein crop, instead of getting the expected decrease this year the protein content rises to over ten percent, thus reverting back to a point higher than it had been for two generations. The season of 1901 was an extremely dry one and from the lack of sufficient moisture much of the corn did not properly "fill out." In the formation of the kernel the proportion of protein is greatest in the younger stages of growth and this proportion gradually diminishes as the carbohydrates are deposited. If the conditions are such that this deposition of carbohydrates is checked, as they were this season, the corn comes to maturity with an abnormally large proportion of protein.

In the case of the high-protein plot the damaging effect of this drouth was so pronounced as to render the crop almost a total failure. The yield of ear corn amounted to only about six bushels per acre and consisted mostly of mere nubbins. On account of the scarcity of ears, it was impossible to follow the regular system of sampling, so the entire product from each plot-row was collected and all of the sound ears and even many nubbins were selected for

analysis in order to obtain the results of the year and to get any sort of seed with which to maintain the experiment. The composite samples representing the high-protein crop are therefore not obtained from the best twenty ears from each plot-row according to the regular system but they were taken from all of the corn fit to analyze from each row. Thus there were altogether only 60 individual ears from which only five were chosen for seed as being fit to plant. Fortunately it was possible to supplement these with some seed ears from our "Special High-protein" plot which was being carried on for another experiment but which was planted from the same strain as the regular high-protein plot so that these ears could be substituted without disturbing the pedigree record. The low-protein plot did not suffer so badly from the drouth, so that here the sampling and selection were made as usual.

During the season of 1902 the climatic conditions as regards rainfall were just the opposite to those of the previous year and we observe in the results obtained precisely the opposite effect. With the very wet season this year we have a great diminution of protein content in the corn in the high-protein as well as in the low-protein plot.

This seasonal condition which seems to have such a marked influence upon the composition of the corn is quite significant. The season of 1901 was very dry and it was attended by an abnormally high protein content in all the corn examined that year. The season of 1902 was unusually wet and the general tendency was to produce corn low in protein. These results are in accordance with those of other investigations, particularly in irrigation experiments where it has been observed that the quantity of water supplied has a direct influence upon the composition of corn, wheat, and oats, the protein content of the grain decreasing as the water supply increases. These results support what seems to be a general principle namely, that a lack of moisture tends to increase the proportion of protein and abundance of moisture reduces it, due, of course, to the effect of water supply upon carbohydrate formation.

With a fairly normal season in 1903 the high-protein crop made a notable advance, but the low-protein in spite of the extremely low content of the seed this year did not go down to the point attained in the low-protein season of the previous year, and in fact we have never been able since to bring it back to the extremely low point reached that year.

The season of 1904 appears to have been another one favorable to the production of protein, for the high-protein plot made a gain

of two percent this year and reached its maximum figure, 15.03 percent, a point which has not since been attained. The low-protein plot shows a similar effect, for instead of decreasing this year, it goes up to 9.27 the highest average percentage in the last five generations of the breeding.

In 1905 as might be expected the content in the high-protein crop was not so high as in the preceding high-protein season. In the low-protein plot a good gain was made this year for low-protein.

In 1906 the percentage in the high-protein was still lower than in 1905 while in the low-protein crop, the percentage was a little higher than in the year before although the difference is not great.

The figures in the last column of the table showing the difference between the percentages of protein in the two crops produced each year are perhaps most instructive because they show the real progress attained in the breeding. They enable us to appreciate more fully the scientific value of breeding for high protein and low protein simultaneously and thereby obtaining a control upon the work which serves to eliminate the question as to the effect of seasonal tendencies in either direction.

These figures practically show a continuously increasing separation between the high-protein and the low-protein strains as the breeding advances up to 1906 so that with the exception of two slight regressions, whether the tendency of the season has been toward the production of high-protein corn or low-protein corn, the force of an hereditary influence is demonstrated always to have been in operation.

It is to be recognized of course that there are practical limits both maximum and minimum to which this matter can be carried and we should expect to finally reach a state where we would interfere with the normal physiological functions of the seed.

As to whether this last year's result in which no more gain was made in the difference between the high and low, is to be taken as indicating that we have reached these limits cannot yet be positively decided. It seems scarcely probable that with seed still unimpaired in vitality and developing into normal healthy plants furnishing otherwise normal crops that the ultimate limits should be at hand. It is proposed still to keep up the selection along these lines and the outcome of the next few years will be awaited with interest.

The results of these experiments thus far show that starting with a single variety of corn, it has been possible in ten generations

by these methods of selection and breeding to increase the protein content from 10.92 percent in the original to 14.26 percent, thus making a gain of 3.34 percent, and at the same time by breeding in the opposite direction it has been possible to reduce the protein content from 10.92 percent to 8.64 percent, making a reduction of 2.28 percent, thus producing a total difference between the two strains of 5.62 percent. In other words the composition of this variety of corn has been so modified that two strains have been developed, one of which is now nearly twice as rich in protein as the other.

MIXED-PROTEIN PLOT

In order to eliminate the question as to whatever influence the soil might exert on the protein content of the corn an experiment was undertaken in which high-protein and low-protein seed were planted together in one plot, our so-called "Mixed-Protein Plot," where the two strains must develop under identical surrounding conditions.

The description and results of the first year of this experiment are given in Bulletin 55. The first year this mixed-protein plot contained five rows of ten hills each. In each hill were planted two kernels of high-protein corn on one side and two kernels of low-protein on the opposite side in such manner that the resulting plants could be identified.

When the crop was harvested eight to ten ears were selected from each kind of corn from each row and from these ears composite samples were made for analysis. These analyses showed that the average protein content of the corn from the high-protein seed was invariably higher than in that produced from the low-protein seed.

This same experiment was repeated in a somewhat larger plot in 1899 and also in 1900. (See Tables 96, 97 and 98 in the appendix for details).

The differences in protein content between the crops from high-protein and low-protein seed were 1.25 percent in 1898, 2.58 percent in 1899, and 2.86 percent in 1900.

Besides these composite samples there were analyzed from the mixed-protein plot of 1899, 137 pairs of ears in which each pair consisted of an ear produced from a high-protein kernel and one from a low-protein kernel and growing together in the same hill. The results of these analyses are given in Table 99 of the appendix and they show an average difference of 2.58 percent to be attributed positively to the influence of the seed selection. But with still further interest, it is to be noted that among these 137 different

pairs, there are only ten cases in which the higher percentage of protein is not found in the ear produced from the high-protein kernel. The most notable of these exceptions occurs in case of Row No. 2, Hill No. 11 where the low-protein kernel produced an ear 3.73 percent higher in protein than the ear resulting from the high-protein kernel. However, these abnormal individual variations are to be expected and they have frequently been observed throughout all of these experiments.

The results of these experiments with the mixed-protein plots during these three different years establish beyond question the fact that the protein content of the corn crop is influenced directly by the seed planted, independently of soil, seasonal, or cultural conditions.

BREEDING TO INFLUENCE THE OIL CONTENT

Summarizing the results of the ten generations of breeding to influence the oil content in the same manner as we have considered the protein breeding, there are brought together from the detailed records in the appendix the general yearly averages of the high-oil and low-oil plots as arranged in Table 6.

TABLE 6.—TEN GENERATIONS OF BREEDING CORN FOR INCREASE AND DECREASE OF OIL

Year.	High-oil plot, average percent oil.		Low-oil plot, average percent oil.		Difference between crops, percent.
	In seed planted.	In crop harvested.	In seed planted.	In crop harvested.	
1896	....	4.70	....	4.70	.00
1897	5.39	4.73	4.03	4.06	.67
1898	5.20	5.15	3.65	3.99	1.16
1899	6.15	5.64	3.47	3.82	1.82
1900	6.30	6.12	3.33	3.57	2.55
1901	6.77	6.09	2.93	3.43	2.66
1902	6.95	6.41	3.00	3.02	3.39
1903	6.73	6.50	2.62	2.97	3.53
1904	7.16	6.97	2.80	2.89	4.08
1905	7.88	7.29	2.67	2.58	4.71
1906	7.86	7.37	2.20	2.66	4.71

The results show that the response to selection for oil has been even more pronounced and more regular than that for protein as indicated by the total relative increase and decrease and by the changes from year to year.

In the percentages representing the crop produced each year in the high-oil plot there has been with but one exception, namely, in

1901, a constant increase in oil content as the breeding proceeds. Likewise in the low-oil plot there has been a steady decrease from year to year with the single exception of the last year.

We have noted the marked effect which the abundance or scarcity of moisture may have upon the protein content of corn, and in these experiments the oil content appears also to be susceptible to some peculiar seasonal conditions. What these conditions are have not been determined, but that they exist is made apparent if we compare the increase and decrease in the percentage of oil in each generation in the two plots. It would appear as though certain seasons were particularly favorable to the production of oil, while other seasons may be normal or unfavorable in this respect. This effect is particularly apparent in the first two years of the breeding; thus, the season of 1897 seems to have been very unfavorable, while the season of 1898 appears to have been very favorable, to the production of oil.

From the last column in the table which shows, by the differences in percentage between the high-oil and the low-oil crops each year, the real progress accomplished by the breeding, we see that there has been a continuously increasing difference between the percentages of oil in the corn from the two plots up to the tenth year where this difference remains stationary. The high-oil corn has increased from 4.70 percent to 7.37 percent of oil, and the low-oil corn has decreased from 4.70 to 2.66 percent, the difference between the two strains having grown from nothing in 1896 to 4.71 percent in 1905. Curiously enough the oil breeding resembles the protein in the fact that there is constant progress indicated until the tenth year when in each case this progression ceases. In the protein experiments it will be recalled that the figures in this "difference column" show actually a slight regression in the tenth year while here in the oil breeding the differences between the averages of the high-oil and low-oil crop stands exactly stationary in the last two years.

As has already been remarked in the discussion of the protein breeding results, it would be rash to decide at this time from these figures that the limits to which the breeding can be carried are now determined.

Summarizing the results of the ten years' experiments to influence the oil content into one general statement we may say that starting with a single variety of corn and breeding in the two opposite directions, there has been a constantly widening separation between the two strains as the breeding advances until finally after ten generations there have been produced two kinds of corn, one of which is almost three times as rich in oil as the other.

MIXED-OIL PLOT

In order to eliminate any question of the influence of the soil upon the oil content in these experiments, a third plot was planted called the "mixed-oil plot," after the plan of the "mixed-protein plot" already described under that heading. In 1898 there were planted in this plot 50 hills arranged in five rows of ten hills each. In each hill two kernels of high-oil corn were planted on one side and two of low-oil on the opposite side and when the crop was harvested composite samples were made to represent the corn of each side of the row.

This same experiment was repeated in 1899 and also in 1900 the details being given in Tables 100, 101 and 102 of the appendix.

From the results it is to be noticed that never in any of the rows has the percentage of oil in the crop of the low-oil side approached that of the high-oil side. In 1898 the average difference in oil content in the corn resulting from the two kinds of seed was 1.11 percent, in 1899 it was 1.35 percent and in 1900 it was 1.97 percent.

From the mixed-oil plot of 1899 there were taken besides these composite samples 85 pairs of individual ears in which each pair consists of one ear produced from a high-oil seed kernel and one from a low-oil kernel, both ears from plants growing in the same hill. Each of these individual ears was sampled and analyzed and these results are given in Table 103 of the appendix.

The average of all of the individual ears from high-oil seed is 5.22 percent and from low-oil seed it is 3.82 percent. But the point of most interest, perhaps, in connection with this table is the regularity with which the oil content of the crop responds to that of the seed planted, for among the 85 pairs there are only four cases in which the oil in the ear, resulting from low-oil seed happens to surpass in percentage that from the high-oil seed.

The results of these three years' experiments with the mixed-oil plot are all in accordance and they establish beyond dispute the possibility of influencing the oil content of corn by the selection of the seed, showing conclusively that heredity has been responsible for the results obtained quite independent of soil, climatic or cultural conditions.

SECONDARY EFFECTS PRODUCED BY SELECTION TO CHANGE THE COMPOSITION OF THE GRAIN

As is always the case in investigations of this sort, the work had not proceeded far before a multitude of interesting side questions arose, inviting investigation in all directions from the main issue. What secondary effects are produced by this intense selection for these special chemical characteristics? What, for example, is the effect of changing the proportion of protein in the grain upon the other constituents? How is the composition of other parts of the plant affected? What influence has it upon the physical type of the kernel and of the ear? And, what is of especially practical importance, how is the yield affected?

Having established the possibility of influencing the composition of the kernel in this way by several years of breeding and after having actually produced the different kinds of corn to work with, it became possible to take up the study of some of these important secondary effects. The results of the investigation of some of these questions are given in the following pages.

EFFECT ON THE COMPOSITION OF OTHER PARTS OF THE PLANT

After the breeding plots had been under way for five years and marked changes had been produced, a study was begun to ascertain how the composition of other parts of the plant was being affected by altering that of the grain.

Beginning in 1903, there have been collected every year at harvest time representative plants from each of the four "Illinois" breeding plots. These plants were divided in the following manner into three parts, namely, upper-stalk, lower-stalk, and leaves. The leaves were first stripped off from the stalks and these, including the husks, constituted the sample designated here as "leaves." Then at the joint where the ear was borne, the stalk was divided and the part below this point comprised the sample called "lower-stalk," and all above including the tassel, made up the sample designated as "upper-stalk."

It may be observed that the condition of these samples is just as it would be in the ordinary handling of corn stover on the farm. It was cured in the field in the ordinary manner, the stalks having lost some parts of the leaves and tassels. Then this rather arbitrary division into parts follows somewhat in the natural way in which the stover is eaten by animals as fed entire without cutting or shredding. The leaves and husks are entirely consumed and usually a portion at least of the upper stalk is eaten. If any is refused, it is the coarser part of the stalk corresponding somewhat to

our sample of "lower-stalk." With this practical bearing in mind, there is lent something of an added interest to the analyses.

The results of the analyses of these samples are brought together in the tables that follow. For convenient comparison each constituent is considered by itself in a table showing the percentages found in the several parts of the plant in the different strains each season.

In the first two years of the work these samples were taken from every individual breeding row in the four plots so that the results shown here really represent averages of several hundred analyses, but these data form such a mass of material that lack of space forbids presenting them here in detail.

EFFECT ON THE ASH CONTENT

We will consider first the effect produced by the breeding upon the ash content as shown in the following table:

TABLE 7.—ASH CONTENT IN DIFFERENT PARTS OF PLANT

Year.	Strain.	Upper-stalk.	Lower-stalk	Leaves.	Grain.
1902	High-Protein	5.25	4.08	8.21	1.57
	Low-Protein	5.82	5.09	8.64	1.45
	High-Oil	5.65	4.89	7.59	1.54
	Low-Oil	4.91	3.72	7.11	1.42
1903	High-Protein	5.23	4.52	9.66	1.52
	Low-Protein	4.86	4.28	7.98	1.34
	High-Oil	5.20	3.98	8.23	1.47
	Low-Oil	4.75	4.27	7.27	1.47
1904	High-Protein	4.38	3.95	6.56	1.60
	Low-Protein	5.14	4.57	7.51	1.41
	High-Oil	5.05	5.80	7.66	1.56
	Low-Oil	5.59	5.53	8.12	1.43
1905	High-Protein	4.30	4.02	6.52	1.54
	Low-Protein	5.00	4.61	7.47	1.50
	High-Oil	5.26	5.92	8.06	1.58
	Low-Oil	5.69	5.47	8.34	1.28
1906	High-Protein	4.77	4.93	9.08	1.48
	Low-Protein	4.28	4.15	8.85	1.41
	High-Oil	5.05	5.61	7.72	1.64
	Low-Oil	5.67	4.84	7.01	1.46

Comparing the percentages of ash in the high-protein and low-protein strains in the upper-stalk, there is no regularity apparent. In two of the seasons the percentage was greater in the high-protein plot and in the three other seasons it was smaller. The lower-stalk varies in the different seasons in accordance with the

upper-stalk, and the same is true of the leaves. In the grain the differences are very slight but they show every season a little more ash in the high-protein corn.

Comparing the samples of the various parts from the high-oil and low-oil strains, we find no regularly concordant variations except in the case of the grain where usually the percentage of ash has been a trifle higher in the high-oil than in the low-oil corn. In regard to the distribution of the ash over the plant as a whole we find, as we should expect in accordance with what is generally observed in plant studies of this nature, the lowest proportion of ash in the seed and the highest in the leaves where it amounts sometimes to almost one-tenth of the dry substance.

EFFECT ON THE PROTEIN CONTENT

It is especially interesting to note how the change in the proportion of protein in the grain has affected this constituent in other parts of the plant. For example, does the increase of protein in the kernel mean an increase of this substance in the other organs of the plant, or is this higher content in the kernel the result of an accumulation produced at the expense of other parts?

Table 8 shows the results of the protein determinations in the various parts of the plant.

TABLE 8.—PROTEIN CONTENT IN DIFFERENT PARTS OF PLANT
(Protein derived by multiplying the nitrogen content by the factor 6.25)

Year.	Strain.	Upper-stalk.	Lower-stalk	Leaves.	Grain.
1902	High-Protein.....	3.31	3.28	5.00	12.34
	Low Protein.....	2.90	3.21	4.99	8.22
	High-Oil.....	3.70	4.72	5.13	10.83
	Low-Oil.....	2.78	2 83	4.86	9.31
19 3	High-Protein.....	4.00	3.20	4.92	13.04
	Low-Protein.....	3.80	4.26	5 28	8.62
	High-Oil.....	3.20	3.28	5.04	11.04
	Low-Oil.....	3.50	3.58	5.04	10.22
1904	High-Protein.....	6.52	5.68	5.34	15.03
	Low-Protein.....	3.06	3.46	4.77	9.27
	High-Oil.....	4.53	4.08	4.86	12.29
	Low-Oil.....	4.00	4.94	5.10	10.88
1905	High-Protein.....	6.13	6.03	6.46	14.72
	Low-Protein.....	3.59	4.59	5.81	8.57
	High-Oil.....	4.38	6.32	6.42	12.12
	Low-Oil.....	4.41	4.09	5.74	9.86
1906	High-Protein.....	5.99	4.94	5.27	14 26
	Low-Protein...	5.61	6.48	7.13	8.64
	High-Oil.....	5.38	6.56	5.57	11.81
	Low-Oil.....	4.37	4.37	5.03	10.54

Upon comparing the protein content of the upper-stalk samples we find that the percentage has always been greater in the high-protein plot varying in the different seasons, from only a slight difference to over double the amount.

The lower-stalk follows the upper-stalk in this respect in three of the seasons but in the other two years the protein runs higher in the low-protein strain. The leaves agree quite closely in every case with the lower-stalk.

The wide differences in the protein content of the grain are, of course, the direct result of the selection which have already been considered so that we need not discuss them further in this connection.

Turning now to the oil breeding, there seems to be a lack of any significant regularity in the parts of the stover. In the upper-stalk the percentage of protein runs higher three out of the five seasons in the high-oil strain. In the lower-stalk it is three times out of the five higher in the high-oil strain but corresponding only three times with the upper-stalk. The leaves correspond with the lower-stalk in this comparison.

But a very marked correlation appears in the grain where there has been every year a notable increase in protein in the high-oil strain over that of the low-oil. This is indeed significant and is of such interest that it will be discussed more fully later on.

Regarding the general distribution of the protein in the plant, the data show; that in the other parts, the proportion of protein is never as high as it is in the grain; that among the other parts, the leaves have averaged somewhat higher than the stalks although this condition has not been constant in every year; that, as between the upper and lower portions of the stalk no regular difference can be established.

EFFECT ON THE CRUDE FAT CONTENT. (Ether Extract.)

It will be noticed that the term "crude fat" is used here for designating this determination rather than "oil" as has been used in the rest of this work in which only the kernels were concerned. It should be considered that while in the kernels the substance extracted by ether is practically all oil, in the stalk and leaves it consists to a considerable extent of other constituents besides true fats, or oil, such as coloring matters, waxes, organic acids, etc. On this account these results of the ether extraction are not to be taken as necessarily explicitly expressing the relations of the amount of oil or fat in the various organs of the plant to that of the kernels. However in the chemical analyses of food stuffs, the ether extraction is the best practical method that we have at present of classify-

ing these substances, and in view of the fact that it is usually made and reported in fodder analyses this determination was made in this study with the idea that the information would be of interest and might prove suggestive. The results are given in Table 9.

TABLE 9.—ETHER EXTRACT IN DIFFERENT PARTS OF PLANT

Year.	Strain.	Upper-stalk.	Lower-stalk	Leaves.	Grain.
1902	High-Protein.....	0.98	1.31	1.02	4.85
	Low-Protein.....	0.82	0.95	1.02	4.15
	High-Oil.....	1.08	1.27	0.99	6.41
	Low-Oil.....	0.87	1.21	1.02	3.02
1903	High-Protein.....	0.92	1.42	1.04	4.83
	Low-Protein.....	0.77	0.88	0.90	4.08
	High-Oil.....	0.69	0.86	0.98	6.50
	Low-Oil.....	1.18	0.98	0.98	2.97
1904	High-Protein.....	0.77	1.23	1.16	5 07
	Low-Protein.....	0.78	0.81	1.00	4.17
	High-Oil.....	0 67	0.87	1.10	6.97
	Low-Oil.....	0.69	0.90	0.98	2.89
1905	High-Protein.....	0.95	1.20	1.21	5.04
	Low-Protein.....	0.88	0.95	1.28	3.85
	High-Oil.....	0.82	1.00	1.24	7.29
	Low-Oil.....	0.72	0.82	1.09	2.58
1906	High-Protein.....	1.02	1.69	1.25	5.28
	Low-Protein.....	1.62	1.89	1.46	3.86
	High-Oil.....	1.07	2.05	1.32	7.37
	Low-Oil.....	1.29	1.46	1 23	2.66

The proportion of ether-extract in the stalks and leaves is not very large ranging mostly around one percent and there are no apparent relations among these results that would indicate any significant influence of the selections either in the protein or in the oil breeding.

In the case of the grain, however, there is an interesting correlation manifested. We have already seen how the protein content of the grain is influenced by the oil selection, and, just as the protein rises and falls with the oil content, so here the oil follows the protein selections, and in every season there is a decided increase of oil in the high-protein strain over that of the low-protein.

The figures show in regard to the relative proportions of ether-extract in the different parts of the plant, that the crude fat in other parts scarcely ever approaches in percentage the oil in the kernel and also that it is generally greater in the lower-stalk and leaves than in the upper-stalk.

EFFECT ON THE PHOSPHORUS CONTENT

On account of their especial bearing upon questions pertaining to soil fertility a knowledge of the phosphorus and potassium contents in these different strains of corn is of interest. Accordingly determinations of these two elements in the samples of the different parts of the plants have been made since 1903. The percentages are given in Tables 10 and 11 being expressed in terms of the elementary substances.

TABLE 10.—PHOSPHORUS CONTENT IN DIFFERENT PARTS OF PLANT

Year.	Strain.	Upper-stalk.	Lower-stalk	Leaves.	Grain.
1903	High-Protein.....	0.19	0.19	0.15	0.36
	Low-Protein.....	0.12	0.10	0 14	0.30
	High-Oil.....	0.10	0 08	0.10	0.34
	Low-Oil.....	0.10	0 09	0.13	0.31
1904	High-Protein.....	0.26	0.24	0.18	0.38
	Low-Protein.....	0.14	0.10	0.12	0.33
	High-Oil.....	0.21	0.12	0.16	0.38
	Low-Oil.....	0.17	0.17	0.18	0.35
1905	High-Protein.....	0.26	0.22	0.18	0.32
	Low-Protein.....	0.12	0 09	0.12	0.30
	High-Oil.....	0.18	0.11	0.12	0.34
	Low-Oil.....	0 17	0.14	0.17	0.25
1906	High-Protein.....	0 28	0.32	0.21	0.34
	Low-Protein.....	0.29	0.21	0.24	0.30
	High-Oil.....	0.25	0.22	0.19	0.35
	Low-Oil.....	0.19	0.14	0.15	0.31

Comparing the high-protein and low-protein strains it is interesting to note that with only the exception of the upper-stalk and leaves in 1906, the phosphorus content is always somewhat higher in the samples representing the high-protein plot both in stover and grain.

In the breeding for high and low-oil, however, such a correlation does not appear in the stover but in the grain we find regularly a higher phosphorus content in the high-oil corn. Taking the plant as a whole the grain is decidedly the richest part in phosphorus thus conforming to what has been generally observed.

EFFECT ON THE POTASSIUM CONTENT

Comparing the high-protein and low-protein plots the different parts of the stover show agreement in three out of the four years in being somewhat richer in potassium in the low-protein strain. The other season all parts were richer in this element, in the high-protein strain.

TABLE II.—POTASSIUM CONTENT IN DIFFERENT PARTS OF PLANT

Year.	Strain.	Upper-stalk.	Lower-stalk	Leaves.	Grain.
1903	High-Protein.....	1.47	1.64	0.90	0.35
	Low-Protein.....	1.52	1.64	0.97	0.32
	High-Oil.....	1.34	1.10	0.76	0.36
	Low-Oil.....	1.33	1.54	1.25	0.36
1904	High-Protein.....	1.07	1.10	1.02	0.37
	Low-Protein.....	1.67	1.67	1 31	0.35
	High-Oil.....	1.63	1.70	1.48	0.39
	Low-Oil.....	1.55	1.74	1.56	0.39
1905	High-Protein.....	1.03	1.07	1.05	0.34
	Low-Protein.....	1.61	1.62	1.35	0.37
	High-Oil.....	1.65	2.36	1.39	0.36
	Low-Oil.....	1.81	2.08	1.60	0.37
1906	High-Protein.....	1.17	1.54	0.88	0.36
	Low-Protein.....	0.89	1.17	0.82	0.40
	High Oil.....	1.59	2.14	1.22	0.39
	Low-Oil.....	1.59	1.79	0.92	0.40

In the grain samples the comparisons show conflicting results but the differences here are so small as to be scarcely significant.

As between the high-oil and low-oil breeding no regularity among the stover samples can be made out. In the grain the percentages are just a trifle greater in the low-oil corn but the differences are too slight to be considered seriously.

These results likewise accord with the usual observance that the stover carries a much larger proportion of potassium than the grain. The stalks and leaves do not vary greatly in this respect.

CONCLUSIONS

The preceding data afford material for numerous other comparisons and a critical study would doubtless reveal many other suggestive facts, but it is our present purpose only to derive as direct an answer as possible to our main question regarding the effect produced upon the composition of the plant as a whole by altering the relative proportions of the constituents of the kernel.

Summarizing the results of this study and putting them into the form of a general statement we may say, that aside from the correlation developed between protein and oil in the grain, there has not been produced any very marked effect. The ash in the grain appears to be influenced very slightly by the protein as well as the oil selection, following these selections in direct correlation. The same is true of the phosphorus content.

Further there is seemingly a tendency toward an increased phosphorus content in the stover resulting from high-protein selection, but this observation needs further confirmation.

CORRELATION BETWEEN PROTEIN AND OIL IN THE KERNEL

At the beginning of the breeding the correlation between the protein and oil content in the kernel was only very slight. The result of the mathematical calculation of this correlation in the original 163 ears from which the first selections were made, as given in Bulletin 87, shows only 3.81 percent of a perfect correlation.

But, although this correlation is insignificant at first, it seems to have advanced with the breeding so that, as we have just observed, after five years it became very prominent both in the protein and in the oil selections.

It is interesting to trace the development of this correlation in the progress of the breeding as may be done in Table 12 in which are given the percentages of oil in the high-protein and low-protein strains each generation excepting the second and third years when these determinations were not made.

TABLE 12.—OIL CONTENT IN HIGH-PROTEIN AND LOW-PROTEIN STRAINS

	Average percent oil.		
Year.	High-protein crop.	Low-protein crop.	Difference.
1897	4.52	4.35	0.17
1898	....	....	....
1899	....	....	....
1900	4.75	4.31	0.44
1901	4.82	4.30	0.52
1902	4.85	4.15	0.70
1903	4.83	4.08	0.75
1904	5.07	4.17	0.90
1905	5.04	3.85	1.19
1906	5.28	3.86	1.42

The last column which shows the difference in oil content each year brings out the principle in a most interesting way. This difference between the two plots begins with a very small figure which gradually increases as the breeding goes on corresponding to the differences in the protein itself, until in the tenth generation this difference becomes so significant as to amount to about one-third of the total quantity of oil.

In like manner the behavior of the protein in the high and low-oil strains is shown in Table 13.

TABLE 13.—PROTEIN CONTENT IN HIGH-OIL AND LOW-OIL STRAINS

Year.	Average percent protein. High-oil crop.	Low-oil crop.	Difference.
1897	10.76	11.03	- 0.27
1898	.....	.....	....
1899	.....	.....	....
1900	10.83	11.00	-0.17
1901	12.32	10.03	2.29
1902	10.83	9.31	1.52
1903	11.04	10.22	0.82
1904	12.29	10.88	1.41
1905	12.12	9.86	2.26
1906	11.81	10.54	1.27

Although the differences in protein content in the high-oil and low-oil plots have not been as regular or constant as in the case of the oil content in the high-protein and low-protein plots, yet the same principle is evident, for, whereas in the earlier years the protein actually averages a little higher in the low-oil strain as indicated in the table by the minus signs, in later generations after the breeding had advanced and greater differences in the oil content had been induced, the correlation appears and remains, although fluctuating in intensity from year to year.

EFFECT ON THE TYPE OF KERNEL

That the selection for certain chemical constituents has a very noticeable effect upon the physical charactertistics of the kernel was observed very early in the work and in Bulletin 55 descriptions with photographs were published showing the possibility of distinguishing between high-protein and low-protein corn as well as between high-oil and low-oil corn by the mechanical structure of the kernel. The matter has been mentioned again in Bulletins 82 and 100, and Bulletin 87, "The Structure of the Corn Kernel and the Composition of its Different Parts," deals especially with this phase of the subject, treating it in considerable detail. Therefore it is not proposed to discuss this matter at length here, but only to call attention briefly to the facts observed in this connection.

Selection for high-protein has developed a type of kernel having a relatively larger proportion of that part characterized by its horny structure, the soft starchy part which immediately surrounds the germ and runs up into the crown of the kernel being less prominent. In the type of kernel resulting from low-protein selection

this condition is reversed and here the soft starchy part predominates. Viewed externally the high-protein kernel has a somewhat glassy appearance while the low-protein presents a milky effect.

Following the fact that about four-fifths of all the oil in the kernel resides within the germ, the selection for high-oil has resulted in a kernel having a relatively large proportion of germ, while the low-oil selection has produced a kernel whose germ occupies a relatively small proportion of the space.

It should be borne in mind that a reduction of the proportion of germ does not necessarily depend altogether upon a decrease in the absolute size, for the same effect would be produced by increasing the size of the endosperm, and in our low-oil strain this is what has really taken place to some extent, so that the selection has resulted in a large broad type of kernel admitting fewer rows on the cob.

The question is often asked as to whether there is any difference apparent in germination on account of this effect upon the size of the germ. In laboratory tests under carefully controlled and comparable conditions a difference in the rate and vigor with which the germination starts off has been observed, the first signs of growth appearing about twenty-four hours earlier in the high-oil corn. This difference, however, becomes less apparent as the development of the young plantlet proceeds and in the field there is as yet no detrimental effect noticeable due to impaired vitality in the seed brought about by the selection for low-oil.

EFFECT ON THE TYPE OF EAR

That the selection in these different directions has likewise had its effect upon the physical characteristics of the ear is clearly shown in Bulletin 119, "Type and Variability in Corn," in which Dean Davenport and Doctor Rietz have made this matter the subject of a special study.

In this investigation ears from each of the four "Illinois" strains from the crops of the ninth and tenth generations were subjected to measurements of their length, circumference, weight, and number of rows of kernels.

The variability of each one of these charactertistics was studied by the statistical method in which are determined mathematical expressions showing the "mean," or average value of the character in question, as well as its tendency to vary from this average, expressed by the "standard deviation" and the "coefficient of variability." Taking from these tabulated results those figures which are of especial concern in this connection, the following interesting facts are brought out.

Selection for high-protein has produced an ear averaging somewhat smaller than the low-protein ear as shown by a comparison of the length, circumference and weight; the number of rows of kernels also averages slightly less on the typical high-protein ear.

Similarly the high-oil selection has resulted in a smaller type of ear than has the low-oil, the length, circumference and weight being less in each case in the high-oil strain. However, in spite of the fact that the typical low-oil ear is the largest of any of the strains, the number of rows of kernels is the least, this being due to the broadening of the kernel as previously explained.

EFFECT ON THE YIELD

One of the first questions to be taken into consideration from the practical standpoint is, of course, the effect that selection for these various characteristics has upon the productiveness.

In this connection it should be borne in mind that during the earlier years of these experiments in the selection of seed no special precaution was taken against in-breeding. If the pedigree lines be traced back in the high-protein plot it will be found that they all converge in a single ear grown in 1901. The low-protein strain as it now exists is the progeny of two of the original ears and the same is true of the low-oil. The high-oil strain traces back to three original ears. Thus the pedigree records show that there must have been a considerable amount of rather close in-breeding which has probably exerted a more or less detrimental effect upon the yield. It was not until the ninth generation that we started our present system of taking seed from detasseled rows only and arranging the planting of the seed ears with reference to their relationship, in order to prevent as far as possible such close in-breeding.

Neither was there in the earlier years of the breeding any selection based upon productiveness other than the choice of the largest, finest seed ears. In the sixth generation a system of rejecting a few of the lowest yielding rows was begun but it was not until the ninth generation that our present system was adopted of selecting one-half of the detasseled rows according to their performance as regards productiveness.

Therefore in speaking of the yielding propensities of these several strains of corn, these handicaps which they have undergone in the breeding should be taken into consideration.

In order to test this matter of yield, seed has been taken every year since the sixth generation from each of the four breeding plots and planted in our variety test plots where they are given conditions of soil and culture as uniform as possible for securing comparable results.

In this variety test there are planted at certain intervals so-called "Standard plots" from one of the best standard varieties of this region the purpose of these being to serve as a check for comparison in different parts of the field. In Table 14 the yield each year in terms of bushels of shelled corn per acre is given for each of the four "Illinois" strains along with that of the standard variety.

TABLE 14.—YIELDS OF "ILLINOIS" STRAINS IN VARIETY TEST PLOTS

Year.	High-protein strain.	Low-protein strain.	High-oil strain.	Low-oil strain.	Standard variety.
1903	27.3	37.7	32.7	41.3	40.9 (Boone Co. White)
1904	32.1	55.5	41.9	40.5	53.7 (" " ")
1905	56.6	60 7	58.4	58.1	68.4 (Silvermine)
1906	65.1	73.2	66.3	83.2	75.7 (") 87.9 (Leaming)

In looking over these results there are some irregularities to be seen and it is still too early to draw final conclusions in all respects. The maximum yield varies among the four strains in the different years. In two of the seasons the low-oil gave the highest yield and in two others the low-protein yielded most.

But the lowest yield has in every season been produced by the high-protein corn and this fact accords with our previous observation regarding the type of ear where we found the typical high-protein ear to be the smallest of all the four strains. So it seems a high-protein content and the highest productivity do not go together.

The formation of protein depends, of course, upon the supply of nitrogen in the soil. In fact the relation is so intimate that it has been observed in experiments that the protein content can be increased in corn by the application of nitrogenous fertilizers. This suggests the possibility of a limitation of growth on ordinary soil due to an extra high nitrogen requirement on the part of the high-protein strain.

If, however, we consider the production of *protein per acre* we will find a very decided gain in the production of protein in the high-protein breeding. For example in 1906 the high-protein strain produced 65.1 bushels per acre and the protein content of the crop that year as we have seen was 14.26 percent. This would yield (reckoning 56 pounds shelled corn per bushel) 520 pounds of

protein per acre. At the same time the low-protein strain produced 73.2 bushels carrying 8.54 percent of protein which would yield 354 pounds. This makes a difference of 166 pounds of protein per acre in favor of the high-protein breeding. This, however, from the practical standpoint, would be an unfair comparison because ordinarily what the farmer has to deal with is corn of ordinary protein content rather than low-protein corn. We have no "Illinois" strain now unaffected by chemical selection with which to make the comparison. But suppose we compare our "Illinois High-Protein" with the standard white variety for this year, that is the "Silvermine," which has had no chemical selection, and assume that it contains the same percentage with which we started the "Illinois" breeding, that is 10.92, which as a matter of fact is not far from the average of ordinary dent corn. Making the computation we find that the 75.7 bushel yield containing 10.92 percent would give us 463 pounds of protein per acre. Based upon this estimate there was a gain this year of 57 pounds of protein per acre by the high-protein breeding and this is of no mean consequence when we consider that this 57 pounds represents about one-eighth of the total quantity of protein produced.

On the whole these results of the yields are quite gratifying when we consider that these "Illinois" strains have maintained their productiveness as well as they have in spite of the intense selection they have undergone for other special characteristics. With the exception of one season, some one of the Illinois strains has even surpassed in yield the supposedly good variety used as a standard. All of this goes to show that intense selection for a special character is not necessarily accompanied by a reduction in yield, this not implying, of course, that selection for yield alone would not make greater progress when unhampered by consideration for other characteristics.

APPENDIX

In connection with this investigation a large amount of experimental data has been collected. For the selection of seed for these four "Illinois" breeding plots there have been analyzed during the ten years 4990 individual ears. Of these, 756 ears have been selected and subjected to performance test in the breeding plots and the records of these tests form a most interesting and instructive series. The importance of placing these data on record by publication rests not alone upon their direct connection with the subject matter in hand. There are many obscure problems in this work of corn breeding of intensely practical significance upon which we may hope to secure light by a study of such heredity records as these, and in the study of the broader problems relating to the general subject of heredity there has been a lack of just such specific statistical data as these analyses afford. Already they have furnished excellent material for some such studies and naturally their value as such will ever increase with their accumulation. Therefore it seems advisable to present the essential detailed data of these experiments, preferably incorporated in systematic arrangement in an appendix where they may be referred to at pleasure, rather than encumbering the text of the bulletin with such a mass of statistical material.

The following tables are so arranged in series that the complete history of each strain of the breeding is shown by itself. For each year there is given a record of the breeding plot in a table showing the analyses of the seed ears planted and of the corresponding crops harvested. Immediately following this table is a second one in which are listed the analyses of all of the ears examined from that breeding plot for the selection of seed ears to be planted in the succeeding year's plot.

By this arrangement it is made possible with the system of "Register Numbers" and "Dam Numbers" previously explained, to readily find the relationships of all the ears ever produced in each of the four strains.

The first table gives the complete analyses of the 163 original ears from which the four strains of corn were started and a column is added to indicate to which of the breeding plots each of the selected ears is assigned. Following this table are given the series of records for the high-protein plot, low-protein plot, high-oil plot and low-oil plot in the order named.

The "Annual Ear No." in these records correspond to the "Corn No." as used in Bulletin 55 and, as previously explained, this is simply a temporary number used while working with the corn for the selection and has no permanent significance, there is no necessity for changing the back records in this respect and so these old numbers are retained. They begin in the first table with No. 76 and run in the order of the rows of the breeding plot, that is in the order of their mother ears or "Dam Numbers."

In the first year usually four ears were analyzed from each plot-row and every fifth number was given to the composite sample representing the row as will be seen in the tables of 1897. In the years following, up to 1903, nine ears were analyzed from each plot-row and every tenth number was given to the corresponding composite sample. In 1903 the new system was adopted in which the "Annual Ear Number" begins with 1 each year and ten ears are anaylzed from each selected plot-row with no provision for composite sample numbers within the series. In 1905 another modification was introduced in which 20 ears instead of 10 are analyzed from each selected plot-row.

In the tables of analyses all ears that have been selected for seed are indicated by their assigned "Register Nos." being placed in the column opposite.

In order to illustrate the working of this system of records let us suppose that it be desired to trace the pedigree record of a given ear. We may take as an example the first ear analyzed from the high-protein plot in 1906 and registered as No. 1102. We see immediately that the "dam" or mother of this ear was No. 1004. By reference to the plot record of the year 1906 we find that the ear with Register No. 1004 had a protein content of 17.39 percent and that its "dam" was No. 914. Turning now to the plot record of the previous year we find that Register No. 914 had 17.73 percent of protein and by the corresponding "Dam No." we are referred to No. 811 of the preceding generation. Following along in this manner through the preceding generations we finally trace the complete maternal pedigree back to the beginning of the breeding. Thus we find the pedigree record with respect to the protein content of this ear registered as No. 1102 to run as follows:

Maternal pedigree record.	Year planted.	Protein, percent.
Register No. 1102	1907	17.13
By Dam No. 1004	1906	17.39
" " " 914	1905	17.73
" " " 811	1904	17.33
" " " 710	1903	14.70
" " " 601	1902	15.00
" " " 507	1901	15.71
" " " 413	1900	14.53
" " " 323	1899	12.45
" " " 207	1898	12.46
" " " 121	1897	12.28

At the end of these four series of the regular plots are Tables 96 to 103 inclusive which contain the records of the mixed-protein and mixed-oil plots.

TABLE 15.—COMPOSITION OF ONE HUNDRED SIXTY-THREE INDIVIDUAL EARS FROM GENERAL CROP OF 1896

Annual ear No.	Ash.	Protein.	Oil.	Carbohydrates.	Plot assigned.	Register No. assigned.
76	1.70	10.05	4.77	83.48		
77	1.45	10.42	5.24	82.89	High-oil	107
78	1.55	11.00	4.90	82.55		
79	1.62	10.89	4.88	82.61		
80	1.63	11.50	4.58	82 29		
81	1.47	11.49	4.26	82.78		
82	1.39	11.78	4.83	82.00		
83	1.17	9.08	4.05	85.70	Low-protein	103
84	1.51	12.79	4.25	81.45	High-protein	110
85	1.46	11.76	4.94	81.84		
86	1.50	12.07	4.61	81.82	High-protein	102
87	1.59	12.40	4.74	81.27	High-protein	117
88	1.35	9.34	4.84	84.47		
89	1.61	10.71	4.70	82.98		
90	1.55	9.90	4.97	83.58		
91	1 56	10.68	4.91	82.85		
92	1.46	12.96	3.97	81.61	High-protein	113
93	1.48	11.80	4.80	81.92		
94	1.74	11.89	4.55	81.82	High-protein	101
95	1.55	10.49	5.51	82.45	High-oil	109
96	1.60	11.10	4.38	82.92		
97	1.59	11.84	4.96	81.61		
98	1.39	10.23	5.51	82.87	High-oil	115
99	1.42	8.40	4.91	85.27	Low-protein	107
100	1.65	12.28	4.76	81.31	High-protein	105
101	1.30	10 08	4.86	83.76		
102	1 49	11.83	4.51	82.17		
103	1.44	11.25	4.78	82.53		
104	1.54	11.82	4.43	82.21		
105	1.37	12.36	4.84	81.43	High-protein	119
106	1.33	11.15	5.21	82.31	High-oil	120
107	1.33	9.47	4.97	84 23		
108	1.30	11.04	4.67	82 99		
109	1.45	10.82	5.65	82.08	High-oil	111
110	1.60	12.81	5.21	80.38	High-protein	111
111	1.31	10.76	4.13	83.80		
112	1.26	10.48	4.54	83.72		
113	1.10	9.30	4.38	85.22	Low-protein	111
114	1.33	9.12	4.10	85.45	Low-protein	102
115	1.29	10.41	4.17	84.13		
116	1.10	8.38	4.88	85.64	Low-protein	105
117	1.42	9.95	4.23	84.40		
118	1.44	11.40	5.02	82.14	High-oil	101
119	1.55	12.38	4.62	81.45	High-protein	106
120	1.39	9.97	4.42	84.22		
121	1.36	10.09	4.82	83.73		
122	1.36	10.31	5.25	83.08	High-oil	117
123	1.34	9 68	4.01	84.97	Low-oil	108
124	1.44	11.87	4.61	82.08		
125	1.34	10.73	4.53	83.40		
126	1.49	13.87	5.72	78.92	High-protein	112
127	1.43	11.53	4.31	82.73		
128	1.33	11.64	4.57	82.46		
129	1.36	11.25	4.16	83.23		

TABLE 15.—*Continued*

Annual ear No.	Ash.	Protein.	Oil.	Carbohydrates.	Plot assigned.	Register No. assigned.
130	1.35	11.86	5.01	81.78		
131	1.47	10.49	4.86	83 18		
132	1.55	11.13	4.55	82.77		
133	1.39	11.13	4.10	83 38	Low-oil	110
134	1.30	10.85	4.45	83.40		
135	1.37	11.29	4.53	82.81		
136	1.59	11.43	5.10	81.88	High-oil	103
137	1 47	11.61	4 41	82.51		
138	1.36	11.36	4.53	82.75		
139	1.57	9.81	5.23	83.39	High-oil	118
140	1.34	10 53	4.18	83.95		
141	1 45	12.42	4.51	81.62	High-protein	120
142	1.37	9.31	4.82	84.50		
143	1.29	11.33	4.49	82.89		
144	1.42	11.39	4.99	82.20	High-oil	124
145	1.45	8.25	4.81	85.49	Low-protein	106
146	1.47	11.29	4.83	82.41		
147	1.26	12.21	4.49	82.04	High-protein	123
148	1 54	11.94	4.74	81.78		
149	1.36	11.29	4.08	83.27	Low-oil	101
150	1.44	11.71	4.03	82.82	Low-oil	103
151	1.40	9.31	4.96	84.33	Low-protein	101
152	1.41	11.90	4.09	82 60	Low-oil	102
153	1.35	12.51	5.19	80.95	High-protein	108
154	1.42	11 13	5.02	82.43	High-oil	123
155	1.44	11.05	4.53	82.98		
156	1.39	11.74	4.14	82.73	Low-oil	112
157	1.46	10.02	4.88	83.64		
158	1 45	10.66	4.51	83.38		
159	1.48	11.53	4.65	82.34		
160	1.43	11.50	4.83	82.24		
161	1.47	11.11	4.93	82.49		
162	1.48	12.09	5.61	80.82	High-oil	114
163	1.29	10.78	5.09	82.84	High-oil	102
164	1 30	9.36	4.34	85.00	Low-protein	110
165	1.47	10 50	4.75	83.28		
166	1.65	11.29	3.84	83.22	Low-oil	106
167	1.37	9.58	4.72	84.33		
168	1.49	10.94	4.34	83.23		
169	1.60	11 79	4.22	82.39		
170	1.36	11.06	4.39	83.19		
171	1.44	11.18	5.75	81.63	High-oil	113
172	1.45	12.28	3.99	82.28	High-protein	121
173	1.39	10.14	4.35	84.12		
174	1.30	10.19	5.22	83.29	High-oil	106
175	1.40	12 68	5.29	80.63	High-protein	109
176	1.37	9.86	4.73	84 04		
177	1.48	13.06	4.93	80.53	High-protein	114
178	1.37	10 93	4.76	82.94		
179	1.32	11.87	5.03	81.78		
180	1.39	11.27	4.55	82 79		
181	1.47	9 66	4.21	84.66		
182	1.37	10.97	3.94	83.72	Low-oil	107
183	1.54	10.32	5.46	82.68	High-oil	108
184	1.44	10.68	4.89	82.99		

TABLE 15.—*Continued*

Annual ear No.	Ash.	Protein.	Oil.	Carbohydrates.	Plot assigned.	Register No. assigned.
185	1.42	9.33	4.49	84.76	Low-protein	109
186	1.48	10.78	4.74	83.00		
187	1.28	10 49	4.44	83.79		
188	1.53	13.10	5.51	79.86	High-protein	115
189	1.32	9.58	5.63	83.47	High-oil	110
190	1.25	11.50	4.95	82.30		
191	1.29	11.19	4.31	83.21		
192	1.51	11.49	4.07	82.93	Low-oil	104
193	1.36	9.47	4 51	84.66	Low-protein	112
194	1.50	11.47	4.65	82.38		
195	1.54	11.09	4.37	83.00		
196	1.30	9.44	3.95	85.31	Low-oil	105
197	1.26	11.20	4.46	83.08		
198	1.44	10.23	4 53	83.80		
199	1.29	10 64	4.67	83.40		
200	1.39	10.13	4.84	83.64		
201	1.38	9.64	5.22	83 76	High-oil	105
202	1.39	11.26	4.96	82.39		
203	1.26	10.48	4.59	83.67		
204	1.66	12.57	4.82	80.95	High-protein	118
205	1.46	10.71	5.36	82.47	High-oil	116
206	1.34	10.27	4.65	83.74		
207	1 25	11.09	4.27	83.39		
208	1.48	12.05	4.78	81.69	High-protein	124
209	1.48	10.22	4.30	84.00		
210	1.45	11.16	4.75	82.64		
211	1.48	10.44	4.21	83.87		
212	1.27	9.75	4.12	84 86	Low-oil	111
213	1.53	12.40	4.75	81.32	High-protein	104
214	1.58	10.22	4.43	83.77		
215	1.45	9.22	4.60	84.73	Low-protein	108
216	1.42	10.27	4.35	83.96		
217	1.32	9.39	4.83	84.46		
218	1.40	9.74	4.71	84.15		
219	1.37	9.92	4.32	84 39		
220	1.43	9.63	5.23	83.71	High-oil	104
221	1.32	10.33	5.01	83.34		
222	1.41	12.34	4.57	81.68	High-protein	122
223	1.49	10.58	4.64	83.29		
224	1.52	11.36	4.63	82.49		
225	1.33	9.15	4.55	84.97	Low-protein	104
226	1.36	10.31	5 08	83.25		
227	1.46	12.63	5.15	80.76	High-protein	107
228	1.41	12.16	4.12	82.31	Low-oil	109
229	1.36	11.04	4.52	83.08		
230	1.43	12.10	4.29	82.18	High-protein	103
231	1.33	10.95	4.60	83.12		
232	1.52	12.76	4.10	81.62	High-protein	116
233	1.40	9.75	4 14	84.71		
234	1.39	10.78	4.76	83.07		
235	1.58	9.97	5.27	83.18	High-oil	119
236	1.40	10.18	6.02	82.40	High-oil	112
237	1.47	11.16	5.13	82.24	High-oil	122
238	1.60	11.42	5.20	81.78	High-oil	121

TABLE 16.—FIRST GENERATION HIGH PROTEIN PLOT RECORD, 1897

Register ear No.	†By Dam No.	Protein, percent.		Register ear No.	†By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested			Seed ear planted.	Crop harvested.
101		11.89	9.61	*114		13.06	10 89
102		12.07	11.07				10 67
103		12.10	10.94	*115		13.10	10.34
104		12.40	11.48				11.48
105		12.28	10.85	116		12.76	11.05
106		12.38	11.64	117		12 40	10.75
107		12.63	11.46	118		12.57	10.86
108		12.51	11.57	119		12.36	11.07
109		12.68	11.17	120		12.42	10.88
110		12.79	11.14	121		12.28	11.73
111		12.81	11.16	122		12.34	10.76
*112		13.87	11.60	123		12.21	11 30
			11.31	124		12.05	11.53
*113		12.96	11.07				
			11.44				
Average of plot						12.54	11.10

*Crop from Reg. Nos. 112, 113, 114, and 115 sampled in duplicate.
†First generation not known.

TABLE 17.—PROTEIN IN ONE HUNDRED TWELVE INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1897

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 101		
271	8.82	
272	8.42	
273	11.60	
274	8.34	
By Dam 102		
276	12.83	215
277	10.46	
278	9.95	
279	10.96	
By Dam 103		
281	12.62	208
282	10.43	
283	9.87	
284	11.58	
By Dam 104		
286	10.97	
287	11.08	
288	10.23	
289	12.99	214
By Dam 105		
291	11.52	
292	10.44	
293	11.92	
294	11.25	
By Dam 106		
296	11.11	
297	12 07	222
298	13.58	213
299	11.68	
By Dam 107		
301	10.80	
302	12.26	219
303	11.20	
304	11.97	223
Dy Dam 108		
306	12.33	206
307	12.39	217
308	9.64	
309	9.93	
By Dam 109		
311	10.65	
312	11.05	
313	9.89	
314	10.22	
By Dam 110		
316	11.08	
317	10.29	
318	11.72	
319	8.76	
By Dam 111		
321	11.43	
322	10.94	
323	11.18	
324	11.55	
By Dam 112		
326	13.62	212
327	10.99	
328	11 07	
329	9.18	
* *By Dam 112*		
331	11.40	
332	12.24	205
333	10.06	
334	11.02	
By Dam 113		
336	10.78	
337	11.28,	
338	11.09	
339	12.85	210
* *By Dam 113*		
341	11.65	
342	11.35	
343	10.60	
344	12.16	220
By Dam 114		
346	11.63	
347	12.26	204
348	8.76	
349	10.69	
* *By Dam 114*		
351	11.39	
352	10.59	
353	9.65	
354	9.83	
By Dam 115		
356	8.63	
357	11.08	
358	11.39	
359	9.12	
* *By Dam 115*		
361	11.63	
362	9.98	
363	10.45	
364	11.89	224
By Dam 116		
366	12.01	202
367	9.51	
368	11.43	
369	11.76	
By Dam 117		
371	11.75	
372	9.46	
373	11.17	
374	8.67	
By Dam 118		
376	10.47	
377	10.92	
378	9.32	
379	12.28	218
By Dam 119		
381	9.31	
382	11.00	
383	12.23	221
384	11.99	201
By Dam 120		
386	12.10	203
387	9.20	
388	9.76	
389	9.18	
By Dam 121		
391	12.46	207
392	11.14	
393	10.03	
394	13.27	211
By Dam 122		
396	9.94	
397	11.78	
398	11.30	
299	11.08	
By Dam 123		
401	11.23	
402	10.92	
403	9.72	
404	11.14	
By Dam 124		
406	10.44	
407	12.72	216
408	12.80	209
409	11.17	

*An extra set of ears were analyzed from Dams 112, 113, 114 and 115.

TABLE 18.—SECOND GENERATION HIGH PROTEIN PLOT RECORD, 1898

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
201	119	11.99	11.18	*213	106	13.58	11.74
202	116	12.01	10.86				11.42
203	120	12.10	10.64	*214	104	12.99	11.42
204	114	12.26	11.26				11.20
205	112	12.24	11.61	215	102	12.83	11.34
206	108	12.33	11.24	216	124	12.72	10.77
207	121	12.46	11.26	217	108	12.39	11.03
208	103	12.62	10 80	218	118	12.28	10.96
209	124	12.80	10.55	219	107	12.26	10.47
210	113	12.85	10 92	220	113	12.16	10.33
*211	121	13.27	11.06	221	119	12.23	11.58
			10.67	222	106	12.07	9 78
*212	112	13.62	11.17	223	107	11.97	10.72
			12.48	224	115	11.89	10.95
Average of plot						12.49	11.05

*Crop from Reg. Nos. 211, 212, 213, and 214 were sampled in duplicate.

TABLE 19.—PROTEIN IN TWO HUNDRED FIFTY-TWO INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1898

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 201			*By Dam 206*			*By Dam 211*		
821	9.82		871	12.82	321	921	11.29	
822	10.38		872	11.65		922	9.69	
823	10.46		873	10.21		923	9.78	
824	11.08		874	10.13		924	10.18	
825	10.79		875	10.49		925	11.54	
826	12.83	305	876	10.58		926	11.93	
827	12.50		877	11.20		927	12.29	
828	7.84		878	10.61		928	11.39	
829	12.07		879	12.01		929	10.98	
By Dam 202			*By Dam 207*			**By Dam 211*		
831	10.19		881	10.76		931	11.98	
832	9.66		882	11.38		932	11.05	
833	9.97		883	11.22		933	10.04	
834	11.92		884	9.60		934	9.84	
835	11.47		885	12.45	323	935	9.96	
836	10.76		886	13.67		936	11.01	
837	12.04		887	9.90		937	11.22	
838	11.58		888	11.08		938	11.09	
839	9.39		889	11.59		939	8.76	
By Dam 203			*By Dam 208*			*By Dam 212*		
841	11.17		891	10.40		941	9.84	
842	10.88		892	12.09		942	10.84	
843	10.39		893	9.98		943	11.69	
844	10.91		894	9.06		944	8.75	
845	13.05	308	895	13.46	314	945	14.92	312
846	7.72		896	10.54		946	11.36	
847	9.48		897	9.93		947	13.04	
848	8.92		898	9.28		948	10.12	
849	9.63		899	11.64		949	8.89	
By Dam 204			*By Dam 209*			**By Dam 212*		
851	12.48	303	901	9.90		951	14.25	313
852	10.31		902	10.33		952	9.83	
853	12.03		903	11.48		953	13.21	309
854	11.78		904	12.55	322	954	12.91	
855	11.22		905	8.89		955	10.37	
856	10.60		906	11.95		956	11.50	
857	11.27		907	10.84		957	10.69	
858	9.81		908	9.15		958	11.94	
859	9.69		909	10.02		959	14.05	311
By Dam 205			*By Dam 210*			*By Dam 213*		
861	11.18		911	11.66		961	12.97	306
862	12.10		912	11.06		962	13.25	315
863	11.55		913	10.02		963	12.66	
864	13.04	317	914	10.08		964	11.68	
865	11.08		915	11.83		965	9.29	
866	11.73		916	11.09		966	9.89	
867	11.48		917	11.45		967	12.12	
868	11.78		918	10.75		968	12.29	
869	10.64		919	9.67		969	9.71	

TABLE 19.—*Continued.*

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 213		
971	10.55	
972	11.80	
973	9.47	
974	11.97	
975	11.94	
976	12.98	319
977	10.96	
978	11.43	
979	12.16	
By Dam 214		
981	11.80	
982	11.58	
983	10.12	
984	13.12	316
985	13.34	310
986	10.95	
987	11.38	
988	11.17	
989	10.11	
By Dam 214		
991	11.39	
992	9.86	
993	10.69	
994	10.75	
995	12.42	
996	10.42	
997	11.72	
998	12.20	
999	10.96	
By Dam 215		
1001	11.85	
1002	11.42	
1003	10.39	
1004	12.88	320
1005	9.32	
1006	11.04	
1007	12.75	
1008	10.33	
1009	12.09	
By Dam 216		
1011	12.99	318
1012	9.96	
1013	9.71	
1014	10.78	
1015	11.51	
1016	11.39	
1017	9.81	
1018	9.11	
1019	11.29	

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 217		
1021	10.06	
1022	12.24	
1023	10.25	
1024	11.84	
1025	11.50	
1026	11.23	
1027	9.66	
1028	11.91	
1029	9.86	
By Dam 218		
1031	11.74	
1032	11.53	
1033	10.15	
1034	8.90	
1035	9.93	
1036	10.46	
1037	10.47	
1038	11.72	
1039	12.39	302
By Dam 219		
1041	8.70	
1042	10.98	
1043	8.63	
1044	12.16	
1045	12.35	301
1046	10.10	
1047	9.54	
1048	10.83	
1049	10.68	
By Dam 220		
1051	10.87	
1052	9.63	
1053	8.61	
1054	10.31	
1055	12.37	324
1056	10.28	
1057	11.85	
1058	11.26	
1059	9.80	
By Dam 221		
1061	12.78	
1062	13.03	307
1063	11.72	
1064	10.58	
1065	10.95	
1066	11.50	
1067	12.04	
1068	11.43	
1069	11.42	

Annual ear No.	Protein, percent.	Register No assigned.
By Dam 222		
1071	8.07	
1072	11.48	
1073	10.95	
1074	10.47	
1075	10.90	
1076	10.17	
1077	10.84	
1078	7.83	
1079	9.06	
By Dam 223		
1081	11.44	
1082	9.97	
1083	11.55	
1084	9.94	
1085	11.27	
1086	11.57	
1087	10.53	
1088	9.36	
1089	10.61	
By Dam 224		
1091	8.74	
1092	9.50	
1093	10.20	
1094	10.60	
1095	11.49	
1096	12.74	304
1097	10.47	
1098	12.07	
1099	12.36	

*An extra set of ears were analyzed from Dams 211, 212, 213 and 214.

TABLE 20.—THIRD GENERATION HIGH PROTEIN PLOT RECORD, 1899

Register ear No.	By Dam No.	Protein, percent		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
301	219	12.35	10.00	313	212	14.25	10.74
302	218	12.39	10.17	314	208	13.46	11.09
303	204	12.48	11.50	315	213	13 25	11.42
304	224	12.74	11.00	316	214	13.12	11.77
305	201	12.83	10.89	317	205	13.04	12.50
306	213	12.97	11.35	318	216	12.99	11.88
307	221	13.03	11.91	319	213	12.98	12.68
308	203	13.05	10.56	320	215	12.88	12.09
309	212	13.21	12.04	321	206	12.82	11.89
310	214	13.34	11.37	322	209	12.55	10.22
311	212	14.05	12.78	323	207	12.45	12.24
312	212	14.92	12.21	324	220	12.37	10.76
Average of plot.						13.06	11.46

TABLE 21.—PROTEIN IN TWO HUNDRED SIXTEEN INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1899

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 301		
1601	12.03	
1602	9.81	
1603	10.79	
1604	7.71	
1605	11.28	
1606	11.56	
1607	10.18	
1608	8.91	
1609	9.66	
By Dam 302		
1611	9.91	
1612	8.35	
1613	9.11	
1614	9.83	
1615	11.20	
1616	11.88	
1617	10.96	
1618	10.75	
1619	9.77	
By Dam 303		
1621	11.69	
1622	11.60	
1623	9.94	
1624	13.13	
1625	10.60	
1626	12.15	
1627	12.32	
1628	12.65	
1629	11.82	
By Dam 304		
1631	10.25	
1632	12.83	
1633	13.54	
1634	11.55	
1635	11.10	
1636	11.87	
1637	9.78	
1638	10.30	
1639	10.24	
By Dam 305		
1641	11.04	
1642	12.13	
1643	10.50	
1644	11.15	
1645	9.97	
1646	11.31	
1647	10.81	
1648	11.55	
1649	10.66	
By Dam 306		
1651	12.10	
1652	11.85	
1653	10.75	
1654	9.54	
1655	11.73	
1656	13.22	401
1657	11.57	
1658	9.66	
1659	13.36	405
By Dam 307		
1661	13.41	403
1662	12.75	
1663	11.72	
1664	11.46	
1665	12.32	
1666	11.58	
1667	13.09	
1668	12.77	
1669	11.48	
By Dam 308		
1671	11.32	
1672	11.11	
1673	12.30	
1674	9.81	
1675	10.02	
1676	10.27	
1677	10.92	
1678	10.52	
1679	9.55	
By Dam 309		
1681	10.59	
1682	12.33	
1683	13.48	404
1684	12.88	
1685	11.00	
1686	13.87	408
1687	13.31	402
1688	10.29	
1689	12.09	
By Dam 310		
1691	11.90	
1692	11.35	
1693	12.97	
1694	10.07	
1695	12.21	
1696	12.53	
1697	11.93	
1698	11.37	
1699	10.56	
By Dam 311		
1701	13.46	420
1702	13.74	407
1703	12.10	
1704	14.41	411
1705	12.09	
1706	11.70	
1707	12.78	
1708	11.01	
1709	12.75	
By Dam 312		
1711	12.37	
1712	12.83	
1713	10.17	
1714	12.69	
1715	10.32	
1716	11.41	
1717	12.06	
1718	11.35	
1719	10.59	
By Dam 313		
1721	13.05	
1722	9.94	
1723	10.23	
1724	11.97	
1725	12.25	
1726	10.32	
1727	10.06	
1728	9.91	
1729	11.21	
By Dam 314		
1731	11.95	
1732	13.19	424
1733	13.94	409
1734	11.05	
1735	10.47	
1736	10.10	
1737	12.34	
1738	13.20	
1739	10.02	
By Dam 315		
1741	10.13	
1742	10.50	
1743	11.41	
1744	8.74	
1745	11.96	
1746	13.73	418
1747	11.76	
1748	10.16	
1749	11.20	

TABLE 21.—*Continued.*

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 316			*By Dam 319*			*By Dam 322*		
1751	11.12		1781	12.26		1811	11.17	
1752	11.30		1782	13.89	417	1812	11.89	
1753	11.78		1783	10.69		1813	13.51	419
1754	11.85		1784	12.29		1814	10.95	
1755	12.16		1785	14.24	414	1815	11.84	
1756	13.48	421	1786	13.89	416	1816	10.60	
1757	11.23		1787	11.83		1817	12.00	
1758	11.02		1788	14.20		1818	9.76	
1759	11.97		1789	12.66		1819	11.19	
By Dam 317			*By Dam 320*			*By Dam 323*		
1761	12.32		1791	13.97	410	1821	14.53	413
1762	12.46		1792	12.35		1822	11.31	
1763	14.78	412	1793	11.62		1823	11.95	
1764	12.70		1794	11.69		1824	10.44	
1765	12.49		1795	11.61		1825	13.31	423
1766	12.67		1796	12.07		1826	10.46	
1767	12.04		1797	10.72		1827	11.53	
1768	12.96		1798	12.92		1828	13.02	
1769	13.41	422	1799	12.10		1829	12.01	
By Dam 318			*By Dam 321*			*By Dam 324*		
1771	10.85		1801	13.93	415	1831	10.09	
1772	12.88		1802	12.42		1832	11.61	
1773	11.81		1803	10.65		1833	10.81	
1774	12.86		1804	13.63	406	1834	10.81	
1775	13.05		1805	10.90		1835	10.96	
1776	11.84		1806	11.99		1836	10.35	
1777	12.66		1807	10.54		1837	12.78	
1778	11.73		1808	12.80		1838	11.15	
1779	12.32		1809	10.94		1839	9.62	

TABLE 22.—FOURTH GENERATION HIGH PROTEIN PLOT RECORD, 1900.

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
401	306	13.22	12.27	413	323	14.53	13.50
402	309	13.31	12.56	414	319	14.24	12.34
403	307	13.41	12.44	415	321	13.93	12.44
404	309	13.48	11.62	416	319	13.89	12.24
405	306	13.36	11.53	417	319	13.89	12.76
406	321	13.63	12.00	418	315	13.73	12.21
407	311	13.74	12.90	419	322	13.51	12.37
408	309	13.87	12.09	420	311	13.46	12.13
409	314	13.94	11.70	421	316	13.48	12.38
410	320	13.97	11.95	422	317	13.41	12.26
411	311	14.41	12.87	423	323	13.31	12.71
412	317	14.78	12.86	424	314	13.19	11.63
Average of plot.						13.74	12.32

TABLE 23.—PROTEIN IN TWO HUNDRED SIXTEEN INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1900

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 401		
2801	12.22	
2802	13.09	
2803	14.35	514
2804	12.05	
2805	12.57	
2806	11.20	
2807	12.31	
2808	12.54	
2809	11.87	
By Dam 402		
2811	14.10	
2812	14.01	515
2813	12.34	
2814	12.45	
2815	11.99	
2816	14.06	
2817	11.93	
2818	13.13	
2819	13.30	
By Dam 403		
2821	11.82	
2822	14.09	
2823	13.32	
2824	13.72	
2825	14.56	511
2826	11.30	
2827	13.55	
2828	11.64	
2829	12.48	
By Dam 404		
2831	11.45	
2832	11.86	
2833	12.11	
2834	13.70	
2835	11.54	
2836	11.90	
2837	12.63	
2838	11.63	
2839	12.86	
By Dam 405		
2841	11.35	
2842	11.62	
2843	11.31	
2844	13.05	
2845	12.54	
2846	11.47	
2847	11.54	
2848	12.53	
2849	12.60	
By Dam 406		
2851	12.55	
2852	12.28	
2853	11.14	
2854	13.30	
2855	10.56	
2856	12.82	
2857	12.15	
2858	13.34	
2859	11.61	
By Dam 407		
2861	11.44	
2862	13.31	
2863	14.63	510
2864	13.53	
2865	13.11	
2866	11.75	
2867	12.99	
2868	13.43	
2869	13.63	
By Dam 408		
2871	13.63	
2872	13.11	
2873	10.59	
2874	12.55	
2875	12.19	
2876	10.88	
2877	12.57	
2878	12.13	
2879	13.90	
By Dam 409		
2881	11.26	
2882	12.53	
2883	11.85	
2884	12.54	
2885	13.04	
2886	11.45	
2887	11.22	
2888	10.31	
2889	13.77	
By Dam 410		
2891	14.43	502
2892	11.24	
2893	11.55	
2894	11.42	
2895	11.70	
2896	11.79	
2897	11.75	
2898	12.56	
2899	12.11	
By Dam 411		
2901	12.31	
2902	15.21	506
2903	12.72	
2904	12.93	
2905	12.45	
2906	14.43	513
2907	12.43	
2908	12.72	
2909	13.45	
By Dam 412		
2911	14.54	503
2912	13.31	
2913	11.31	
2914	12.64	
2915	13.71	
2916	12.56	
2917	11.79	
2918	12.87	
2919	15.20	509
By Dam 413		
2921	12.47	
2922	14.98	505
2923	14.45	512
2924	14.38	501
2925	13.22	
2926	15.40	508
2927	15.71	507
2028	12.48	
2929	13.58	
By Dam 414		
2931	14.17	
2932	10.89	
2933	11.51	
2934	12.98	
2935	14.19	
2936	14.30	
2937	13.02	
2938	11.92	
2939	11.69	
By Dam 415		
2941	13.24	
2942	13.03	
2943	13.21	
2944	12.53	
2945	13.96	
2946	13.39	
2947	12.39	
2948	13.53	
2949	12.92	

TABLE 23.—*Continued*

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 416			*By Dam 419*			*By Dam 422*		
2951	13.37		2981	12.34		3011	13.73	
2952	12.58		2982	13.03		3012	12.30	
2953	11.74		2983	12.37		3013	11.96	
2954	12.29		2984	13.00		3014	12.78	
2955	11.63		2985	14.59	504	3015	12.88	
2956	11.99		2986	12.73		3016	11.10	
2957	12.14		2987	13.30		3017	12.86	
2958	12.35		2988	12.01		3018	12.16	
2859	11.91		2889	12.23		3019	13.22	
By Dam 417			*By Dam 420*			*By Dam 423*		
2961	13.85		2991	12.29		3021	11.81	
2962	11.74		2992	12.48		3022	11.90	
2963	12.43		2993	12.22		3023	13.01	
2064	12.16		2994	12.66		3024	12.29	
2965	12.36		2995	12.52		3025	11.74	
2966	13.44		2996	12.75		3026	13.01	
2967	13.40		2997	13.01		3027	13.54	
2968	14.01		2998	12.15		3028	13.89	
2969	12.87		2999	11.79		3029	13.50	
By Dam 418			*By Dam 421*			*By Dam 424*		
2971	12.23		3001	12.89		3031	12.49	
2972	13.47		3002	12.66		3032	10.98	
2973	12.36		3003	13.10		3033	11.24	
2974	12.17		3004	13.68		3034	11.44	
2975	12.73		3005	11.82		3035	13.00	
2976	12.16		3006	12.77		3036	12.11	
2977	11.59		3007	11.67		3037	11.98	
2878	10.52		3008	13.16		3038	9.34	
2979	13.81		3009	13.31		3039	11.46	

TABLE 24.—FIFTH GENERATION HIGH PROTEIN PLOT RECORD, 1901

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
501	413	14.38	14.78	508	413	15.40	15.21
502	410	14.43	13.76	509	412	15.20	14.22
503	412	14.54	14.10	510	407	14.63	13.61
504	419	14.59	15.02	511	403	14.56	13.83
505	413	14.98	13.37	512	413	14.45	14.19
506	411	15.21	14.07	513	411	14.43	13.61
507	413	15.71	14.44	514	401	14.35	13.46
...	...	.....	.....	*515	402	14.01	13.37
Average of plot.						14.78	14.12

*Planted in Special High-Protein Plot:—not included in average.

TABLE 25.—PROTEIN IN SIXTY INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1901 AND SEVENTY-TWO ADDITIONAL EARS FROM SPECIAL HIGH-PROTEIN PLOT

Annual ear No.	Protein, percent.	Register No. assigned
By Dam 501		
3611	14.78	
3612	16.03	
3613	13.57	
3614	14.84	
By Dam 502		
3621	13.15	
By Dam 503		
3631	14.12	
3632	13.62	
By Dam 504		
3641	15.51	610
3642	14.64	
3643	14.68	
3644	14.89	
3645	14.85	
3646	14.27	
3647	12.78	
3648	14.22	
By Dam 505		
3651	13.02	
3652	12.17	
3653	14.63	
3654	13.57	
3655	12.94	
3656	12.96	
3657	12.80	
3658	13.14	
3659	13.56	
By Dam 506		
3661	15.41	604
3662	13.20	
3663	11.82	
3664	14.17	
By Dam 507		
3671	14.54	
3672	14.88	
By Dam 508		
3681	13.47	
3682	15.38	
3683	15.49	
3684	14.51	
By Dam 509		
3691	15.03	613
3692	13.77	
3693	12.84	
By Dam 510		
3701	12.19	
3702	14.85	
3703	14.33	
3704	12.36	
3705	14.56	
3706	13.00	
By Dam 511		
3711	14.35	
3712	11.59	
3713	11.80	
3714	13.24	
By Dam 512		
3721	12.63	
3722	15.80	608
3723	12.67	
3724	15.65	609
By Dam 513		
3731	13.99	
3732	14.51	
3733	12.01	
3734	12.86	
3735	14.27	
By Dam 514		
3741	11.50	
3742	14.37	
3743	13.86	
3744	13.34	
By Dam 507 Grown in Special High Protein Plot.		
3531	13.29	
3532	12.33	
3533	11.96	
3534	14.25	
3535	13.84	
3536	15.17	612
3537	15.00	601
3538	16.12	607
3539	14.20	
3561	12.86	
3562	15.40	611
3563	12.70	
3564	10.60	
3565	13.69	
3566	14.78	
3567	13.61	
3568	15.27	
3569	12.75	
3591	14.62	
3592	13.93	
3593	15.05	602
3594	13.26	
3595	14.71	
3596	13.18	
3597	14.98	
3598	12.49	
3599	15.58	605
By Dam 515 Grown in Special High Protein Plot.		
3521	13.73	
3522	12.73	
3523	13.46	
3524	13.87	
3525	13.12	
3526	14.93	614
3527	11.56	
3528	13.40	
3529	13.93	
3541	13.78	
3542	11.78	
3543	12.80	
3544	13.54	
3545	13.16	
3546	13.47	
3547	12.21	
3548	13.09	
3549	11.76	
3551	14.88	
3552	13.85	
3553	13.16	
3554	11.08	
3555	12.23	
3556	13.28	
3557	14.12	
3558	14.61	
3559	14.80	
3571	14.69	
3572	12.08	
3573	11.18	
3574	13.67	
3575	13.07	
3576	8.94	
3577	13.58	

TABLE 25.—*Continued.*

Annual ear No.	Protein, percent.	Register No. assigned.
3578	13.33	
3579	15.76	606
3581	12.17	
3582	15.01	
3583	13.58	
3584	13.75	
3585	15.21	603
3586	13.82	
3587	13.13	
3588	14.77	
3589	14.12	

TABLE 26.—SIXTH GENERATION HIGH PROTEIN PLOT RECORD, 1902

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
601	507	15.00	12.47	608	512	15.80	.....
601	507	15.05	12.83	609	512	15.65	12.44
603	515	15.21	.....	610	504	15.51	11.76
604	506	15.41	11.59	611	507	15.40	13.17
605	507	15.58	12.44	612	507	15.17	11.93
606	515	15.76	.....	613	509	15.03	12.42
607	507	16.12	12.32	614	515	14.93	.....
Average of ten selected rows.						15.39	12.34

TABLE 27.—PROTEIN IN NINETY INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1902

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 601		
4171	13.07	
4172	12.64	
4173	12.82	
4174	14.70	710
4175	13.51	
4176	13.51	
4177	12.29	
4178	13.62	
4179	13.38	
By Dam 602		
4181	12.11	
4182	13.80	719
4183	11.84	
4184	12 32	
4185	13.72	721
4186	12 86	
4187	14.25	715
4188	13.30	
4189	14.75	712
By Dam 604		
4191	11.77	
4192	12.32	
4193	13.28	
4194	13.08	
4195	12.16	
4196	11.69	
4197	12.54	
4198	12.73	
4199	9.99	
By Dam 605		
4201	13.44	
4202	14.22	707
4203	13.76	720
4204	13.50	
4205	13 32	
4206	13 47	
4207	13 13	
4208	13.32	
4209	13.06	
By Dam 607		
4211	13.14	
4212	14.62	713
4213	13.86	704
4214	13 31	
4215	14 12	716
4216	14 02	717
4217	11.50	
4218	14 37	714
4219	13.66	
By Dam 609		
4221	13 28	
4222	13.30	
4223	10.88	
4224	13.42	
4225	13.76	702
4226	13.45	
4227	14.03	706
4228	11.09	
4229	12.99	
By Dam 610		
4231	13.89	718
4232	13.68	722
4233	11.00	
4234	9.80	
4235	13.12	
4236	11.79	
4237	11.86	
4238	9.54	
4239	12 17	
By Dam 611		
4241	12 81	
4242	14.29	708
4243	12 76	
4244	14 49	709
4245	13.79	703
4246	13.19	
4247	10.48	
4248	13.70	701
4249	12.68	
By Dam 612		
4251	12.28	
4252	12.15	
4253	15.01	711
4254	12.50	
4255	12.02	
4256	13.22	
4257	12.49	
4258	11.04	
4259	12.66	
By Dam 613		
4261	11.60	
4262	12.36	
4263	12.99	
4264	13.67	
4265	13.98	705
4266	12.36	
4267	12.91	
4268	12.53	
4269	13.02	

TABLE 28.—SEVENTH GENERATION HIGH PROTEIN PLOT RECORD, 1903

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
701	611	13.70		712	602	14.75	13.63
702	609	13.76		713	607	14.62	14.03
703	611	13.79		714	607	14.37	11.20
704	607	13.86		715	602	14.25	
705	613	13.98	13.22	716	607	14.12	12.40
706	609	14.03	12.76	717	607	14.02	12.30
707	605	14.22		718	610	13.89	12.47
708	611	14.29		719	602	13.80	
709	611	14.49	13.74	720	605	13.76	
710	601	14.70	14.61	721	602	13.72	
711	612	15.01		722	610	13.68	
Average of ten selected rows.						14.30	13.04

TABLE 29.—PROTEIN IN ONE HUNDRED INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1903

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 705			*By Dam 712*			*By Dam 717*		
1	13.68		41	13.02		81	13.92	
2	11.98		42	12.30		82	14.30	
3	14.42		43	12.02		83	13.12	
4	14.40		44	12.71		84	13.06	
5	14.60	822	45	13.94		85	12.51	
6	12.64		46	12.78		86	8.47	
7	11.49		47	14.30		87	14.90	818
8	11.39		48	13.77		88	14.88	804
9	13.44		49	14.37		89	14.28	
10	13.49		50	13.14		90	10.47	
By Dam 706			*By Dam 713*			*By Dam 718*		
11	14.42		51	14.85	819	91	14.26	
12	11.35		52	13.44		92	14.38	
13	12.96		53	15.21	806	93	15.23	816
14	13.85		54	14.76	802	94	13.91	
15	12.57		55	12.95		95	13.98	
16	11.18		56	13.82		96	10.93	
17	15.34	808	57	12.66		97	10.84	
18	12.22		58	14.56		98	12.68	
19	15.40	813	59	14.78	820	99	10.37	
20	14.75	801	60	13.65		100	11.62	
By Dam 709			*By Dam 714*					
21	13.58		61	13.34				
22	14.95	805	62	11.87				
23	11.87		63	13.07				
24	15.30	815	64	14.00				
25	12.51		65	13.26				
26	14.34		66	12.56				
27	15.12	817	67	12.81				
28	15.55	812	68	12.22				
29	15.38	809	69	13.30				
30	14.83	803	70	13.90				
By Dam 710			*By Dam 716*					
31	14.76	821	71	11.09				
32	13.42		72	11.01				
33	15.37	814	73	14.50				
34	17.33	811	74	13.76				
35	14.56		75	12.28				
36	13.80		76	13.68				
37	15.45	810	77	15.24	807			
38	14.08		78	12.37				
39	11.47		79	14.34				
40	14.40		80	12.69				

TABLE 30.—EIGHTH GENERATION HIGH PROTEIN PLOT RECORD, 1904

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested			Seed ear planted.	Crop harvested.
801	706	14.75		812	709	15.55	15.56
802	713	14.76		813	706	15.40	
803	709	14.83	15.19	814	710	15.34	15.41
804	717	14.88		815	709	15.30	
805	709	14.95		816	718	15.23	14.70
806	713	15.21	14.99	817	709	15.12	
807	716	15.24		818	717	14.90	14.96
808	706	15.34	13.79	819	713	14.85	
809	709	15.38	14.32	820	713	14.78	14.99
810	710	15.45		821	710	14.76	
811	710	17.33	16.39	822	705	14.60	
Average of ten selected rows						15.39	15.03

TABLE 31.—PROTEIN IN ONE HUNDRED INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1904

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 803		
1	13.88	
2	14.10	
3	15.54	
4	16.41	907
5	16.89	904
6	15.30	
7	17.00	913
8	13.48	
9	14.64	
10	15.38	
By Dam 806		
11	16.60	906
12	13.90	
13	16.77	924
14	15.43	
15	14.06	
16	14.28	
17	15.10	
18	14.00	
19	14.46	
20	13.18	
By Dam 808		
21	16.49	901
22	12.72	
23	14.21	
24	14.77	
25	13.80	
26	13.75	
27	13.46	
28	13.95	
29	16.75	908
30	10.61	
By Dam 809		
31	13.68	
32	16.35	921
33	14.77	
34	14.65	
35	15.69	
36	13.81	
37	14.64	
38	16.57	918
39	15.64	
40	14.18	
By Dam 811		
41	17.79	916
42	17.07	
43	14.74	
44	15.83	
45	17.53	902
46	17.73	914
47	14.41	
48	16.26	
49	16.71	
50	17.38	905
By Dam 812		
51	15.39	
52	17.04	915
53	16.43	919
54	16.78	923
55	15.94	
56	14.75	
57	14.18	
58	13.87	
59	15.00	
60	15.73	
By Dam 814		
61	15.74	
62	16.28	912
63	13.62	
64	16.50	920
65	15.72	
66	13.90	
67	14.60	
68	15.62	
69	16.13	
70	16.33	925
By Dam 816		
71	14.83	
72	14.07	
73	14.38	
74	15.17	
75	16.24	909
76	13.52	
77	14.20	
78	13.12	
79	13.40	
80	12.94	
By Dam 818		
81	13.22	
82	15.43	
83	15.97	911
84	14.63	
85	13.07	
86	13.43	
87	16.76	922
88	15.18	
89	14.65	
90	15.15	
By Dam 820		
91	15.83	903
92	15.92	
93	14.83	
94	12.62	
95	14.38	
96	15.85	917
97	16.52	910
98	14.17	
99	13.22	
100	14.52	

TABLE 32.—NINTH GENERATION HIGH PROTEIN PLOT RECORD, 1905

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
901	808	16.49		914	811	17.73	15.09
902	811	17.53		915	812	17.04	
903	820	15.83		916	811	17.79	
904	803	16.89		917	820	15.85	
905	811	17.38		918	809	16.57	14.75
906	806	16.60		919	812	16.43	
907	803	16.41		920	814	16.50	14.91
908	808	16.75		921	809	16.35	
909	816	16.24		922	818	16.76	14.76
910	820	16.52		923	812	16.78	
911	818	15.97		924	806	16 77	14.86
912	814	16.28	13.97	925	814	16.33	
913	803	17.00					
Average of six selected rows						16.77	14.72

TABLE 33.—PROTEIN IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1905

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 912			*By Dam 918*			*By Dam 922*		
1	13.84		41	14.65		81	15.43	
2	13.82		42	14.00		82	13.38	
3	15.30		43	15.83	1011	83	14.06	
4	12.77		44	14.71		84	16.16	1010
5	14.35		45	14.86		85	14.83	
6	12.91		46	13.95		86	12.74	
7	15.52	1007	47	14.51		87	15.25	
8	15.84	1002	48	15.87	1023	88	15.30	
9	13.39		49	16.58	1006	89	15.71	1003
10	13.82		50	14.59		90	14.79	
11	11.31		51	14.02		91	14.59	
12	12.98		52	13.87		92	14.89	
13	13.99		53	13.15		93	.....	
14	15.81	1014	54	15.07		94	14.78	
15	15.22		55	14.29		95	12.84	
16	13.48		56	15.29		96	15.39	
17	14.70		57	16.10	1018	97	15.10	
18	10.77		58	15.36		98	13.87	
19	15.62	1019	59	14.54		99	15.72	1022
20	13.99		60	13.81		100	15.65	1015
By Dam 914			*By Dam 920*			*By Dam 924*		
21	16.00		61	15.41		101	14.75	
22	14.94		62	15.19		102	14.79	
23	14.25		63	16.87	1008	103	15.21	
24	16.32		64	12.44		104	15.56	
25	12.80		65	14.55		105	15.95	1012
26	17.35	1009	66	13.47		106	17.05	1024
27	14.95		67	15.46		107	15.05	
28	14.24		68	15.78		108	15.88	1005
29	15.02		69	15.87	1001	109	12.00	
30	15.01		70	15.99	1020	110	15.38	
31	15.15		71	13.08		111	11.03	
32	14.74		72	15.25		112	14.60	
33	12.92		73	15.88	1013	113	15.74	1017
34	14.45		74	15.85		114	16.59	
35	17.39	1004	75	13.99		115	14.02	
36	15.23		76	14.71		116	15.44	
37	15.68	1016	77	14.36		117	14.97	
38	12.25		78	14.11		118	14.12	
39	17.30	1021	79	14.79		119	15.26	
40	15.74		80	15.28		120	13.90	

TABLE 34.—TENTH GENERATION HIGH PROTEIN PLOT RECORD, 1906

Register ear No.	By Dam No.	Protein, percent		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
1001	920	15.87		1013	920	15.88	
1002	912	15.84		1014	912	15.81	
1003	922	15 71		1015	922	15.65	
1004	914	17.39	14.35	1016	914	15.68	
1005	924	15.88		1017	924	15.74	
1006	918	16.58	14.50	1018	918	16.10	
1007	912	15 52		1019	912	15.62	
1008	920	16.87	-	1020	920	15.99	14.47
1009	914	17.35		1021	914	17.30	
1010	922	16.16	14.35	1022	922	15.72	13.97
1011	918	15.83		1023	918	15.87	
1012	924	15.95	13.92	1024	924	17.05	
Average of six selected rows						16.30	14.26

TABLE 35.—PROTEIN IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM HIGH-PROTEIN PLOT OF 1906

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 1004			*By Dam 1010*			*By Dam 1020*		
1	17.13	1102	41	14.17		81	16.11	1110
2	15.56		42	13.94		82	14.36	
3	16.62	1114	43	11.84		83	12.64	
4	14.57		44	14.00		84	14.27	
5	13.83		45	13.14		85	15.57	
6	11.73		46	14.75		86	15.00	
7	15.02		47	14.42		87	14.62	
8	14.07		48	14.37		88	12.57	
9	13.89		49	12.50		89	13.69	
10	13.85		50	14.96		90	14.15	
11	13.02		51	13.93		91	14.46	
12	13.88		52	15.69	1111	92	14.12	
13	15.76	1107	53	15.54	1106	93	15.74	1103
14	13.98		54	15.16	1123	94	15.63	1115
15	12.69		55	17.67	1118	95	13.51	
16	12.04		56	14.91		96	14.19	
17	14.87		57	13.67		97	13.25	
18	15.79	1119	58	13.50		98	14.79	
19	14.14		59	14.70		99	14.48	
20	14.56		60	14.16		100	16.17	1122
By Dam 1006			*By Dam 1012*			*By Dam 1022*		
21	14.88		61	14.17		101	16.11	1105
22	12.87		62	15.58	1113	102	13.77	
23	12.61		63	14.85		103	14.14	
24	14.72		64	11.09		104	14.11	
25	12.75		65	14.21		105	13.15	
26	12.85		66	13.59		106	11.30	
27	16.30	1104	67	12.44		107	12.91	
28	15.44	1109	68	14.07		108	15.82	1112
29	15.01		69	15.35	1101	109	16.48	1124
30	15.26		70	14.45		110	10.46	
31	13.37		71	11.42		111	14.79	
32	16.06	1116	72	12.19		112	14.36	
33	13.31		73	13.40		113	12.47	
34	15.20		74	14.89		114	12.06	
35	15.93	1121	75	13.58		115	14.93	
36	15.08		76	13.94		116	12.62	
37	13.78		77	16.36	1120	117	14.10	
38	14.95		78	12.82		118	14.28	
39	14.44		79	14.18		119	15.65	
40	14.08		80	15.79	1108	120	15.78	1117

TABLE 36.—FIRST GENERATION LOW PROTEIN PLOT RECORD, 1897

Register ear No.	By Dam No.	Protein, percent. Seed ear planted.	Protein, percent. Crop harvested.	Register ear No.	By Dam No.	Protein, percent. Seed ear planted	Protein, percent. Crop harvested.
101		9.31	†				
102		9.12	10.55	*107		8.40	10.36 10.20
103		9.08	10 89	108		9.22	9.89
104		9.15	10.26	109		9.33	10.24
105		8.38	10 10	110		9.36	11.20
*106		8.25	10.73 9.90	111		9.30	12.24
				112		9.47	†
Average of ten rows †						8.96	10.55

†Analyses of seed for rows that are not represented in the harvest are not included in the plot average.

*Crop from Reg. Nos. 106 and 107 were sampled in duplicate.

TABLE 37.—PROTEIN IN FORTY-EIGHT INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1897

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 102			*By Dam 106*			*By Dam 108*		
411	11.37		431	10.98		451	10.80	
412	11.47		432	9.67	212	452	10.07	
413	11.36		433	9.91		453	12.13	
414	11.15		434	12.85		454	10.04	
By Dam 103			*By Dam 106*			*By Dam 109*		
416	8.88	208	436	9.38	211	456	10.16	
417	9.26	203	437	10.03		457	10.22	
418	11.62		438	10.97		458	8.22	206
419	10.43		439	9.28	210	459	11.92	
By Dam 104			*By Dam 107*			*By Dam 110*		
421	9.60	201	441	10.25		461	11.61	
422	9.93		442	10.28		462	10.85	
423	12.45		443	11.40		463	10.04	
424	10.43		444	9.34	202	464	11.68	
By Dam 105			*By Dam 107*			*By Dam 111*		
426	11.46		446	8.84	205	466	13.98	
427	8.29	207	447	11.27		467	12.55	
428	10.19		448	9.05	209	468	13.89	
429	9.69		449	8.95	204	469	12.19	

*An extra set of ears were analyzed from Dams 106 and 107

TABLE 38.—SECOND GENERATION LOW PROTEIN PLOT RECORD, 1898

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
201	104	9.60	10.92	*207	105	8.29	10.43 11.14
202	107	9.34	11.00				
203	103	9.26	11.03	208	103	8.88	10.68
204	107	8.95	10.06	209	107	9.05	11.16
205	107	8.84	9.83	210	106	9.28	9.93
*206	109	8.22	10.26 10.19	211	106	9.38	10.27
				212	106	9.67	10.83
Average of plot						9.06	10.55

*Crop from Reg. Nos. 206 and 207 were sampled in duplicate.

TABLE 39.—PROTEIN IN ONE HUNDRED TWENTY-SIX INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1898

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 201		
1101	9.26	
1102	10.25	
1103	10.73	
1104	7.76	309
1105	12.78	
1106	11.36	
1107	10.17	
1108	12.49	
1109	11.98	
By Dam 202		
1111	9.99	
1112	11.07	
1113	11.26	
1114	11.09	
1115	10.40	
1116	11.11	
1117	11.33	
1118	10.70	
1119	11.41	
By Dam 203		
1121	11.87	
1122	9.57	
1123	10.48	
1124	10.28	
1125	10.87	
1126	13.36	
1127	11.44	
1128	9.45	
1129	11.60	
By Dam 204		
1131	8.58	312
1132	12.97	
1133	7.85	307
1134	9.24	
1135	11.81	
1136	11.77	
1137	8.80	
1138	10.97	
1139	8.57	305
By Dam 205		
1141	10.58	
1142	11.21	
1143	10.21	
1144	7.50	308
1145	9.67	
1146	9.56	
1147	9.54	
1148	10.15	
1149	8.62	304
By Dam 206		
1151	8.90	315
1152	10.62	
1153	9.33	
1154	9.52	
1155	11.00	
1156	10.68	
1157	10.30	
1158	13.04	
1159	9.02	301
**By Dam 206*		
1161	10.93	
1162	10.58	
1163	10.24	
1164	9.41	
1165	7.85	310
1166	11.71	
1167	8.29	306
1168	11.65	
1169	9.90	
By Dam 207		
1171	10.10	
1172	10.71	
1173	8.63	313
1174	10.34	
1175	11.32	
1176	10.93	
1177	11.66	
1178	9.66	
1179	11.10	
**By Dam 207*		
1181	16.08	
1182	12.30	
1183	13.25	
1184	8.95	316
1185	11.36	
1186	9.46	
1187	11.42	
1188	8.83	302
1189	10.19	
By Dam 208		
1191	9.71	
1192	11.38	
1193	9.15	
1194	12.48	
1195	11.48	
1196	10.41	
1197	11.59	
1198	10.85	
1199	9.26	
By Dam 209		
1201	12.70	
1202	11.02	
1203	10.97	
1204	10.89	
1205	10.25	
1206	12.31	
1207	11.35	
1208	9.81	
1209	9.60	
By Dam 210		
1211	8.66	303
1212	9.87	
1213	11.63	
1214	9.45	
1215	10.78	
1216	9.99	
1217	9.87	
1218	10.22	
1219	8.82	314
By Dam 211		
1221	11.51	
1222	11.28	
1223	10.94	
1224	10.63	
1225	8.32	311
1226	10.16	
1227	9.18	
1228	8.78	
1229	10.74	
By Dam 212		
1231	10.44	
1232	11.27	
1233	10.30	
1234	12.46	
1235	9.52	
1236	10.02	
1237	11.34	
1238	10.54	
1239	10.09	

*An extra set of ears were analyzed from Dams 206 and 207.

TABLE 40.—THIRD GENERATION LOW PROTEIN PLOT RECORD, 1899

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
301	206	9.02	9.80	309	201	7.76	9.26
302	207	8.83	10.09	310	206	7.85	10.33
303	210	8.66	9.87	311	211	8.32	9.61
304	205	8.62	9.95	312	204	8.58	10.50
305	204	8.57	9.70	313	207	8.63	9.88
306	206	8.29	9.83	314	210	8.82	9.73
307	204	7.85	9.55	315	206	8.90	9.79
308	205	7.50	9.53	316	207	8.95	10.40
Average of plot						8.45	9.86

TABLE 41.—PROTEIN IN ONE HUNDED FORTY-FOUR INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1899

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 301			*By Dam 306*			*By Dam 311*		
1841	9.49		1891	8.54		1941	9.66	
1842	8.66		1892	9.13		1942	8.66	
1843	9.17		1893	8.68		1943	8.71	
1844	9.11		1894	8.47	409	1944	8.83	
1845	8.97		1895	6.66	408	1945	9.11	
1846	11.49		1896	9.40		1946	10.15	
1847	9.56		1897	9.00		1947	9.29	
1848	9.74		1898	8.79		1948	9.86	
1849	9.72		1899	9.66		1949	9.54	
By Dam 302			*By Dam 307*			*By Dam 312*		
1851	10.16		1901	10.49		1951	9.84	
1852	8.82		1902	9.04		1952	10.57	
1853	9.26		1903	8.95		1953	9.93	
1854	10.07		1904	9.89		1954	9.76	
1855	11.29		1905	9.92		1955	9.27	
1856	9.69		1906	10.91		1956	9.85	
1857	10.23		1907	10.04		1957	10.15	
1858	8.63	416	1908	10.24		1958	10.74	
1859	8.57	415	1909	8.08	404	1959	9.12	
By Dam 303			*By Dam 308*			*By Dam 313*		
1861	9.48		1911	9.52		1961	9.62	
1862	10.23		1912	8.41		1962	10.57	
1863	10.77		1913	9.50		1963	11.99	
1864	9.74		1914	9.26		1964	10.27	
1865	10.34		1915	8.39		1965	9.55	
1866	9.96		1916	9.26		1966	8.54	402
1867	9.30		1917	8.62	401	1967	9.99	
1868	9.01		1918	9.18		1968	10.19	
1869	10.38		1919	7.74	406	1969	13.06	
By Dam 304			*By Dam 309*			*By Dam 314*		
1871	9.27		1921	7.49	407	1971	9.66	
1872	8.70		1922	8.61		1972	8.44	403
1873	10.54		1923	7.98	405	1973	8.85	
1874	9.20		1924	9.89		1974	9.72	
1875	9.44		1925	7.60	410	1975	10.28	
1876	10.19		1926	8.41		1976	8.74	
1877	8.18	413	1927	9.44		1977	11.27	
1878	10.99		1928	9.42		1978	10.13	
1879	12.66		1929	8.67		1979	10.26	
By Dam 305			*By Dam 310*			*By Dam 315*		
1881	7.83	411	1931	11.62		1981	9.54	
1882	9.53		1932	10.12		1982	9.00	
1883	10.98		1933	10.15		1983	9.06	
1884	7.61		1934	10.01		1984	9.09	
1885	9.84		1935	8.47	414	1985	9.57	
1886	9.52		1936	11.76		1986	8.95	
1887	8.94		1937	10.14		1987	8.03	412
1888	9.17		1938	9.59		1988	10.48	
1889	8.48		1939	11.86		1989	9.64	

TABLE 41. (*Continued.*)

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 316		
1991	10.33	
1992	10.46	
1993	9.34	
1994	9.96	
1995	10.70	
1996	10.09	
1997	11.28	
1998	10.59	
1999	10.86	

TABLE 42.—FOURTH GENERATION LOW PROTEIN PLOT RECORD, 1900

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
401	308	8.62	9.14	409	306	8.47	9.03
402	313	8.54	9.54	410	309	7.60	9.08
403	314	8.44	9.20	411	305	7.83	9.97
404	307	8.08	9.09	412	315	8.03	9.39
405	309	7.98	9.04	413	304	8.18	9.09
406	308	7.74	9.08	414	310	8.47	9.41
407	309	7.49	9.35	415	302	8.57	9.53
408	306	6.66	8.84	416	302	8.63	10.72
Average of plot						8.08	9.34

TABLE 43.—PROTEIN IN ONE HUNDRED FORTY-FOUR INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1900

Annual ear No	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 401			*By Dam 406*			*B Dam 411*		
3041	9.82		3091	8.50		3141	7.54	510
3042	9.08		3092	8.37		3142	8.15	
3043	9.58		3093	9.28		3143	10.02	
3044	8.02		3094	8.60		3144	11.05	
3045	7.96		3095	8.30		3145	8.87	
3046	7.62	511	3096	7.91		3146	9.54	
3047	8.61		3097	10.26		3147	11.32	
3048	9.36		3098	7.67	503	3148	10.73	
3049	8.55		3099	8.25		3149	12.29	
By Dam 402			*By Dam 407*			*By Dam 412*		
3051	8.44		3101	8.27		3151	10.76	
3052	8.90		3102	8.39		3152	11.16	
3053	9.47		3103	11.85		3153	11.12	
3054	9.67		3104	8.57		3154	10.12	
3055	7.90	514	3105	9.13		3155	7.78	513
3056	8.95		3106	10.13		3156	8.69	
3057	10.90		3107	8.52		3157	9.14	
3058	8.34		3108	7.79	501	3158	10.05	
3059	10.23		3109	9.81		3159	9.34	
By Dam 403			*By Dam 408*			*By Dam 413*		
3061	8.40		3111	7.90		3161	9.39	
3062	9.04		3112	8.57		3162	9.85	
3063	7.50	505	3113	8.04		3163	8.14	
3064	8.60		3114	8.18		3164	8.74	
3065	9.95		3115	7.26	508	3165	9.21	
3066	7.43	506	3116	9.79		3166	8.54	
3067	9.71		3117	8.14		3167	9.54	
3068	10.19		3118	11.83		3168	8.87	
3069	7.67		3119	8.67		3169	9.72	
By Dam 404			*By Dam 409*			*By Dam 414*		
3071	7.75	502	3121	9.58		3171	8.14	
3072	9.08		3122	8.12		3172	10.12	
3073	10.53		3123	8.93		3173	8.68	
3074	8.09		3124	8.02		3174	9.31	
3075	9.81		3125	8.46		3175	8.86	
3076	9.32		3126	9.33		3176	9.28	
3077	9.36		3127	9.56		3177	8.16	
3078	7.08	507	3128	9.19		3178	8.81	
3079	10.08		3129	8.28		3179	8.70	
By Dam 405			*By Dam 410*			*By Dam 415*		
3081	7.49	509	3131	8.72		3181	8.40	
3082	9.53		3132	8.49		3182	10.89	
3083	8.56		3133	7.70	512	3183	10.91	
3084	8.48		3134	9.66		3184	9.85	
3085	8.24		3135	9.18		3185	9.91	
3086	9.77		3136	9.17		3186	8.55	
3087	9.67		3137	8.17		3187	9.03	
3088	10.47		3138	10.31		3188	8.92	
3089	9.99		3139	7.56	504	3189	9.94	

TABLE 43.—*Continued*

Annual ear No.	Protein percent.	Register No. assigned.
By Dam 416		
3191	10.51	
3192	9.52	
3193	9.52	
3194	9.93	
3195	8.58	
3196	10.74	
3197	11.09	
3198	9.86	
3199	9.41	

TABLE 44.—FIFTH GENERATION LOW PROTEIN PLOT RECORD 1901

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
501	407	7.79	10.30	508	408	7.26	9.92
502	404	7.75	9.50	509	405	7.49	10.90
503	406	7.67	9.69	510	411	7.54	9.38
504	410	7.56	9.97	511	401	7.62	10.68
505	403	7.50	9.59	512	410	7.70	10 44
506	403	7.43	10.08	513	412	7.78	9.61
507	404	7.08	10.54	514	402	7.90	9.97
Average of plot						7.58	10.04

TABLE 45.—PROTEIN IN ONE HUNDRED TWENTY-SIX INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1901

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 501		
3751	9.79	
3752	9.85	
3753	11.03	
3754	9.17	
3755	10.22	
3756	10.32	
3757	10.12	
3758	9.01	
3759	8.89	
By Dam 502		
3761	8.37	614
3762	7.77	609
3763	9.08	
3764	8.14	610
3765	8.44	
3766	10.37	
3767	8.43	
3768	11.63	
3769	11.11	
By Dam 503		
3771	8.20	611
3772	9.33	
3773	9.44	
3774	10.03	
3775	8.41	601
3776	9.52	
3777	10.51	
3778	9.88	
3779	9.60	
By Dam 504		
3781	8.41	
3782	9.18	
3783	11.38	
3784	8.49	
3785	10.83	
3786	8.68	
3787	8.49	
3788	10.72	
3789	11.18	
By Dam 505		
3791	9.45	
3792	9.16	
3793	10.19	
3794	8.19	
3795	10.41	
3796	8.53	
3797	8.34	612
3798	9.08	
3799	10.39	
By Dam 506		
3801	9.56	
3802	10.30	
3803	9.03	
3804	8.36	602
3805	9.61	
3806	9.80	
3807	9.78	
3808	8.36	613
3809	9.77	
By Dam 507		
3811	10.26	
3812	9.03	
3813	9.70	
3814	11.22	
3815	11.39	
3816	9.27	
3817	8.92	
3818	10.50	
3819	10.52	
By Dam 508		
3821	8.83	
3822	10.29	
3823	10.05	
3824	9.11	
3825	10.24	
3826	9.05	
3827	9.68	
3828	9.08	
3829	9.66	
By Dam 509		
3831	9.83	
3832	13.05	
3833	11.44	
3834	10.54	
3835	9.57	
3836	10.23	
3837	12.02	
3838	9.23	
3839	11.59	
By Dam 510		
3841	8.73	
3842	7.59	608
3843	8.53	
3844	10.26	
3845	9.20	
3846	8.19	604
3847	9.52	
3848	8.73	
3849	8.81	
By Dam 511		
3851	9.24	
3852	10.25	
3853	12.82	
3854	10.93	
3855	9.73	
3856	9.98	
3857	10.78	
3858	9.91	
3859	8.22	
By Dam 512		
3861	8.61	
3862	8.72	
3863	8.93	
3864	10.03	
3865	9.35	
3866	8.78	
3867	9.75	
3868	12.47	
3869	10.79	
By Dam 513		
3871	9.40	
3872	8.71	
3873	7.54	607
3874	9.06	
3875	9.05	
3876	10.84	
3877	8.87	
3878	9.53	
3879	9.79	
By Dam 514		
3881	9.61	
3882	7.66	606
3883	9.60	
3884	11.75	
3885	8.03	605
3886	8.25	603
3887	11.34	
3888	8.53	
3889	10.97	

TABLE 46.—SIXTH GENERATION LOW PROTEIN PLOT RECORD 1902

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
601	503	8.41	8.03	608	510	7.59	8.01
602	506	8.36	7.78	609	502	7.77	
603	514	8.25	7.63	610	502	8.14	8.53
604	510	8.19		611	503	8.20	
605	514	8.03	8.47	612	505	8.34	8.29
606	514	7.66	8.43	613	506	8.36	8.47
607	513	7.54		614	502	8.37	8.57
Average of ten selected rows						8.15	8.22

TABLE 47.—PROTEIN IN NINETY INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1902

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 601		
4271	7.66	
4272	9.05	
4273	7.89	
4274	8.63	
4275	7.74	
4276	6.98	707
4277	7.78	
4278	9.69	
4279	7.46	
By Dam 602		
4281	6.61	714
4282	8.89	
4283	8.31	
4284	8.52	
4285	7.46	
4286	6.86	715
4287	6.37	712
4288	7.59	
4289	7.50	
By Dam 603		
4291	7.47	
4292	7.36	702
4293	7.97	
4294	7.91	
4295	6.45	713
4296	7.29	720
4297	7.52	
4298	7.24	719
4299	7.12	705
By Dam 605		
4301	7.96	
4302	9.38	
4303	8.04	
4304	8.41	
4305	7.53	
4306	8.20	
4307	7.63	
4308	7.65	
4309	7.57	
By Dam 606		
4311	9.44	
4312	8.31	
4313	7.01	706
4314	7.65	
4315	7.43	701
4316	8.47	
4317	8.03	
4318	7.62	
4319	8.27	
By Dam 608		
4321	7.09	717
4322	6.42	710
4323	7.22	718
4324	9.14	
4325	7.42	721
4326	7.00	716
4327	9.53	
4328	6.37	711
4329	8.20	
By Dam 610		
4331	8.38	
4332	8.44	
4333	7.73	
4334	8.10	
4335	7.67	
4336	7.78	
4337	7.27	703
4338	7.70	
4339	7.85	
By Dam 612		
4341	7.57	
4342	8.15	
4343	8.11	
4344	7.73	
4345	8.70	
4346	6.84	708
4347	7.94	
4348	7.94	
4349	8.10	
By Dam 613		
4351	7.52	
4352	8.17	
4353	7.80	
4354	7.47	
4355	7.59	
4356	9.12	
4357	8.63	
4358	9.48	
4359	7.23	704
By Dam 614		
4361	8.38	
4362	7.94	
4363	8.46	
4364	7.62	
4365	8.63	
4366	8.51	
4367	7.45	722
4368	6.48	709
4369	8.21	

TABLE 48.—SEVENTH GENERATION LOW PROTEIN PLOT RECORD 1903

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
701	606	7.43		712	602	6.37	
702	603	7.36	8.57	713	603	6.45	
703	610	7.27	9.04	714	602	6.61	
704	613	7.23	7.68	715	602	6.86	8.41
705	603	7.12		716	608	7.00	8.74
706	606	7.01	8.53	717	608	7.09	
707	601	6.98	9.22	718	608	7.22	
708	612	6.84	8.88	719	603	7.24	
709	614	6.48		720	603	7.29	
710	608	6.42	8.63	721	608	7.42	
711	608	6.37	8.51	722	614	7.45	
Average of ten selected rows						6.93	8.62

TABLE 49.—PROTEIN IN ONE HUNDRED INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1903

Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 702		
1	8.58	
2	8.40	
3	8.56	
4	6.82	815
5	8.41	
6	7.14	805
7	8.37	
8	8.43	
9	6.89	816
10	7.26	819
By Dam 703		
11	9.14	
12	8.86	
13	8.20	
14	7.85	
15	9.26	
16	9.48	
17	8.21	
18	8.43	
19	8.00	
20	7.36	822
By Dam 704		
21	7.00	817
22	6.80	808
23	7.19	818
24	6.62	810
25	7.32	821
26	6.99	806
27	8.85	
28	7.35	
29	7.74	
30	7.31	802
By Dam 706		
31	7.73	
32	7.43	
33	8.69	
34	6.67	
35	7.20	
36	7.56	
37	8.95	
38	7.41	
39	8.01	
40	8.03	
By Dam 707		
41	8.26	
42	7.34	801
43	7.37	
44	6.75	813
45	10.20	
46	9.05	
47	9.35	
48	9.34	
49	7.80	
50	8.82	
By Dam 708		
51	6.54	812
52	8.55	
53	8.61	
54	8.21	
55	8.61	
56	8.10	
57	8.16	
58	9.08	
59	8.19	
60	9.42	
By Dam 710		
61	7.61	
62	9.27	
63	7.56	
64	7.64	
65	8.34	
66	7.61	
67	7.72	
68	8.37	
69	10.05	
70	8.00	
By Dam 711		
71	7.17	
72	8.41	
73	8.10	
74	7.77	
75	7.92	
76	7.28	803
77	6.80	814
78	8.01	
79	6.79	809
80	9.50	
By Dam 715		
81	7.95	
82	7.30	820
83	10.05	
84	7.41	
85	8.14	
86	7.74	
87	9.00	
88	7.23	804
89	7.37	
90	6.38	811
By Dam 716		
91	8.13	
92	8.37	
93	8.60	
94	8.57	
95	8.61	
96	7.86	
97	7.87	
98	8.61	
99	6.87	807
100	7.95	

TABLE 50.—EIGHTH GENERATION LOW PROTEIN PLOT RECORD 1904

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
801	707	7.34		812	708	6.54	9.56
802	704	7.31	9.42	813	707	6.75	
803	711	7.28	8.76	814	711	6.80	
804	715	7.23	8.81	815	702	6.82	9.02
805	702	7.14		816	702	6.89	
806	704	6.99		817	704	7.00	
807	716	6.87	8.66	818	704	7.19	9.27
808	704	6.80		819	702	7.26	
809	711	6.79	9.36	820	715	7.30	
810	704	6.62	10.09	821	704	7.32	9.79
811	715	6.38		822	703	7.36	
Average of ten selected rows						7.00	9.27

TABLE 51.—PROTEIN IN ONE HUNDRED INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1904

Annual ear No.	Protein, percent	Register No. assigned.
By Dam 802		
1	7.60	902
2	7.71	
3	7.83	
4	8.83	
5	9.41	
6	7.96	
7	7.24	911
8	9.82	
9	8.14	
10	9.61	
By Dam 803		
11	8.94	
12	6.13	908
13	7.24	
14	7.69	
15	8.67	
16	8.55	
17	6.78	914
18	7.38	
19	7.24	901
20	7.64	
By Dam 804		
21	8.44	
22	7.16	923
23	7.06	912
24	8.44	
25	8.71	
26	8.18	
27	7.64	
28	6.71	906
29	9.25	
30	7.74	
By Dam 807		
31	9.00	
32	7.80	903
33	7.95	909
34	8.44	
35	8.64	
36	8.21	
37	7.31	916
38	8.51	
39	6.36	
40	8.22	
By Dam 809		
41	8.68	
42	9.24	
43	9.60	
44	7.87	
45	7.58	
46	7.67	907
47	7.65	913
48	7.49	920
49	8.71	
50	8.00	
By Dam 810		
51	8.58	
52	9.98	
53	8.87	
54	7.89	
55	7.34	905
56	8.06	
57	8.89	
58	8.55	
59	10.46	
60	7.79	922
By Dam 812		
61	9.90	
62	8.05	
63	8.19	
64	7.88	
65	8.77	
66	9.47	
67	8.63	
68	7.51	917
69	8.93	
70	8.25	
By Dam 815		
71	8.13	
72	8.30	
73	7.39	
74	7.15	918
75	7.57	
76	7.63	
77	7.26	925
78	7.87	
79	8.93	
80	6.57	904
By Dam 818		
81	7.86	
82	8.75	
83	7.76	
84	8.34	
85	8.84	
86	9.26	
87	7.35	921
88	7.70	
89	8.85	
90	7.53	910
By Dam 821		
91	8.91	
92	7.46	
93	7.34	919
94	8.10	
95	9.88	
96	6.91	924
97	8.47	
98	7.27	915
99	7.95	
100	9.98	

TABLE 52.—NINTH GENERATION LOW PROTEIN PLOT RECORD, 1905

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
901	803	7.24		914	803	6.78	8.91
902	802	7.60	7.96	915	821	7.27	
903	807	7.80		916	807	7.31	
904	815	6.57		917	812	7.51	
905	810	7.34		918	815	7.15	
906	804	6.71	8.78	919	821	7.34	
907	809	7.67		920	809	7.49	8.38
908	803	6.13		921	818	7.35	
909	807	7.95		922	810	7.79	
910	818	7.53		923	804	7.16	
911	802	7.24		924	821	6.91	8.71
912	804	7.06	8.68	925	815	7.26	
913	809	7.65					
Average of six selected rows						7.09	8.57

TABLE 53.—PROTEIN IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1905

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 902			*By Dam 912*			*By Dam 920*		
1	7.57		41	8.75		81	6.78	1010
2	6.86	1007	42	10.80		82	8.09	
3	7.61		43	7.92		83	7.93	
4	7.88		44	9.97		84	7.47	
5	6.62	1002	45	8.60		85	9.38	
6	9.06		46	9.57		86	9.52	
7	8.02		47	9.36		87	10.01	
8	8.02		48	7.24	1006	88	9.48	
9	7.60		49	8.38		89	7.28	1003
10	7.87		50	8.20		90	7.86	
11	7.70		51	8.14		91	6.72	1022
12	9.57		52	9.14		92	7.08	1015
13	8.47		53	6.96	1018	93	8.04	
14	9.01		54	8.61		94	10.45	
15	7.39	1019	55	9.83		95	7.46	
16	6.69	1014	56	8.13	1011	96	7.52	
17	8.59		57	7.76	1023	97	10.04	
18	8.07		58	8.33		98	8.18	
19	8.36		59	8.38		99	8.71	
20	8.16		60	9.48		100	9.69	
By Dam 906			*By Dam 914*			*By Dam 924*		
21	9.69		61	9.09		101	9.80	
22	8.32		62	12.14		102	7.50	1012
23	9.05		63	7.47	1001	103	11.39	
24	9.62		64	8.12		104	7.58	1005
25	9.09		65	8.58		105	7.88	
26	9.23		66	8.15	1013	106	10.06	
27	8.53		67	9.28		107	7.90	
28	9.57		68	7.21	1008	108	9.40	
29	6.72	1004	69	8.35		109	9.32	
30	8.54		70	8.54		110	7.38	1024
31	8.30		71	11.43		111	9.20	
32	8.24	1009	72	9.46		112	7.67	1017
33	8.88		73	7.38	1020	113	9.36	
34	9.28		74	10.00		114	7.81	
35	8.18	1021	75	9.54		115	8.20	
36	9.20		76	9.13		116	7.68	
37	9.57		77	7.90		117	9.05	
38	8.11	1016	78	8.76		118	8.28	
39	7.62		79	9.20		119	9.68	
40	9.81		80	8.53		120	9.05	

TABLE 54.—TENTH GENERATION LOW PROTEIN PLOT RECORD, 1906

Register ear No.	By Dam No.	Protein, percent.		Register ear No.	By Dam No.	Protein, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
1001	914	7.47		1013	914	8.15	
1002	902	6.62		1014	902	6.69	8.25
1003	920	7.28		1015	920	7.08	
1004	906	6.72		1016	906	8.11	8.70
1005	924	7.58		1017	924	7.67	
1006	912	7.24	9.01	1018	912	6.96	8.76
1007	902	6.86		1019	902	7.39	
1008	914	7.21		1020	914	7.38	
1009	906	8.24		1021	906	8.18	
1010	920	6.78	8.43	1022	920	6.72	
1011	912	8.13		1023	912	7.76	
1012	924	7.50	8.71	1024	924	7.38	
Average of six selected rows						7.21	8.64

TABLE 55.—PROTEIN IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM LOW-PROTEIN PLOT OF 1906

Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.	Annual ear No.	Protein, percent.	Register No. assigned.
By Dam 1006			*By Dam 1012*			*By Dam 1016*		
1	10.54		41	8.12		81	7.99	
2	8.80		42	9.02		82	8.19	
3	7.52	1107	43	9.83		83	7.54	1110
4	10.38		44	8.08		84	7.67	1103
5	10.32		45	9.48		85	7.36	1122
6	7.61	1119	46	8.88		86	8.92	
7	9.46		47	7.92	1106	87	8.14	
8	9.38		48	9.48		88	9.63	
9	10.17		49	8.15		89	10.91	
10	9.23		50	8.53		90	9.78	
11	9.00		51	8.87		91	7.93	
12	8.70		52	8.05	1111	92	9.07	
13	9.25		53	8.71		93	7.65	1115
14	9.17		54	8.18		94	9.83	
15	7.94		55	7.86	1118	95	8.97	
16	8.98		56	9.60		96	8.78	
17	8.88		57	7.97	1123	97	9.06	
18	7.51	1102	58	9.35		98	9.03	
19	10.45		59	8.65		99	7.91	
20	6.94	1114	60	9.49		100	9.67	
By Dam 1010			*By Dam 1014*			*By Dam 1018*		
21	8.85		61	8.19		101	7.68	1112
22	7.64		62	7.07	1108	102	9.29	
23	9.87		63	8.54		103	8.36	
24	10.17		64	7.75		104	9.70	
25	8.43		65	8.39		105	9.21	
26	7.39		66	9.36		106	8.67	
27	9.52		67	9.26		107	9.51	
28	8.70		68	7.67		108	9.29	
29	6.73	1104	69	9.17		109	9.43	
30	8.13		70	7.47		110	8.93	
31	9.92		71	9.54		111	7.71	1105
32	9.71		72	6.49	1120	112	8.49	
33	7.02	1116	73	7.41	1101	113	8.88	
34	7.96		74	8.04		114	9.36	
35	7.36	1109	75	10.63		115	7.04	1124
36	8.18		76	7.27	1113	116	8.88	
37	8.81		77	8.14		117	9.42	
38	8.53		78	8.15		118	8.05	1117
39	7.36	1121	79	7.57		119	9.07	
40	8.32		80	8.80		120	8.15	

TABLE 56.—FIRST GENERATION HIGH OIL PLOT RECORD, 1897

Register ear No.	By Dam No.	Oil, percent.		Register ear No	By Dam No.	Oil, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
101		5.02		113		5.75	4.99
102		5.09		114		5.61	4.84
103		5.10	4.43	115		5.51	5.23
104		5.23	4.74	116		5.36	4.70
105		5.22	4.77	117		5.25	4.47
106		5.22	4.65	118		5.23	4.81
107		5.24	4.50	119		5.27	4.38
108		5.46	4.53	120		5.21	4.80
109		5.51	4.98	121		5.20	4.58
110		5.63	4.75	122		5.13	4.46
111		5.65	5.40	123		5.02	
112		6.02	4.65	124		4.99	
Average twenty rows harvested						5.39	4.73

TABLE 57.—OIL IN EIGHTY INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1897

Annual ear No.	Oil percent.	Register No. assigned.
By Dam 103		
471	4.44	
472	4.79	
473	4.42	
474	4.59	
By Dam 104		
476	4.84	
477	4.82	
478	5.39	209
479	4.40	
By Dam 105		
481	5.04	
482	4.87	
483	4.46	
484	5.07	219
By Dam 106		
486	5.03	203
487	4.20	
488	4.72	
489	4.86	
By Dam 107		
491	4.85	
492	4.38	
493	4.93	
494	4.97	224
By Dam 108		
496	4·26	
497	4.59	
498	4.76	
499	4.45	
By Dam 109		
501	5.45	211
502	4.95	
503	4.64	
504	4.77	
By Dam 110		
506	4.91	
507	4.69	
508	5.04	221
509	4.20	
By Dam 111		
511	5.44	210
512	5.45	214
513	5.49	213
514	5.39	216
By Dam 112		
516	4.63	
517	5.26	217
518	4.81	
519	4.44	
By Dam 113		
521	4.98	201
522	4.22	
523	4.91	
524	5.68	212
By Dam 114		
526	4.70	
527	5.43	215
528	5.12	206
529	4.68	
By Dam 115		
531	5.04	204
532	4.82	
533	4.98	202
534	5.27	208
By Dam 116		
536	4.97	223
537	4.50	
538	4.92	
539	4.83	
By Dam 117		
541	4.78	
542	3.60	
543	4.91	
544	5.02	220
By Dam 118		
546	5.20	207
547	5.00	222
548	4.90	
549	4.81	
By Dam 119		
551	4.31	
552	4.33	
553	4.24	
554	4.33	
By Dam 120		
556	4.93	
557	4.68	
558	4.92	
559	5.12	218
By Dam 121		
561	4.41	
562	4.62	
563	4.95	
564	4.23	
By Dam 122		
566	4.39	
567	4.20	
568	5.05	205
569	4.42	

TABLE 58.—SECOND GENERATION HIGH OIL PLOT RECORD 1898

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
201	113	4.98	4.86	213	111	5.49	5.21
202	115	4.98	4.74	214	111	5.45	5.44
203	106	5.03	4.94	215	114	5.43	5.48
204	115	5.04	5.17	216	111	5.39	5.26
205	122	5.05	5.36	217	112	5.26	5.55
206	114	5.12	4.79	218	120	5.12	5.23
207	118	5.20	4.87	219	105	5.07	5.06
208	115	5.27	5.20	220	117	5.02	4.89
209	104	5.39	5.16	221	110	5.04	5.00
210	111	5.44	5.25	222	118	5.00	5.10
211	109	5.45	5.21	223	116	4.97	5.05
212	113	5.68	5.63	224	107	4.97	5.21
Average of plot						5.20	5.15

TABLE 59.—OIL IN TWO HUNDRED SIXTEEN INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1898

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 201		
1241	5.14	
1242	5.47	
1243	4.44	
1244	4.66	
1245	4.30	
1246	4.38	
1247	4.94	
1248	4.76	
1249	4.62	
By Dam 202		
1251	4.11	
1252	5.16	
1253	4.53	
1254	4.39	
1255	4.73	
1256	4.79	
1257	4.16	
1258	4.47	
1259	5.82	312
By Dam 203		
1261	4.37	
1262	4.52	
1263	4.84	
1264	5.10	
1265	5.00	
1266	5.24	
1267	5.29	
1268	4.99	
1269	4.96	
By Dam 204		
1271	4.42	
1272	5.80	
1273	4.99	
1274	5.51	
1275	4.26	
1276	5.90	310
1277	4.80	
1278	4.87	
1279	5.02	
By Dam 205		
1281	5.21	
1282	5.87	
1283	5.23	
1284	5.44	
1285	4.50	
1286	5.21	
1287	4.85	
1288	5.18	
1289	5.26	
By Dam 206		
1291	5.29	
1292	4.43	
1293	5.57	
1294	4.54	
1295	4.57	
1296	4.52	
1297	4.52	
1298	5.04	
1299	4.39	
By Dam 207		
1301	4.58	
1302	4.37	
1303	4.93	
1304	4.21	
1305	5.59	
1306	4.83	
1307	4.84	
1308	6.09	309
1309	4.91	
By Dam 208		
1311	4.77	
1312	4.82	
1313	5.09	
1314	6.28	304
1315	5.32	
1316	4.90	
1317	5.27	
1318	4.57	
1319	5.72	
By Dam 209		
1321	5.43	
1322	4.75	
1323	5.55	
1324	5.18	
1325	5.64	
1326	4.97	
1327	5.22	
1328	4.84	
1329	4.68	
By Dam 210		
1331	5.05	
1332	4.73	
1333	5.02	
1334	5.55	
1335	4.59	
1336	5.68	
1337	5.54	
1338	6.08	303
1339	5.00	
By Dam 211		
1341	4.79	
1342	5.90	302
1343	4.68	
1344	5.33	
1345	5.70	
1346	4.80	
1347	5.09	
1348	5.08	
1349	5.31	
By Dam 212		
1351	5.94	
1352	6.71	306
1353	5.73	
1354	6.49	307
1355	5.78	
1356	5.11	
1357	5.33	
1358	4.90	
1359	5.76	
By Dam 213		
1361	4.72	
1362	5.39	
1363	5.78	
1364	4.79	
1365	5.23	
1366	5.51	
1367	5.09	
1368	5.59	
1369	5.14	
By Dam 214		
1371	5.07	
1372	5.12	
1373	5.09	
1374	5.43	
1375	5.55	
1376	5.55	
1377	5.14	
1378	5.77	
1379	5.89	311
By Dam 215		
1381	5.29	
1382	4.70	
1383	5.00	
1384	5.69	
1385	5.81	
1386	5.77	
1387	5.07	
1388	5.06	
1389	6.47	305

TABLE 59.—*Continued*

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 216			*By Dam 219*			*By Dam 222*		
1391	5.55		1421	4.87		1451	4.44	
1392	4.98		1422	5.05		1452	4.66	
1393	5.23		1423	4.54		1453	4.94	
1394	5.29		1424	4.99		1454	4.99	
1395	4.65		1425	4.97		1455	5.63	
1396	5.41		1426	4.87		1456	4.99	
1397	5.33		1427	5.54		1457	4.80	
1398	5.28		1428	5.10		1458	5.43	
1399	4.96		1429	4.61		1459	5.22	
By Dam 217			*By Dam 220*			*By Dam 223*		
1401	5.26		1431	4.88		1461	4.58	
1402	4.75		1432	4.63		1462	4.48	
1403	5.62		1433	4.47		1463	5.10	
1404	5.58		1434	4.46		1464	4.97	
1405	5.24		1435	5.10		1465	5.63	
1406	5.74		1436	4.76		1466	4.98	
1407	5.54		1437	4.90		1467	5.69	
1408	5.66		1438	4.69		1468	5.08	
1409	5.52		1439	5.23		1469	4.48	
By Dam 218			*By Dam 221*			*By Dam 224*		
1411	5.26		1441	4.75		1471	5.17	
1412	4.81		1442	5.05		1472	4.61	
1413	5.83	301	1443	4.81		1473	4.51	
1414	4.94		1444	5.28		1474	5.72	
1415	5.34		1445	4.87		1475	4.99	
1416	5.33		1446	5.07		1476	6.34	308
1417	4.85		1447	5.11		1477	5.12	
1418	4.84		1448	4.79		1478	4.91	
1419	4.59		1449	4.18		1479	5.32	

TABLE 60.—THIRD GENERATION HIGH OIL PLOT RECORD 1899

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropha-rvested.			Seed ear planted.	Cropha-rvested.
301	218	5.83	5.49	307	212	6.49	5.95
302	211	5.90	5.68	308	224	6.34	5.61
303	210	6.08	5.82	309	207	6.09	5.48
304	208	6.28	5.62	310	204	5.90	5.53
305	215	6.47	5.94	311	214	5.89	5.47
306	212	6.71	5.66	312	202	5.82	5.40
Average of plot						6.15	5.64

TABLE 61.—OIL IN ONE HUNDRED EIGHT INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1899

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned,
By Dam 301			*By Dam 305*			*By Dam 309*		
2001	5.07		2041	5.21		2081	5.07	
2002	5.28		2042	5.24		2082	5.43	
2003	5.52		2043	6.21	402	2083	5.31	
2004	5.07		2044	5.38		2084	5.67	
2005	5.50		2045	6.20	411	2085	6.22	410
2006	5.61		2046	5.63		2086	5.59	
2007	6.42	405	2047	6.34		2087	5.23	
2008	5.91		2048	5.87		2088	5.13	
2009	5.73		2049	5.65		2089	6.09	
By Dam 302			*By Dam 306*			*By Dam 310*		
2011	5.35		2051	5.84		2091	5.94	
2012	6.11		2052	5.85		2092	6.12	
2013	5.71		2053	5.76		2093	5.49	
2014	5.77		2054	5.43		2094	6.15	
2015	5.34		2055	5.77		2095	5.17	
2016	5.10		2056	5.96		2096	5.90	
2017	5.74		2057	6.18	401	2097	5.39	
2018	4.30		2 58	6.16		2098	5.48	
2019	6.01		2059	5.63		2099	5.56	
By Dam 303			*By Dam 307*			*By Dam 311*		
2021	5.65		2061	5.80		2101	4.89	
2022	6.09		2062	5.87		2102	6.33	408
2023	5.85		2063	5.50		2103	6.35	404
2024	6.27	409	2064	5.90		2104	6.10	
2025	5.54		2065	5.38		2105	5.38	
2026	6.02		2066	5.46		2106	5.69	
2027	6.43	407	2067	5.83		2107	4.74	
2028	5.70		2068	6.18	412	2108	5.24	
2029	5.37		2069	6.06		2109	6.02	
By Dam 304			*By Dam 308*			*By Dam 312*		
2031	5.31		2071	5.35		2111	4.96	
2032	5.91		2072	5.84		2112	5.86	
2033	5.26		2073	6.22	403	2113	5.40	
2034	6.54	406	2074	4.84		2114	5.11	
2035	5.84		2075	5.82		2115	4.93	
2036	5.97		2076	5.53		2116	5.61	
2037	5.06		2077	6.08		2117	5.00	
2038	5.39		2078	5.40		2118	5.28	
2039	5.56		2079	5.32		2119	6.04	

TABLE 62.—FOURTH GENERATION HIGH OIL PLOT RECORD 1900

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested			Seed ear planted.	Crop harvested.
401	306	6.18	5.93	407	303	6.43	5.92
402	305	6.21	6.29	408	311	6.33	6.29
403	308	6.22	6.04	409	303	6.27	5.92
404	311	6.35	6.16	410	309	6.22	5.91
405	301	6.42	6.17	411	305	6.20	6.27
406	304	6.54	6.30	412	307	6.18	6.24
Average of plot						6.30	6.12

TABLE 63.—OIL IN ONE HUNDRED EIGHT INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1900

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 401			*By Dam 405*			*By Dam 409*		
3201	5.63		3241	6.30		3281	5.32	
3202	5.71		3242	5.68		3282	6.34	
3203	6.61	513	3243	5.78		3283	5.66	
3204	5.31		3244	6.57		3284	6.57	
3205	6.30		3245	5.97		3285	5.81	
3206	6.77	505	3246	6.05		3286	6.31	
3207	6.18		3247	6.51		3287	5.41	
3208	5.58		3248	6.74	510	3288	6.20	
3209	5.94		3249	6.29		3289	5.44	
By Dam 402			*By Dam 406*			*By Dam 410*		
3211	6.18		3251	5.43		3291	6.67	512
3212	6.46		3252	6.14		3292	6.47	
3213	6.60		3253	6.22		3293	5.30	
3214	6.03		3254	5.43		3294	5.78	
3215	5.67		3255	6.37		3295	6.74	504
3216	6.14		3256	6.33		3296	4.60	
3217	6.23		3257	6.51		3297	6.02	
3218	6.64	502	3258	6.58	501	3298	5.60	
3219	6.38		3259	6.26		3299	6.13	
By Dam 403			*By Dam 407*			*By Dam 411*		
3221	5.72		3261	5.63		3301	5.51	
3222	6.15		3262	6.73	511	3302	6.03	
3223	5.51		3263	5.46		3303	6.58	514
3224	6.29		3264	6.91	508	3304	6.79	509
3225	6.10		3265	5.82		3305	6.31	
3226	5.70		3266	5.94		3306	5.71	
3227	6.88	506	3267	5.76		3307	5.80	
3228	5.08		3268	5.60		3308	5.98	
3229	5.94		3269	6.39		3309	5.95	
By Dam 404			*By Dam 408*			*By Dam 412*		
3231	6.29		3271	6.25		3311	5.81	
3232	6.16		3272	6.44		3312	6.29	
3233	6.26		3273	6.31		3313	6.32	
3234	5.99		3274	5.85		3314	6.73	503
3235	7.40	507	3275	6.41		3315	6.38	
3236	5.84		3276	6.24		3316	5.70	
3237	6.09		3277	6.14		3317	5.96	
3238	6.07		3278	6.14		3318	6.28	
3239	6.53		3279	6.27		3319	6.45	

TABLE 64.—FIFTH GENERATION HIGH OIL PLOT RECORD 1901

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
501	406	6.58	5.69	508	407	6.91	6.25
502	402	6.64	5.97	509	411	6.79	6.09
503	412	6.73	5.98	510	405	6.74	6.09
504	410	6.74	6.10	511	407	6.73	6.41
505	401	6.77	5.97	512	410	6.67	6.55
506	403	6.88	5.92	513	401	6.61	6.05
507	404	7.40	6.35	514	411	6.58	5.83
Average of plot						6.77	6.09

TABLE 65.—OIL IN ONE HUNDRED TWENTY SIX INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1901

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 501		
3891	6.55	
3892	6.58	
3893	5.68	
3894	4.92	
3895	5.77	
3896	6.26	
3897	6.01	
3898	6.35	
3899	5.56	
By Dam 502		
3901	5.96	
3902	5.72	
3903	6.08	
3904	6.27	
3905	6.61	
3906	6.55	
3907	6.14	
3908	6.09	
3909	6.44	
By Dam 503		
3911	6.25	
3912	6.05	
3913	5.69	
3914	5.92	
3915	6.25	
3916	6.53	
3917	5.27	
3918	6.09	
3919	7.09	606
By Dam 504		
3921	6.53	
3922	6.63	
3923	7.13	607
3924	6.52	
3925	6.16	
3926	6.49	
3927	5.66	
3928	6.31	
3929	6.50	
By Dam 505		
3931	5.59	
3932	6.53	
3933	6.55	
3934	5.68	
3935	6.64	
3936	6.75	
3937	6.48	
3938	5.92	
3939	5.81	
By Dam 506		
3941	6.56	
3942	6.02	
3943	6.62	
3944	6.62	
3945	6.20	
3946	5.97	
3947	5.43	
3948	6.43	
3949	5.95	
By Dam 507		
3951	6.67	
3952	7.03	610
3953	6.51	
3954	6.57	
3955	6.60	
3956	6.50	
3957	5.98	
3958	6.18	
3959	6.87	603
By Dam 508		
3961	6.66	
3962	5.89	
3963	7.10	608
3964	6.14	
3965	5.90	
3966	6.61	
3967	7.07	609
3968	6.08	
3969	6.00	
By Dam 509		
3971	6.64	
3972	6.19	
3973	6.14	
3974	6.55	
3975	6.81	613
3976	6.72	614
3977	7.00	611
3978	6.26	
3979	6.01	
By Dam 510		
3981	5.94	
3982	5.37	
3983	5.61	
3984	5.61	
3985	6.22	
3986	6.20	
3987	6.66	
3988	5.92	
3989	5.59	
By Dam 511		
3991	6.57	
3992	6.78	601
3993	6.17	
3994	6.51	
3995	6.74	
3996	6.68	
3997	6.07	
3998	7.05	605
3999	5.34	
By Dam 512		
4001	6.24	
4002	6.83	602
4003	6.85	612
4004	6.52	
4005	7.01	604
4006	6.61	
4007	6.36	
4008	6.43	
4009	5.92	
By Dam 513		
4011	6.01	
4012	6.62	
4013	5.12	
4014	5.61	
4015	6.24	
4016	6.08	
4017	5.90	
4018	6.35	
4019	5.74	
By Dam 514		
4021	5.88	
4022	5.89	
4023	5.78	
4024	5.84	
4025	6.46	
4026	5.83	
4027	5.87	
4028	6.46	
4029	5.74	

TABLE 66.—SIXTH GENERATION HIGH OIL PLOT RECORD 1902

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
601	511	6.78		608	508	7.10	
602	512	6.83	6.18	609	508	7.07	6.65
603	507	6.87		610	507	7.03	6.65
604	512	7.01	6.61	611	509	7.00	6.50
605	511	7.05		612	512	6.85	6.48
606	503	7.09	6.21	613	509	6.81	6.08
607	504	7.13	6.65	614	509	6.72	6.11
Average of ten selected rows						6.95	6.41

TABLE 67.—OIL IN NINETY INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1902

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 602		
4371	5.82	
4372	6.50	703
4373	6.15	
4374	7.04	710
4375	5.43	
4376	6.50	720
4377	6.04	
4378	5.76	
4379	6.44	
By Dam 604		
4381	6.94	
4382	6.41	722
4383	5.29	
4384	6.21	
4385	6.68	705
4386	5.30	
4387	6.38	
4388	5.66	
4389	6.56	704
By Dam 606		
4391	5.14	
4392	5.50	
4393	5.74	
4394	5.04	
4395	6.40	
4396	6.08	
4397	6.26	
4398	5.17	
4399	6.14	
By Dam 607		
4401	5.98	
4402	6.09	
4403	7.00	
4404	7.08	
4405	6.38	
4406	5.85	
4407	6.68	
4408	6.77	
4409	6.62	
By Dam 609		
4411	7.00	709
4412	6.87	715
4413	6.65	718
4414	6.85	707
4415	6.70	717
4416	6.31	
4417	7.00	714
4418	5.35	
4419	6.36	
By Dam 610		
4421	7.02	713
4422	6.50	702
4423	6.94	708
4424	6.67	
4425	6.61	
4426	6.11	
4427	6.69	
4428	6.13	
4429	6.27	
By Dam 611		
4431	6.50	721
4432	6.77	
4433	6.67	
4434	6.17	
4435	6.22	
4436	7.17	712
4437	6.92	
4438	6.13	
4439	6.45	
By Dam 612		
4441	7.37	711
4442	5.82	
4443	6.40	
4444	6.27	
4445	6.28	
4446	5.11	
4447	5.67	
4448	6.78	716
4449	6.36	
By Dam 613		
4451	6.34	
4452	5.95	
4453	5.86	
4454	5.86	
4455	6.06	
4456	6.43	701
4457	6.10	
4458	6.21	
4459	5.83	
By Dam 614		
4461	5.59	
4462	6.74	706
4463	6.00	
4464	6.28	
4465	5.92	
4466	6.56	719
4467	5.98	
4468	5.67	
4469	6.00	

TABLE 68.—SEVENTH GENERATION HIGH OIL PLOT RECORD 1903

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
701	613	6.43	6.25	712	611	7.17	
702	610	6.50	6.54	713	610	7.02	7.04
703	602	6.50		714	609	7.00	
704	604	6.56		715	609	6.87	6.39
705	604	6.68		716	612	6.78	
706	614	6.74		717	609	6.70	6.61
707	609	6.85		718	609	6.65	6.24
708	610	6.94		719	614	6.56	6.35
709	609	7.00	6.68	720	602	6.50	
710	602	7.04	6.62	721	611	6.50	6.25
711	612	7.37		722	604	6.41	
Average of ten selected rows						6.73	6.50

TABLE 69.—OIL IN ONE HUNDRED INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1903

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 701		
1	6.20	
2	6.35	
3	6.23	
4	6.44	
5	6.09	
6	6.04	
7	5 75	
8	6.35	
9	6.73	
10	6.84	
By Dam 702		
11	5.88	
12	6.20	
13	5.70	
14	6.39	
15	7.08	816
16	6.37	
17	6.13	
18	6.49	
19	6.59	
20	5.92	
By Dam 709		
21	6.68	
22	6.34	
23	7.33	810
24	6.68	
25	7.56	812
26	6.37	
27	6.47	
28	6.78	
29	6.69	
30	7.29	814
By Dam 710		
31	6.81	
32	6.97	804
33	6.19	
34	6.99	818
35	6.72	
36	6.50	
37	6.60	
38	6.95	820
39	7.10	807
40	663.	
By Dam 713		
41	7.41	813
42	6.98	819
43	7.71	811
44	6.56	
45	7.31	809
46	6.61	
47	7.16	815
48	7.06	806
49	6.46	
50	6.94	803
By Dam 715		
51	6.90	821
52	6.33	
53	7.05	817
54	7.27	808
55	5.74	
56	6.51	
57	5.69	
58	6.12	
59	6.77	
60	6.78	
By Dam 717		
61	6.60	
62	6.90	802
63	6.70	
64	5.80	
65	6.35	
66	6.76	
67	6.09	
68	5.96	
69	6.44	
70	5.52	
By Dam 718		
71	6.28	
72	5.73	
73	6.25	
74	6.23	
75	6.82	801
76	6.51	
77	6.09	
78	6.82	
79	7.02	805
80	5.63	
By Dam 719		
81	6.53	
82	5.90	
83	6.65	
84	6.43	
85	5.83	
86	6.26	
87	6.33	
88	6.16	
89	6.62	
90	6.41	
By Dam 721		
91	6.37	
92	6.70	
93	6.94	
94	6.66	
95	5.65	
96	5.84	
97	5.96	
98	6.64	
99	6.81	822
100	6.73	

TABLE 70.—EIGHTH GENERATION HIGH OIL PLOT RECORD 1904

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
801	718	6.82		812	709	7.56	7.02
802	717	6.90	6.82	813	713	7.41	7.13
803	713	6.94		814	709	7.29	7.16
804	710	6.97	6.81	815	713	7.16	
805	718	7.02		816	702	7.08	7.06
806	713	7.06		817	715	7.05	
807	710	7.10		818	710	6.99	7.17
808	715	7.27	6.69	819	713	6.98	
809	713	7.31		820	710	6.95	
810	709	7.33	7.32	821	715	6.90	
811	713	7.71		822	721	6.81	6.47
Average of ten selected rows						7.16	6.97

TABLE 71.—OIL IN ONE HUNDRED ONE INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1904

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 802		
1	7.73	912
2	6.62	
3	7.36	
4	7.55	901
5	7.39	
6	7.10	
7	7.33	
8	7.22	
9	6.87	
10	4.88	
By Dam 804		
11	7.00	
12	7.36	
13	7.02	
14	7.43	
15	6.29	
16	6.29	
17	7.57	913
18	7.99	920
19	6.74	
20	7.44	
By Dam 808		
21	7.09	
22	7.95	904
23	6.94	
24	7.03	
25	7.32	
26	7.37	911
27	6.95	
28	6.54	
29	6.81	
30	7.32	
By Dam 810		
31	7.53	
32	7.31	
33	6.88	
34	7.72	909
35	7.63	914
36	6.86	
37	7.43	
38	7.41	
39	6.88	
40	7.62	925
By Dam 812		
41	6.68	
42	6.27	
43	8.09	917
44	7.69	922
45	7.58	907
46	6.31	
47	6.25	
48	6.87	
49	7.20	
50	7.23	
By Dam 813		
51	6.75	
52	6.78	
53	6.89	
54	7.50	919
55	7.17	
56	7.70	906
57	6.84	
58	7.49	924
59	7.43	
60	6.87	
By Dam 814		
61	7.05	
62	6.81	
63	7.92	921
64	8.14	916
65	7.82	
66	6.47	
67	6.82	
68	6.60	
69	6.38	
70	7.94	903
By Dam 816		
71	8.44	908
72	6.82	
73	8.03	915
74	7.24	
75	6.94	
76	7.68	
77	8.30	918
78	7.54	
79	7.52	
80	7.14	
By Dam 818		
81	7.39	
82	7.41	910
83	6.54	
84	7.28	923
85	7.03	
86	7.68	
87	7.10	
88	7.22	
89	7.24	
90	7.26	
By Dam 822		
91	6.02	
92	6.51	
93	6.18	
94	6.62	
95	6.60	
96	6.37	
97	6.35	
98	5.97	
99	6.21	
100	7.13	905
101	7.56	902

TABLE 72.—NINTH GENERATION HIGH OIL PLOT RECORD 1905

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
901	802	7.55		914	810	7.63	
902	822	7.56	6.98	915	816	8.03	
903	814	7.94		916	814	8.14	7.11
904	808	7.95	7.55	917	812	8.09	
905	822	7.13		918	816	8.30	7.68
906	813	7.70		919	813	7.50	
907	812	7.58		920	804	7.99	7.12
908	816	8.44		921	814	7.92	
909	810	7.72		922	812	7.69	
910	818	7.41	7.30	923	818	7.28	
911	808	7.37		924	813	7.49	
912	802	7.73		925	810	7.62	
913	804	7.57					
Average of six selected rows						7.88	7.29

TABLE 73.—OIL IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1905

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 902			*By Dam 910*			*By Dam 918*		
1	6.67		41	7.28		81	7.78	
2	6.40		42	7.36		82	7.02	
3	8.38	1002	43	6.27		83	8.57	1010
4	6.32		44	6.59		84	7.73	
5	7.24		45	6.28		85	7.74	
6	6.43		46	7.02		86	7.41	
7	6.71		47	7.44		87	7.46	
8	7.12		48	6.63		88	7.12	
9	6.73		49	7.84	1011	89	7.49	
10	6.68		50	7.86	1006	90	8.59	1022
11	6.84		51	7.18		91	7.51	
12	7.57	1014	52	7.83	1023	92	7.50	
13	6.55		53	7.68		93	7.81	
14	6.76		54	7.18		94	7.57	
15	7.56	1007	55	7.77		95	7.87	
16	6.84		56	7.69		96	7.79	
17	6.79		57	7.10		97	7.89	1003
18	7.21		58	6.87		98	8.00	1015
19	7.46	1019	59	8.24		99	7.39	
20	7.30		60	7.87	1018	100	7.30	
By Dam 904			*By Dam 916*			*By Dam 920*		
21	7.35		61	7.18		101	7.15	
22	6.58		62	7.65	1008	102	6.69	
23	7.90		63	6.88		103	6.93	
24	7.20		64	6.39		104	7.20	
25	7.32		65	7.65	1001	105	7.35	1017
26	7.33		66	8.00		106	7.02	
27	8.33	1004	67	7.02		107	6.38	
28	7.65		68	6.70		108	7.91	
29	7.53		69	6.27		109	8.17	1012
30	6.76		70	6.58		110	7.38	1005
31	8.02		71	7.31		111	6.95	
32	8.25	1009	72	7.44		112	6.53	
33	6.79		73	6.67		113	7.76	1024
34	8.33	1021	74	7.15		114	7.20	
35	6.66		75	7.38		115	6.97	
36	7.58		76	7.04		116	7.06	
37	7.71		77	7.76	1020	117	6.95	
38	7.98		78	6.82		118	7.14	
39	7.26		79	6.74		119	6.76	
40	8.50	1016	80	7.53	1013	120	6.87	

TABLE 74.—TENTH GENERATION HIGH OIL PLOT RECORD 1906

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
1001	916	7.65		1013	916	7.53	
1002	902	8.38		1014	902	7.57	7.50
1003	918	7.89		1015	918	8.00	
1004	904	8.33		1016	904	8.50	
1005	920	7.38		1017	920	7.34	
1006	910	7.86		1018	910	7.87	6.96
1007	902	7.56		1019	902	7.46	
1008	916	7.65	743	1020	916	7.76	7.23
1009	904	8.25		1021	904	8.33	
1010	918	8.57	749	1022	918	8.59	
1011	910	7.84		1023	910	7.83	
1012	920	8.17		1024	920	7.76	7.60
Average of six selected rows						7.86	7.37

TABLE 75.—OIL IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM HIGH-OIL PLOT OF 1906

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 1008			*By Dam 1014*			*By Dam 1020*		
1	7.70		41	6.98		81	6.77	
2	7.29		42	7.89	1111	82	7.62	1103
3	7.44		43	7.47		83	7.30	
4	7.31		44	8.02	1123	84	6.89	
5	7.37		45	7.85		85	7.45	
6	7.01		46	7.72		86	7.14	
7	6.94		47	8.23	1106	87	7.10	
8	7.72	1107	48	7.58		88	7.90	1110
9	7.55		49	7.45		89	7.33	
10	7.02		50	6.88		90	7.26	
11	7.81	1119	51	7.63		91	6.62	
12	7.69		52	7.66		92	7.49	
13	7.42		53	7.64		93	6.56	
14	7.42		54	6.93		94	7.86	1122
15	6.87		55	6.67		95	7.48	
16	7.47		56	7.62		96	6.90	
17	7.82	1102	57	6.87		97	7.42	
18	7.30		58	7.47		98	7.41	
19	7.58		59	7.09		99	6.57	
20	7.87	1114	60	8.39	1118	100	7.53	1115
By Dam 1010			*By Dam 1018*			*By Dam 1024*		
21	7.14		61	7.16	1101	101	7.97	1105
22	7.47		62	6.59		102	7.52	
23	7.08		63	7.11	1113	103	7.39	
24	7.73		64	6.71		104	7.59	
25	7.92	1109	65	7.43		105	7.33	
26	7.04		66	6.73		106	7.67	
27	7.84		67	6.86		107	7.13	
28	6.99		68	7.61	1108	108	7.05	
29	7.44		69	7.05		109	8.01	1112
30	7.47		70	6.96		110	7.61	
31	6.92		71	8.33	1120	111	7.46	
32	7.05		72	6.57		112	7.22	
33	7.94	1121	73	7.02		113	7.76	
34	7.31		74	6.11		114	8.46	1124
35	7.28		75	6.88		115	7.60	
36	7.75		76	6.66		116	7.56	
37	8.51	1104	77	6.95		117	7.87	1117
38	8.05	1116	78	6.68		118	7.82	
39	7.61		79	6.88		119	7.87	
40	7.34		80	6.94		120	7.61	

TABLE 76.—FIRST GENERATION LOW OIL PLOT RECORD 1897

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crophar-vested.			Seed ear planted.	Crophar-vested.
101		4.08		107		3.94	4.01
102		4.09	3.96	108		4.01	4.06
103		4.03	4.21	109		4.12	3.97
104		4.07	4.31	110		4.10	4.05
105		3.95	4.05	111		4.12	4.22
106		3.84	3.79	112		4.14	
Average of ten rows harvested						4.03	4.06

TABLE 77.—OIL IN FORTY INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1897

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 102		
571	4.00	
572	3.96	
573	3.89	
574	3.83	202
By Dam 103		
576	4.21	
577	4.28	
578	4.18	
579	4.41	
By Dam 104		
581	4.74	
582	4.69	
583	4.65	
584	4.07	
By Dam 105		
586	4.21	
587	4.74	
588	3.70	209
589	3.85	201
By Dam 106		
591	3.85	212
592	3.72	203
593	3.38	207
594	3.39	205
By Dam 107		
596	4.21	
597	4.22	
598	4.42	
599	4.04	
By Dam 108		
601	4.68	
602	3.55	204
603	3.80	210
604	4.42	
By Dam 109		
606	3.50	208
607	4.40	
608	3.90	
609	3.90	
By Dam 110		
611	3.84	211
612	4.08	
613	4.39	
614	3.39	206
By Dam 111		
616	4.08	
617	4.19	
618	4.43	
619	4.68	

TABLE 78.—SECOND GENERATION LOW OIL PLOT RECORD 1898

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop har-vested.			Seed ear planted.	Crop har-vested.
201	105	3.85	3.97	207	106	3.38	3.69
202	102	3.83	4.32	208	109	3.50	3.78
203	106	3.72	4.08	209	105	3.70	3.93
204	108	3.55	3.99	210	108	3.80	4.18
205	106	3.39	3.81	211	110	3.84	4.21
206	110	3.39	3.81	212	106	3.85	4.11
Average of plot						3.65	3.99

TABLE 79.—OIL IN ONE HUNDRED EIGHT INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1898

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 201			*By Dam 205*			*By Dam 209*		
1481	4.11		1521	3.64	301	1561	3.68	
1482	3.88		1522	3.27	309	1562	3.73	
1483	3.91		1523	4.10		1563	4.24	
1484	4.02		1524	3.72		1564	3.58	303
1485	4.29		1525	3.89		1565	3.92	
1486	3.39	312	1526	4.02		1566	3.72	
1487	3.76		1527	4.07		1567	4.00	
1488	4.02		1528	3.90		1568	3.67	
1489	4.02		1529	3.22	308	1569	4.25	
By Dam 202			*By Dam 206*			*By Dam 210*		
1491	4.27		1531	3.33	310	1571	4.01	
1492	4.60		1532	3.67		1572	4.09	
1493	3.81		1533	3.86		1573	4.11	
1494	4.12		1534	3.67		1574	4.26	
1495	4.19		1535	4.34		1575	4.45	
1496	4.27		1536	3.85		1576	4.19	
1497	4.37		1537	3.50		1577	4.29	
1498	4.52		1538	3.56	304	1578	3.80	
1499	3.82		1539	3.34	306	1579	3.80	
By Dam 203			*By Dam 207*			*By Dam 211*		
1501	4.55		1541	3.83		1581	4.35	
1502	4.02		1542	4.11		1582	3.82	
1503	4.25		1543	3.59	314	1583	4.22	
1504	3.38	305	1544	3.66		1584	4.50	
1505	3.77		1545	3.35	311	1585	4.61	
1506	4.35		1546	3.63		1586	4.06	
1507	4.17		1547	3.64		1587	3.75	
1508	4.08		1548	3.65	316	1588	4.39	
1509	3.95		1549	3.72		1589	4.45	
By Dam 204			*By Dam 208*			*By Dam 212*		
1511	3.98		1551	3.89		1591	3.95	
1512	3.64	315	1552	3.87		1592	4.34	
1513	4.20		1553	3.86		1593	4.17	
1514	4.01		1554	3.79		1594	4.77	
1515	4.10		1555	3.93		1595	4.17	
1516	3.32	307	1556	3.64		1596	3.99	
1517	3.65		1557	3.56	313	1597	3.85	
1518	4.26		1558	3.80		1598	4.40	
1519	4.03		1559	3.63	302	1599	3.98	

TABLE 80.—THIRD GENERATION LOW OIL PLOT RECORD 1899

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
301	205	3.64	3.85	309	205	3.27	3.73
302	208	3.63	3.92	310	206	3.33	3.71
303	209	3.58	3.81	311	207	3.35	3.76
304	206	3.56	3.88	312	201	3.39	3.76
305	203	3.38	4.01	313	208	3.56	3.86
306	206	3.34	3.81	314	207	3.59	3.74
307	204	3.32	3.59	315	204	3.64	3.94
308	205	3.22	3.91	316	207	3.65	3.84
Average of plot						3.47	3.82

TABLE 81.—OIL IN ONE HUNDRED FORTY-FOUR INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1899

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 301		
2121	3.89	
2122	3.45	404
2123	3.82	
2124	3.91	
2125	4.09	
2126	3.93	
2127	3.56	
2128	4.12	
2129	3.68	
By Dam 302		
2131	3.79	
2132	4.17	
2133	3.62	
2134	3.82	
2135	4.24	
2136	3.54	401
2137	3.74	
2138	4.12	
2139	4.20	
By Dam 303		
2141	3.53	402
2142	4.50	
2143	4.21	
2144	3.87	
2145	4.10	
2146	3.55	
2147	3.89	
2148	3.94	
2149	3.65	
By Dam 304		
2151	3.62	
2152	3.96	
2153	3.83	
2154	3.62	
2155	4.57	
2156	3.82	
2157	3.76	
2158	3.89	
2159	4.19	
By Dam 305		
2161	3.68	
2162	4.04	
2163	3.66	
2164	4.38	
2165	4.16	
2166	4.08	
2167	4.72	
2168	4.35	
2169	3.86	
By Dam 306		
2171	3.55	
2172	3.57	
2173	3.46	414
2174	3.76	
2175	3.91	
2176	3.60	
2177	3.90	
2178	4.16	
2179	3.79	
By Dam 307		
2181	2.94	409
2182	3.53	
2183	3.14	410
2184	3.22	
2185	3.58	
2186	3.69	
2187	3.71	
2188	3.60	
2189	3.51	
By Dam 308		
2191	4.38	
2192	3.93	
2193	4.18	
2194	4.13	
2195	3.87	
2196	4.38	
2197	4.21	
2198	3.92	
2199	3.46	403
By Dam 309		
2201	3.73	
2202	4.00	
2203	3.52	416
2204	3.69	
2205	3.57	
2206	3.69	
2207	3.95	
2208	3.81	
2209	3.84	
By Dam 310		
2211	3.68	
2212	4.26	
2213	4.45	
2214	3.08	407
2215	3.58	
2216	3.33	
2217	3.60	
2218	3.93	
2219	3.32	411
By Dam 311		
2221	3.31	406
2222	4.00	
2223	3.82	
2224	4.36	
2225	3.73	
2226	3.98	
2227	3.75	
2228	4.41	
2229	3.92	
By Dam 312		
2231	4.03	
2232	3.65	
2233	4.29	
2234	3.55	
2235	3.41	412
2236	4.03	
2237	3.72	
2238	4.10	
2239	3.42	405
By Dam 313		
2241	4.21	
2242	3.63	
2243	3.47	413
2244	3.81	
2245	3.99	
2246	4.32	
2247	3.95	
2248	3.98	
2249	3.96	
By Dam 314		
2251	3.90	
2252	3.71	
2253	3.56	
2254	3.68	
2255	2.81	408
2256	4.13	
2257	3.84	
2258	4.48	
2259	3.60	
By Dam 315		
2261	4.11	
2262	4.25	
2263	3.93	
2264	3.67	
2265	3.60	
2266	3.49	415
2267	4.28	
2268	3.84	
2269	3.76	
By Dam 316		
2271	4.13	
2272	3.72	
2273	3.71	
2274	4.22	
2275	3.97	
2276	3.78	
2277	4.14	
2278	3.92	
2279	3.59	

TABLE 82.—FOURTH GENERATION LOW OIL PLOT RECORD 1900

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
401	302	3.54	3.61	409	307	2.94	3.36
402	303	3.53	3.67	410	307	3.14	3.40
403	308	3.46	3.55	411	310	3.32	3.61
404	301	3.45	3.52	412	312	3.41	3.65
405	312	3.42	3.99	413	313	3.47	3.68
406	311	3.31	3.43	414	306	3.46	3.71
407	310	3.08	3.33	415	315	3.49	3.71
408	314	2.81	3.39	416	309	3.52	3.43
Average of plot						3.33	3.57

TABLE 83.—OIL IN ONE HUNDRED FORTY-FOUR INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1900

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 401		
3321	4.35	
3322	3.55	
3323	4.05	
3324	3.16	501
3325	3.32	
3326	3.42	
3327	3.69	
3328	4.43	
3329	3.68	
By Dam 402		
3331	3.49	
3332	3.70	
3333	3.44	
3334	3.61	
3335	3.64	
3336	3.26	
3337	4.08	
3338	4.30	
3339	3.23	
By Dam 403		
3341	3.26	
3342	3.74	
3343	3.26	
3344	3.37	
3345	3.94	
3346	3.82	
3347	3.46	
3348	3.44	
3349	3.45	
By Dam 404		
3351	3.31	
3352	3.90	
3353	3.27	
3354	3.35	
3355	3.09	513
3356	3.54	
3357	3.25	
3358	3.43	
3359	3.86	
By Dam 405		
3361	4.52	
3362	3.96	
3363	4.06	
3364	4.05	
3365	4.07	
3366	4.02	
3367	3.62	
3368	4.01	
3369	4.45	
By Dam 406		
3371	3.35	
3372	3.42	
3373	3.03	512
3374	3.35	
3375	3.54	
3376	3.03	502
3377	3.32	
3378	3.65	
3379	3.55	
By Dam 407		
3381	3.76	
3382	3.34	
3383	3.66	
3384	3.27	
3385	3.55	
3386	3.23	
3387	3.31	
3388	3.28	
3389	2.97	504
By Dam 408		
3391	2.94	510
3392	3.49	
3393	3.43	
3394	3.37	
3395	2.56	507
3396	3.20	
3397	3.66	
3398	4.03	
3399	3.41	
By Dam 409		
3401	3.68	
3402	3.81	
3403	2.65	508
3404	3.49	
3405	3.54	
3406	3.50	
3407	3.37	
3408	2.65	506
3409	3.51	
By Dam 410		
3411	4.19	
3412	2.89	505
3413	3.75	
3414	3.47	
3415	3.20	
3416	3.47	
3417	3.02	503
3418	3.44	
3419	3.59	
By Dam 411		
3421	3.50	
3422	3.59	
3423	3.56	
3424	3.24	
3425	3.86	
3426	3.59	
3427	3.90	
3428	3.46	
3429	3.63	
By Dam 412		
3431	3.55	
3432	3.89	
3433	3.38	
3434	3.77	
3435	3.24	
3336	3.36	
3437	3.71	
3438	3.82	
3439	3.75	
By Dam 413		
3441	3.30	
3442	3.73	
3443	3.93	
3444	3.83	
3445	4.01	
3446	3.95	
3447	3.68	
3448	4.04	
5449	3.22	514
By Dam 414		
3451	3.56	
3452	3.58	
3453	3.50	
3454	3.89	
3455	3.94	
3456	3.32	
3457	4.31	
3458	4.17	
3459	3.78	
By Dam 415		
3461	3.71	
3462	3.36	
3463	3.68	
3464	4.05	
3465	3.39	
3466	4.14	
3467	3.81	
3468	3.31	
3469	3.55	

TABLE 83.—*Continued.*

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 416		
3471	3.39	
3472	3.28	
3473	3.84	
3474	2.87	509
3475	3.78	
3476	2.97	511
3477	3.38	
3478	4.05	
3479	3.71	

TABLE 84.—FIFTH GENERATION LOW OIL PLOT RECORD 1901

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
501	401	3.16	3.48	508	409	2.65	3.37
502	406	3.03	3.41	509	416	2.87	3.64
503	410	3.02	3.54	510	408	2.94	3.44
504	407	2.97	3.32	511	416	2.97	3.35
505	410	2.89	3.47	512	406	3.03	3.42
506	409	2.65	3.31	513	404	3.09	3.44
507	408	2.56	3.32	514	413	3.22	3.48
Average of plot						2.93	3.43

TABLE 85.—OIL IN ONE HUNDRED TWENTY-SIX INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1901

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 501		
4031	3.31	
4032	3.96	
4033	3.19	
4034	3.32	
4035	3.53	
4036	3.31	
4037	3.90	
4038	3.35	
4039	3.34	
By Dam 502		
4041	3.57	
4042	3.42	
4043	3.26	
4044	3.09	613
4045	3.29	
4046	3.81	
4047	3.65	
4048	3.16	614
4049	3.77	
By Dam 503		
4051	3.06	603
4052	3.93	
4053	3.60	
4054	3.69	
4055	3.42	
4056	3.52	
4057	3.53	
4058	3.57	
4059	3.32	
By Dam 504		
4061	2.96	605
4062	3.66	
4063	2.97	610
4064	3.62	
4065	3.34	
4066	3.36	
4067	3.22	
4068	3.78	
4069	3.47	

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 505		
4071	3.60	
4072	3.75	
4073	3.57	
4074	3.77	
4075	3.37	
4076	3.36	
4077	3.72	
4078	3.45	
4079	3.56	
By Dam 506		
4081	3.18	
4082	3.75	
4083	3.50	
4084	3.52	
4085	3.29	
4086	2.78	607
4087	3.17	
4088	3.56	
4089	3.80	
By Dam 507		
4091	3.21	
4092	3.08	602
4093	3.88	
4094	3.70	
4095	3.24	
4096	3.35	
4097	3.22	
4098	3.07	612
4099	3.26	
By Dam 508		
4101	2.95	609
4102	3.33	
4103	3.82	
4104	3.40	
4105	3.35	
4106	3.47	
4107	3.47	
4108	3.18	
4109	3.20	
By Dam 509		
4111	3.73	
4112	3.17	
4113	3.38	
4114	3.61	
4115	3.49	
4116	3.77	
4117	3.63	
4118	3.10	601
4119	3.64	

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 510		
4121	3.60	
4122	3.25	
4123	3.29	
4124	3.41	
4125	3.42	
4126	3.42	
4127	3.65	
4128	3.58	
4129	3.54	
By Dam 511		
4131	3.47	
4132	3.00	604
4133	3.45	
4134	3.11	
4135	3.23	
4136	3.38	
4137	3.44	
4138	3.40	
4139	3.66	
By Dam 512		
4141	3.32	
4142	2.93	606
4143	3.44	
4144	3.68	
4145	3.03	611
4146	3.62	
4147	3.83	
4148	3.62	
4149	3.39	
By Dam 513		
4151	3.56	
4152	4.17	
4153	3.78	
4154	3.28	
4155	3.53	
4156	3.37	
4157	3.65	
4158	3.66	
4159	2.97	
By Dam 514		
4161	3.40	
4162	3.73	
4163	4.09	
4164	3.64	
4165	3.69	
4166	2.87	608
4167	3.38	
4168	3.87	
4169	3.55	

TABLE 86.—SIXTH GENERATION LOW OIL PLOT RECORD 1902

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Crop harvested.			Seed ear planted.	Crop harvested.
601	509	3.10		608	514	2.87	
602	507	3.08	3.16	609	508	2.95	3.03
603	503	3.06	3.18	610	504	2.97	
604	511	3.00	2.92	611	512	3.03	2.84
605	504	2.96	2.86	612	507	3.07	3.01
606	512	2.93	3.02	613	502	3.09	
607	506	2.78	2.80	614	502	3.16	3.32
Average of ten selected rows						3.00	3.02

TABLE 87.—OIL IN NINETY INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1902

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 602		
4471	3.32	
4472	2.80	
4473	3.55	
4474	2.67	718
4475	3.37	
4476	3.41	
4477	3.08	
4478	3.04	
4479	3.28	
By Dam 603		
4481	2.94	
4482	2.86	
4483	3.16	
4484	3.05	
4485	3.66	
4486	2.65	707
4487	3.39	
4488	3.51	
4489	3.03	
By Dam 604		
4491	2.60	708
4492	2.93	
4493	3.19	
4494	2.78	
4495	2.59	714
4496	2.67	704
4497	3.33	
4498	2.87	
4499	2.72	703
By Dam 605		
4501	2.83	
4502	2.66	717
4503	3.21	
4504	3.03	
4505	2.75	721
4506	2.78	701
4507	2.81	
4508	2.83	
4509	2.52	713
By Dam 606		
4511	3.06	
4512	2.44	710
4513	3.36	
4514	2.98	
4515	2.79	722
4516	3.16	
4517	3.07	
4518	2.83	
4519	3.23	
By Dam 607		
4521	2.12	711
4522	3.06	
4523	2.93	
4524	2.90	
4525	3.06	
4526	3.54	
4527	2.63	715
4528	2.70	719
4529	2.87	
By Dam 609		
4531	3.12	
4532	2.92	
4533	2.83	
4534	2.80	
4535	2.73	720
4536	3.16	
4537	2.41	712
4538	2.74	
4539	3.65	
By Dam 611		
4541	3.17	
4542	2.85	
4543	3.21	
4544	2.87	
4545	2.83	
4546	2.79	
4547	2.80	
4548	2.54	709
4549	2.87	
By Dam 612		
4551	3.53	
4552	3.01	
4553	2.65	716
4554	2.66	705
4555	2.65	706
4556	2.83	
4557	3.44	
4558	3.12	
4559	3.28	
By Dam 614		
4561	3.80	
4562	3.56	
4563	3.76	
4564	3.20	
4565	3.29	
4566	3.03	
4567	3.52	
4568	2.74	702
4569	3.07	

TABLE 88.—SEVENTH GENERATION LOW OIL PLOT RECORD 1903

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
701	605	2.78		712	609	2.41	2.82
702	614	2.74		713	605	2.52	3.01
703	604	2.72		714	604	2.59	*
704	604	2.67		715	607	2.63	
705	612	2.66		716	612	2.65	3.24
706	612	2.65		717	605	2.66	
707	603	2.65		718	602	2.67	2.81
708	604	2.60	3.04	719	607	2.70	3.01
709	611	2.54	2.82	720	609	2.73	2.93
710	606	2.44		721	605	2.75	
711	607	2.12		722	606	2.79	3.02
Average of nine rows						2.62	2.97

*Sample destroyed

TABLE 89.—OIL IN NINETY INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1903

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 708		
1	3.26	
2	3.12	
3	2.92	816
4	3.04	
5	2.96	
6	2.83	
7	2.95	
8	3.04	
9	3.22	
10	2.62	
By Dam 709		
11	2.78	
12	2.93	
13	3.38	
14	3.10	
15	2.93	
16	2.73	
17	3.13	
18	2.81	
19	2.68	
20	2.89	
By Dam 712		
21	2.71	
22	2.94	
23	2.74	
24	2.85	
25	2.81	
26	2.87	
27	2.93	
28	2.84	
29	3.28	
30	3.03	
By Dam 713		
31	3.19	801
32	2.86	
33	2.82	807
34	3.31	
35	3.20	
36	3.26	
37	3.21	
38	3.12	
39	3.01	
40	3.03	820
By Dam 714		
41	(Samples spoiled)	
42	(No analyses) made	
43		
44		
45		
46		
47		
48		
49		
50		
By Dam 716		
51	2.98	
52	2.83	
53	2.66	
54	3.39	
55	3.31	
56	2.88	
57	2.78	814
58	3.18	817
59	3.28	
60	2.75	
By Dam 718		
61	2.62	
62	2.96	
63	3.17	
64	3.21	
65	2.91	
66	2.94	
67	3.00	
68	2.92	806
69	2.99	
70	2.86	
By Dam 719		
71	3.14	821
72	3.18	
73	2.66	812
74	2.51	
75	2.77	808
76	3.26	
77	3.47	
78	3.31	
79	3.56	
80	3.01	803
By Dam 720		
81	3.19	822
82	3.33	
83	2.99	805
84	2.91	
85	2.96	818
86	2.85	
87	3.02	802
88	2.71	810
89	2.71	
90	3.32	
By Dam 722		
91	3.02	804
92	3.37	
93	3.38	
94	3.06	
95	2.72	813
96	2.81	819
97	2.33	811
98	2.92	815
99	2.72	809
100	2.97	

TABLE 90.—EIGHTH GENERATION LOW OIL PLOT RECORD 1904

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropha-r- vested.			Seed ear planted.	Cropha-r- vested.
801	713	3.19		812	719	2.66	2.82
802	720	3.02		813	722	2.72	
803	719	3.01		814	716	2.78	3.05
804	722	3.02	3.08	815	722	2.92	2.88
805	720	2.99		816	708	2.92	2.84
806	718	2.92	2.84	817	716	3.18	
807	713	2.82	2.88	818	720	2.96	2.99
808	719	2.77		819	722	2.81	
809	722	2.72		820	713	3.03	
810	720	2.71	2.93	821	719	3.14	
811	722	2.33	2.60	822	720	3.19	
Average of ten selected rows						2.80	2.89

TABLE 91.—OIL IN ONE HUNDRED INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1904

Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 804		
1	3.10	
2	3.05	
3	3.43	
4	3.15	
5	3.30	
6	3.26	
7	2.70	906
8	2.96	
9	3.31	
10	2.83	911
By Dam 806		
11	2.98	
12	2.82	
13	2.93	
14	2.83	901
15	2.84	908
16	2.79	
17	2.84	
18	2.83	
19	3.03	
20	2.69	915
By Dam 807		
21	2.83	
22	2.83	
23	2.94	
24	3.02	
25	2.67	904
26	2.75	910
27	2.83	
28	3.03	
29	3.24	
30	2.53	919
By Dam 810		
31	3.09	
32	2.57	
33	2.69	912
34	3.18	
35	2.97	
36	2.66	921
37	2.94	
38	2.76	
39	2.90	
40	2.90	
By Dam 811		
41	2.37	
42	2.78	
43	2.40	902
44	2.79	
45	2.74	
46	2.66	
47	2.67	
48	2.52	914
49	2.53	
50	2.34	917
By Dam 812		
51	2.93	
52	2.91	
53	2.86	907
54	2.96	
55	2.74	918
56	3.10	
57	2.85	
58	2.93	
59	2.74	925
60	3.02	
By Dam 814		
61	3.23	
62	3.07	
63	2.67	909
64	3.14	
65	3.41	
66	3.27	
67	2.68	
68	3.47	
69	2.86	
70	3.12	
By Dam 815		
71	3.29	
72	2.65	924
73	2.47	920
74	2.87	
75	2.78	
76	3.28	
77	3.14	
78	3.33	
79	2.69	913
80	2.99	
By Dam 816		
81	3.15	
82	2.95	
83	2.95	
84	2.63	905
85	3.07	
86	3.44	
87	3.07	
88	2.74	922
89	2.96	
90	2.84	
By Dam 818		
91	2.69	903
92	2.98	
93	3.10	
94	3.17	
95	2.49	916
96	2.65	923
97	3.09	
98	3.00	
99	2.80	
100	3.15	

TABLE 92.—NINTH GENERATION LOW OIL PLOT RECORD, 1905

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
901	806	2.83		914	811	2.53	2.52
902	811	2.40		915	806	2.69	
903	818	2.69		916	818	2.49	
904	807	2.67		917	811	2.34	
905	816	2.63		918	812	2.74	2.69
906	804	2.70	2.60	919	807	2.53	
907	812	2.86		920	815	2.47	2.57
908	806	2.84	2.64	921	810	2.66	
909	814	2.67		922	816	2.74	
910	807	2.75	2.48	923	818	2.65	
911	804	2.83		924	815	2.65	
912	810	2.69		925	812	2.74	
913	815	2.69					
Average of six selected rows						2.67	2.58

TABLE 93.—OIL IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1905

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 906			*By Dam 910*			*By Dam 918*		
1	2.51		41	2.30	1011	81	2.84	
2	2.93		42	3.04		82	3.02	
3	2.35	1002	43	2.33		83	2.53	
4	2.25		44	2.62		84	2.57	
5	2.78		45	2.41		85	3.06	
6	2.35	1014	46	2.77		86	2.24	1010
7	1.97		47	2.52		87	2.42	1003
8	2.92		48	2.50		88	3.02	
9	2.41	1007	49	2.74		89	3.14	
10	2.75		50	2.10		90	2.37	1015
11	2.56		51	2.43		91	2.50	
12	2.95		52	2.82		92	2.32	1022
13	2.42	1019	53	2.22	1006	93	2.58	
14	2.87		54	1.77	1018	94	2.46	
15	2.89		55	3.09		95	2.71	
16	2.76		56	2.44		96	2.66	
17	2.86		57	2.37		97	2.72	
18	2.43		58	2.31		98	2.96	
19	2.60		59	2.58		99	2.83	
20	2.43		60	2.26	1023	100	2.75	
By Dam 908			*By Dam 914*			*By Dam 920*		
21	2.51		61	2.48		101	2.61	
22	2.51		62	2.80		102	2.71	
23	2.94		63	2.73		103	2.99	
24	3.07		64	2.63		104	2.63	
25	2.80		65	2.93		105	2.66	
26	2.58		66	2.24		106	2.31	
27	2.01	1004	67	2.77		107	2.45	1005
28	2.75		68	2.80		108	2.86	
29	2.92		69	2.36	1001	109	2.74	
30	2.52		70	2.56		110	2.80	
31	2.24	1016	71	2.47		111	2.40	1017
32	2.68		72	2.23	1008	112	2.26	1012
33	2.85		73	2.24	1020	113	2.26	
34	2.69		74	2.42		114	2.24	
35	2.45		75	2.64		115	2.50	
36	2.92		76	1.99		116	....	
37	2.43	1009	77	2.67		117	2.89	
38	2.55		78	2.39	1013	118	2.40	1024
39	2.40	1021	79	2.60		119	2.56	
40	2.95		80	2.41		120	2.51	

TABLE 94.—TENTH GENERATION LOW OIL PLOT RECORD 1906

Register ear No.	By Dam No.	Oil, percent.		Register ear No.	By Dam No.	Oil, percent.	
		Seed ear planted.	Cropharvested.			Seed ear planted.	Cropharvested.
1001	914	2.36		1013	914	2.39	
1002	906	2.35	2.79	1014	906	2.35	2.76
1003	918	2.42		1015	918	2.37	
1004	908	2.01		1016	908	2.24	2.60
1005	920	2.45		1017	920	2.40	
1006	910	2.22	2.71	1018	910	1.77	2.46
1007	906	2.41		1019	906	2.42	
1008	914	2.23		1020	914	2.24	2.62
1009	908	2.43		1021	908	2.40	
1010	918	2.24		1022	918	2.32	
1011	910	2.30		1023	910	2.26	
1012	920	2.26		1024	920	2.40	
Average of six selected rows						2.20	2.66

TABLE 95.—OIL IN ONE HUNDRED TWENTY INDIVIDUAL EARS FROM LOW-OIL PLOT OF 1906

Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.	Annual ear No.	Oil, percent.	Register No. assigned.
By Dam 1002			*By Dam 1014*			*By Dam 1018*		
1	2.88		41	2.96		81	2.26	
2	2.22	1102	42	2.76		82	2.38	
3	2.05	1114	43	2.77		83	2.40	
4	2.70		44	2.66		84	1.60	1110
5	2.88		45	2.82		85	2.43	
6	2.69		46	2.05	1106	86	3.17	
7	2.71		47	2.28		87	2.36	
8	2.42	1107	48	3.17		88	2 57	
9	2 98		49	2.87		89	2.35	
10	2 98		50	2.67		90	3.22	
11	2.65	1119	51	2.80		91	2 39	
12	2.88		52	2.97		92	2.98	
13	3.18		53	3.03		93	2.47	
14	3.16		54	2.88		94	2.23	1103
15	3.21		55	2.43	1118	95	2.52	
16	2.93		56	2 43	1111	96	2.41	
17	2.79		57	2 45	1123	97	2.59	
18	2.76		58	2.56		98	2.48	
19	2.77		59	3.10		99	2.34	1115
20	3.00		60	3.54		100	2.10	1122
By Dam 1006			*By Dam 1016*			*By Dam 1020*		
21	2.70		61	2.74		101	2.52	
22	2.68		62	2.67		102	2.44	
23	2.40	1109	63	2.79		103	2 35	1105
24	3.01		64	2.87		104	2.60	
25	2.63		65	2.34	1108	105	3.14	
26	2.34	1104	66	2.45		106	2.85	
27	2.49	1121	67	2.62		107	2.21	1112
28	2.86		68	2.72		108	3.15	
29	2.93		69	2.77		109	2.67	
30	3.13		70	2.55		110	2.91	
31	2.82		71	2.91		111	2.50	
32	2.78		72	2.68		112	2.38	1117
33	2.71		73	2.82		113	2.59	
34	2.71		74	2.45	1101	114	2.61	
35	2.72		75	2.97		115	2.45	
36	2.15	1116	76	2.34	1120	116	2.62	
37	2.73		77	2.50		117	2.22	
38	2.53		78	2.54		118	3.28	
39	2.87		79	2.35	1113	119	2.78	
40	3.01		80	2 54		120	2.10	1124

TABLE 96.—PROTEIN IN CORN PLANTED AND HARVESTED ON MIXED-PROTEIN PLOT IN 1898

Plot row No.	High protein.			Low protein.		
	Register ear No.	Protein, percent.		Register ear No.	Protein, percent.	
		Seed ear planted.	Crop harvested.		Seed ear planted.	Crop harvested.
1	209	12.80	11.24	205	8.84	9.72
2	212	13.62	11.75	206	8.22	11.04
3	216	12.72	12.10	207	8.29	10.09
4	223	11.97	11.65	208	8.88	10.89
5	224	11.89	11.81	209	9.05	10.58
Plot averages		12.60	11.71		8.60	10.46

TABLE 97.—PROTEIN IN CORN PLANTED AND HARVESTED ON MIXED-PROTEIN PLOT IN 1899

Plot row No.	High protein.			Low protein.		
	Register ear No.	Protein, percent.		Register ear No.	Protein, percent.	
		Seed ear planted.	Crop harvested.		Seed ear planted.	Crop harvested.
1	309	13.21	12.04	303	8.66	9.87
2	309	13.21	12.07	303	8.66	10.53
3	310	13.34	12.86	304	8.62	9.39
4	310	13.34	12.24	304	8.62	10.01
5	311	14.05	12.70	305	8.57	9.60
6	311	14.05	12.00	305	8.57	8.74
7	312	14.92	12.74	306	8.29	9.70
8	312	14.92	12.86	306	8.29	9.33
9	313	14.25	12.02	307	7.85	9.36
10	313	14.25	12.04	307	7.85	9.22
11	314	13.46	11.33	308	7.50	9.03
12	314	13.46	12.12	308	7.50	9.06
13	315	13.25	11.16	311	8.32	10.11
14	315	13.25	11.39	311	8.32	9.10
15	316	13.12	11.10	312	8.58	9.40
16	316	13·12	11.63	312	8.58	8.82
17	317	13.04	12.09	314	8.82	9.29
18	317	13.04	12.45	314	8.82	10.00
Plot averages		13.63	12.05		8.36	9.47

TABLE 98.—PROTEIN IN CORN PLANTED AND HARVESTED ON MIXED-PROTEIN PLOT IN 1900

Plot row No.	High protein.			Low protein.		
	Register ear No.	Protein, percent.		Register ear No.	Protein, percent.	
		Seed ear planted.	Crop harvested		Seed ear planted.	Crop harvested.
1	408	13.87	9.54	404	8.08	8.18
2	409	13.94	11.10	405	7.98	8.36
3	410	13.97	10.32	406	7.74	7.68
4	411	14.41	11.55	407	7.49	7.81
5	412	14.78	10.78	408	6.66	7.57
6	413	14.53	11.87	409	8.47	7.68
7	414	14.24	10.19	410	7.60	8.56
8	415	13.93	10.64	411	7.83	7.96
9	416	13.89	10.88	412	8.03	7.79
10	417	13.89	11.18	413	8.18	7.88
Plot averages		14.15	10.81		7.81	7.95

TABLE 99.—PROTEIN IN ONE HUNDRED THIRTY-SEVEN PAIRS OF EARS GROWN ON MIXED-PROTEIN PLOT IN 1899

Plot row No.	Hill No.	Protein, percent.		Plot row No.	Hill No.	Protein, percent.	
		From high-protein seed.	From low-protein seed.			From high-protein seed.	From low-protein seed.
1	4	9.65	12.13	8	15	13.86	9.76
1	6	13.90	10.50	8	16	14.41	9.73
1	7	12.75	9 80	9	7	10.48	7.48
1	8	11.51	9.54	9	9	10.89	11.54
1	9	10.25	9.79	9	10	12.03	8.56
1	13	11.53	8 18	9	10	10.07	7.35
1	13	11.89	8.44	9	11	14.25	8.92
1	14	14 89	9.98	9	13	11.26	8.21
2	1	12.94	9 09	9	14	13.62	7.33
2	3	12.73	10.40	9	15	12.35	7.71
2	4	13 22	8 27	9	15	10.34	9.38
2	7	10.51	9.81	9	16	14.03	14.03
2	10	9.89	7 87	10	2	10.45	7.75
2	11	10.98	14.71	10	3	12.49	13.32
2	12	14.76	11.53	10	7	12.40	7.62
3	3	12.83	10 26	10	9	11.15	7.64
3	5	12.16	9.22	10	10	10.74	9.14
3	6	12.78	8.76	10	13	11.48	11.86
3	7	11.92	9.45	10	14	13.50	8.22
3	8	10.51	9.88	10	15	12.26	9.27
3	8	9.15	7.89	10	15	13.30	8.27
3	11	13.77	10.10	11	2	11.88	8.78
3	12	14.80	8.99	11	5	9.58	9.92
3	14	13.51	11.05	11	6	11.77	10.61
3	16	15.18	9.51	11	10	9.98	7.25
4	8	8.37	9.63	11	11	9.76	7.81
4	9	13.44	10.17	11	12	10.58	9.57
4	11	11 79	8.53	11	13	12.55	8.75
4	14	12.77	11.21	11	14	11.38	9.26
4	15	12.84	9.78	11	14	12.09	9.43
4	16	13 21	9 85	11	15	11.48	7.57
5	4	11 26	7.91	12	1	12.86	9.83
5	5	13.80	8.33	12	5	11.95	11.07
5	5	11.18	10.42	12	7	12.05	8.81
5	10	14.06	10.38	12	8	12.23	8.45
5	11	12.88	9.28	12	8	12 25	8.72
5	14	12.68	11.73	12	9	13.29	8.09
5	15	14.04	9.07	12	11	8.93	8.41
6	6	12.07	9.88	12	13	11.66	8.08
6	7	11.12	8.07	12	15	12.72	7.83
6	9	12.30	7.94	12	16	11.47	9.85
7	9	14.33	8.82	13	3	10.59	10.91
7	10	10.84	9.86	13	7	11 67	9.11
7	11	12.45	8.58	13	8	10.66	11 25
7	11	9.56	9.35	13	9	11.47	7.74
7	12	10.77	8.92	13	9	8 27	8.17
7	14	14.21	9.51	13	11	11.22	10.05
7	15	15.15	12.01	13	15	10.21	9.19
8	8	12.05	9.52	13	16	12.41	11.28
8	9	13.47	8.51	14	4	12 43	8.26
8	10	9.60	8.77	14	7	12.35	9.52
8	13	12.59	8.26	14	8	10.52	9.14

TABLE 99.—*Continued.*

Plot row No.	Hill No.	Protein, percent.		Plot row No.	Hill No.	Protein, percent.	
		From high-protein seed.	From low protein seed.			From high-protein seed.	From low-protein seed.
14	11	11.32	9 09	16	15	11.77	9 92
14	12	9.37	9.08	16	16	12 18	9 51
14	13	10.21	8.36	17	1	10.73	9.99
14	13	11.18	8.25	17	7	10 29	9.71
14	15	12.56	9.46	17	7	12.11	8.92
14	16	10 96	9.94	17	8	12.69	8.12
15	3	10.96	8.65	17	10	13.00	9.04
15	7	11.76	8 91	17	12	12.48	8.85
15	9	9.18	7.74	17	14	12.05	11.00
15	12	11 67	9.68	17	15	13.01	7.57
15	15	11.12	12.48	17	16	12.54	9.45
16	7	12.51	9.32	18	4	14.14	11.17
16	9	11.11	9.06	18	9	11.73	10.84
16	11	11.50	8.39	18	10	14.19	9.66
16	12	10 93	7.45	18	12	9 28	8.51
16	13	12.20	7.46	18	16	13.44	10.35
16	14	10.26	8.15				
Averages						11.92	9.34

TABLE 100.—OIL IN CORN PLANTED AND HARVESTED ON MIXED-OIL PLOT IN 1898

Plot row No.	High oil.			Low oil.		
	Register ear No.	Oil, percent.		Register ear No.	Oil, percent.	
		Seed ear planted.	Crop harvested.		Seed ear planted.	Crop harvested.
1	207	5.20	4.66	205	3 39	3.60
2	210	5.44	4.87	206	3.39	3.86
3	212	5.68	5.38	207	3.38	4.13
4	213	5.49	5.14	208	3.50	4.20
5	215	5.43	5.35	209	3.70	4.06
Plot averages		5.45	5.08		3.47	3.97

TABLE 101.—OIL IN CORN PLANTED AND HARVESTED ON MIXED-OIL PLOT IN 1899

Plot row No.	High oil.			Low oil.		
	Register ear No.	Oil, percent.		Register ear No.	Oil, percent.	
		Seed ear planted.	Crop harvested.		Seed ear planted.	Crop harvested.
1	305	6.47	5.09	304	3.56	3.81
2	305	6.47	5.08	304	3.56	3.92
3	306	6.71	5.27	308	3.22	3.89
4	306	6.71	5.09	308	3.22	3.83
5	307	6.49	5.03	310	3.33	3.73
6	307	6.49	5.33	310	3.33	3.85
7	308	6.34	5.04	311	3.35	3.72
8	308	6.34	5.44	311	3.35	3.76
9	309	6 09	5.07	315	3.64	3.95
10	309	6.09	5.37	315	3.64	3.88
Plot averages		6.42	5.18		3.42	3.83

TABLE 102.—OIL IN CORN PLANTED AND HARVESTED ON MIXED-OIL PLOT IN 1900

Plot row No.	High oil.			Low oil.		
	Register ear No.	Oil, percent.		Register ear No.	Oil, percent.	
		Seed ear planted.	Crop harvested.		Seed ear planted.	Crop harvested.
1	402	6.21	5.61	404	3.45	3.93
2	403	6.22	5.74	405	3.42	3.78
3	404	6.35	5.88	406	3.31	3.73
4	405	6.42	5.99	407	3.08	3.75
5	406	6.54	5.71	408	2.81	3.89
6	407	6.43	5.91	409	2.94	3.80
7	408	6.33	5.60	410	3.14	3.60
8	409	6.27	5.84	411	3.32	3.58
9	410	6.22	5.68	412	3.41	4.22
10	411	6.20	5.82	413	3.47	3.77
Plot averages		6.32	5.78		3.24	3.81

TABLE 103.—OIL IN EIGHTY-FIVE PAIRS OF EARS GROWN ON MIXED-OIL PLOT IN 1899

Plot row No.	Hill No.	Oil, percent.		Plot row No.	Hill No.	Oil, percent.	
		From high-oil seed.	From low-oil seed.			From high-oil seed.	From low-oil seed.
1	6	5.23	3.51	5	12	5.66	3.90
1	8	5.31	3.61	5	13	4.82	3.68
1	9	5.84	4.06	6	1	4.40	3.82
1	10	5.78	3.47	6	5	5.18	3.72
1	12	3.46	4.00	6	9	5.49	5.49
1	14	4.00	3.81	6	9	5.59	3.33
1	15	6.05	3.96	6	11	5.43	3.92
1	16	5.96	4.31	6	12	5.15	3.84
2	1	5.55	4.27	6	12	4 91	3.67
2	3	5.34	4.20	6	13	5.59	3.22
2	4	5.29	4.34	7	3	5.75	3.57
2	6	5.12	3.66	7	5	4.51	3.30
2	8	5.71	3.20	7	6	4.92	3 93
2	9	5.17	3.86	7	9	5.09	3.92
2	10	3.56	3.86	7	10	4.74	3.73
2	11	5.18	4.55	7	13	5 01	3.66
2	12	4.51	3.93	7	15	5.30	3.93
2	12	4.84	3.85	8	2	6.29	3.76
2	15	5 59	3 62	8	10	6 08	4.09
2	16	5.28	3.67	8	11	5.29	3.28
3	3	5.00	5.24	8	12	5.66	3.38
3	4	5.77	3.73	8	13	4.66	4.13
3	8	5.23	3.51	8	13	5.02	4.06
3	9	5.26	3.16	8	14	5.53	4.04
3	9	5.85	3.01	8	16	5.22	3.42
3	10	5.77	3.56	9	2	4.58	4.09
3	11	4.73	3.52	9	4	4.97	3.60
3	12	5.36	3.86	9	6	5.34	4.21
3	13	4 85	4.48	9	6	4.93	3.47
4	2	5.49	4.12	9	8	5.66	3.08
4	3	5.18	3.90	9	9	5.33	3.61
4	7	4.77	3.58	9	12	5.01	3.97
4	11	5.77	4.30	9	12	4.65	4.29
4	12	5.17	3.79	9	13	4.90	4.37
4	13	3.86	3.93	9	14	5.06	3.48
4	13	5.28	4.26	10	4	5.67	3.28
5	2	5.24	3.52	10	7	5.01	3.86
5	3	5.59	3.73	10	9	5.63	3.54
5	5	5.02	3.60	10	10	4.80	3.68
5	7	5.25	3.67	10	12	5.12	4.41
5	9	5.05	3.41	10	14	5.75	3.77
5	10	5.20	3.78	10	15	5.95	3.85
5	10	6.69	3.98				
Averages						5.22	3.82