

Presented by Messrs. E. S. MOFFAT and PARDEE :

Two specimens of magnetic iron ore, one containing 15 per cent. MgO as serpentine. From Libby Foster Mine, New York State.

Specimen of hematite ore from Bilboa, Spain.

Specimen of hematite ore from Mockta, Algeria.

Presented by E. M. JOHNSON :

Specimens of ferro-chromium, showing fracture, and containing from one-eighth per cent. to 2.9 per cent. of chromium.

Three specimens of chrome steel, showing fracture.

Specimens of ferro-chromium containing 36.54 per cent. of chromium.

Presented by G. H. JOHNSON :

Specimen of ferro-manganese containing 88.68 per cent. of manganese.

Specimen of German ferro-manganese containing 29.05 per cent. of manganese.

Alloy containing 83.79 per cent. of manganese.

Presented by Messrs. PICKHARDT & KUTTROFF :

Case containing sixty-six samples of aniline dyes.

Presented by T. E. ALLEN :

Specimen of common salt showing ripple marks, taken from the shore of Great Salt Lake, Utah.

E. WALLER, Ph. D.,  
*Librarian.*

## II.—CONTRIBUTIONS TO THE EXAMINATION OF EASTERN, WESTERN AND SOUTHERN CORN.

By Prof. C. A. GOESSMANN, Mass. Ag'l Coll.

This investigation was undertaken at the request of several Agricultural Societies of the Connecticut River Valley, in Massachusetts, to ascertain the relative feeding value of corn.

### *Sweet Corn.*

I.—“TEXAS BLUE SWEET,” Palmer, Mass.

The ear contained eight rows of kernels of a blue color; its average length was from 5 to 6 inches, and its average weight was

from 3 to 4 ounces, consisting of 88 per cent. of kernels and 12 per cent. of cob. The average weight of one kernel was 0.32 gm.

The corn was raised upon rich garden soil, manured with commercial fertilizers.

## II.—“CROSBY,” Greenfield, Mass.

The ear contained fourteen rows of kernels of a white color; its average length was from 7 to 8 inches; its average weight was from 4 to 5 ounces, and consisted of 79 per cent. of kernels and 21 per cent. of cob. The average weight of one kernel was 0.2 gm.

The corn was raised upon rich garden soil, manured with commercial fertilizers.

### *Indian Corn (Maize).*

## I.—“WHEELER'S PROLIFIC,” West Springfield, Mass.

The ear contained eight rows of kernels of a yellowish-brown to brown color; its average length was from 7 to 11 inches; its average weight was from 7 to 8 ounces, and consisted of 83 per cent. of kernel and 17 per cent. of cob. The average weight of one kernel was 0.438 gm.

The corn was raised upon a light sandy loam, manured with commercial fertilizers.

## II.—“CLARK,” North Hadley, Mass.

The ear contained eight rows of kernels of a yellow color; its average length was 9 inches; its average weight, 6 to 7 ounces, and consisted of 86 per cent. of kernels and 14 per cent. of cob. The average weight of one kernel was 0.4 gm.

The corn was raised upon a sandy loam, manured with commercial fertilizers. For six or seven years previously, grass had been raised on the land, without manure.

## III.—“TIP CORN,” Chicopee, Mass.

The ear contained eight rows of kernels of a yellow color; its average length was about 7 inches; its average weight from 4 to 5 ounces, and consisted of 87 per cent. of kernels and 13 per cent. of cob. The average weight of one kernel was 0.3 gm.

The corn was raised upon “river land,” manured with barn-yard manure.

## IV.—“SOUTHERN WHITE FLINT,” South Carolina.

The ear contained twelve rows of kernels of a white color; its average length was 8.5 inches; its average weight, about 7 ounces,

and consisted of 80 per cent. of kernels and 20 per cent. of cob. The average weight of one kernel was 0.29 gm.

The corn was raised upon a light sandy soil, without manure.

V.—“CANADA DUTTON,” Mass. Ag'l Coll., Amherst, Mass.

The ear contained twelve rows of kernels of a yellow color; its average length was 9.5 inches; its average weight, from 8 to 9 ounces, and consisted of 82 per cent. of kernels and 18 per cent. of cob. The average weight of one kernel was 0.3 gm.

The corn was raised upon a sandy loam, manured with barn-cellar manure; 56 cords per acre.

VI.—“CANADA DUTTON,” Sunderland, Mass.

The ear contained twelve rows of kernels of a dark yellow color; its average length was from 9 to 10 inches; its average weight from 7 to 8 ounces, and consisted of 84 per cent. of kernels, and 16 per cent. of cob. The average weight of one kernel was 0.3 gm.

The corn was raised upon a light alluvial soil, river land, manured with barn-yard manure; 10 cords per acre.

VII.—“EARLY SOUTHERN,” Hatfield, Mass.

The ear contained sixteen rows of kernels of a light yellow color; its average length was from 10 to 11 inches; its average weight was from 15 to 16 ounces, and consisted of 82 per cent. of kernels, and 18 per cent. of cob. The average weight of one kernel was 0.46 gm.

The corn was raised upon Connecticut River bottom land, in a high state of cultivation, as tobacco had been the crop, the previous year.

VIII.—“WESTERN DENT” (white), Mt. Palatine, Ill.

The ear contained sixteen rows of kernels of a white color; its average length was 8.5 inches; its average weight was about 10 ounces, and consisted of 84 per cent. of kernels, and 16 per cent. of cob. The average weight of one kernel was 0.3 gm.

The corn was raised upon black loam (prairie land), which had never been manured.

IX.—“WESTERN DENT” (yellow), Mt. Palatine, Ill.

The ear contained from twenty to twenty-four rows of kernels of a yellow color; its average length was about 8 inches; its average weight was from 12 to 13 ounces, and consisted of 86 per cent. of kernels, and 14 per cent. of cob. The average weight of one kernel was 0.3 gm.

The corn was raised upon black loam (prairie land), which had never been manured.

SUMMARY OF ANALYSES OF CORN (*Kernels*).

Number of Sample.	Moisture.	Fat.	Nitrogenous Matter. (Albuminoids.)	Non-nitrogenous Extractive Matter.	Cellulose.	Ash.
<i>Sweet Corn.</i>						
I.	10.000	8.487	13.515	63.957 Including 1.83 per c't. of grape sugar and 4.23 per c't. of cane sugar.	2.500	1.541
II.	10.000	6.950	11.670	67.109 Including 2.14 per c't. of grape sugar and 8.15 per c't. of cane sugar.	2.500	1.770
<i>Indian Corn (Maize).</i>						
I.	10.000	4.720	12.432	69.518	1.890	1.440
II.	10.000	4.860	12.420	68.560	2.560	1.660
III.	10.000	5.194	12.703	68.063	2.500	1.540
IV.	10.000	4.480	12.463	69.667	2.020	1.370
V.	10.000	4.747	12.489	68.928	2.500	1.336
VI.	10.000	5.251	10.847	69.971	2.500	1.431
VII.	10.000	4.975	11.925	68.900	2.500	1.700
VIII.	10.000	4.266	11.529	70.323	2.500	1.382
IX.	10.000	4.545	11.115	69.799	3.041	1.500

The cellulose has been ascertained, by actual test, in I., IV., IX. (Maize); in the remaining samples, the mean of these tested samples has been assumed.

ANALYSES OF THE ASH OF SOME OF THE ABOVE VARIETIES OF CORN (*Kernels*).

	II.	I.	IV.	V.	III.	IX.
One hundred parts of the ash contain:	Crosby's Sweet.	Wheeler's Prolific.	Southern White Flint.	Canada Dutton.	Canada Dutton.	Western Dent (yellow).
Silica soluble in Soda..	1.542	1.271	0.362	0.306	0.763	2.612
Ferric oxide.....	0.195	0.934	0.789	0.977	2.087	0.331
Calcium oxide.....	1.788	1.033	1.007	1.797	1.501	1.611
Magnesium oxide.....	12.542	14.613	15.497	13.102	14.564	15.800
Potassium oxide.....	40.237	25.617	27.988	23.109	29.481	31.054
Sodium oxide.....	1.187	2.171	1.890	4.257	.....	3.260
Phosphoric Acid.....	42.509	53.657	52.458	55.481	51.604	45.314

Carbon, sulphur and chlorine, not determined.

SUMMARY OF ANALYSES OF CORN (*Kernels*), WITH REFERENCE TO THE DIGESTIBILITY OF ITS CONSTITUENTS.

(Nitrogenous matter, 85 per cent.; fat, 76 per cent.; non-nitrogenous extractive matter, 94 per cent.; cellulose, 34 per cent.)

No. of Sample.	Nitrogenous Matter. (Albuminoids.)	Non-nitrogenous Extractive Matter.	Fat.	Ratio of Nitrogenous to Non-nitrogenous Matter.
<i>Sweet Corn.</i>				
I.	11.49	60.12	6.45	1 : 5.79
II.	9.92	65.62	5.28	1 : 7.14

No. of Sample.	Nitrogenous Matter. (Albuminoids.)	Non-nitrogenous Extractive Matter.	Fat.	Ratio of Nitrogenous to Non-nitrogenous Matter.
<i>Indian Corn (Maize).</i>				
I.	10.57	65.35	3.59	1 : 6.52
II.	10.56	64.45	3.69	1 : 6.45
III.	10.80	63.98	3.95	1 : 6.29
IV.	10.59	65.49	3.40	1 : 6.51
V.	10.62	64.79	3.61	1 : 6.44
VI.	9.22	65.77	3.99	1 : 7.56
VII.	10.14	64.77	3.78	1 : 6.76
VIII.	9.80	66.10	3.24	1 : 7.07
IX.	9.45	65.61	3.41	1 : 7.30

The above described samples of corn rank, with reference to their feeding value, as follows:

*Sweet Corn.*

- I.—Blue Texas Sweet Corn, Palmer, Mass.
- II.—Crosby's Sweet Corn, Greenfield, Mass.

*Indian Corn (Maize).*

- III.—Tip Corn, Chicopee, Mass.
- V.—Canada Dutton, Mass. Ag'l Coll.
- II.—Clark Corn, North Hadley, Mass.
- IV.—Southern White Flint, South Carolina.
- I.—Wheeler's Prolific, West Springfield, Mass.
- VII.—Early Southern, Hatfield, Mass.
- VIII.—Western Dent (white), Mt. Palatine, Ill.
- VI.—Canada Dutton, Sunderland, Mass.
- IX.—Western Dent (yellow), Mt. Palatine, Ill.

Judging from the above analyses, it is reasonable to assume:

*First*—that the varieties of sweet corn are, on account of their peculiar and superior composition, the most valuable kinds we have for feeding purposes.

*Second*—there is, apparently, no marked distinction between a good sample of Eastern and a good sample of Western or Southern corn; the Eastern corn, cultivated and harvested with better care, as a rule, than the bulk of the Western corn, seems to be the safer article.

*Third*—that a more or less careful system of cultivation and harvesting would cause as striking variations in the chemical composition of every one of the above varieties—not excepting the Western varieties—as are noticeable in the above analytical statements. A good illustration of this circumstance may be noticed in samples V. and VI., both being Canada Dutton; the former contains 12.42 per

cent. of nitrogenous matter, the latter only 10.85 per cent., a difference of 1.57 per cent., for which an increase of 0.39 per cent. of fat does not compensate. The first-mentioned sample was raised after a heavy dressing with barn-yard manure (56 cords per acre), and the latter after a light one (10 cords per acre).

## SUMMARY OF ANALYSES OF CORN-COBS.

*Indian Corn (Maize).*

No. of Sample.	Moisture.	Fat.	Nitrogenous Matter. (Albuminoids.)	Non-nitrogenous Extractive Matter.	Cellulose.	Ash.
I.	10.0000	0.6032	3.7313	54.5226	29.8700	1.2720
IV.	10.0000	0.3406	3.1413	55.7898	30.0500	0.6783
V.	10.0000	.....	.....	.....	.....	0.1629
VI.	10.0000	.....	.....	.....	.....	1.1485
IX.	10.0000	0.4117	3.2587	57.2537	28.2265	0.8494

## ANALYSES OF THE ASH OF THE ABOVE VARIETIES OF CORN-COBS.

	I. Wheeler's Prolific.	IV. Southern White Flint.	V. Canada Dutton.	VI. Canada Dutton.	IX. Western Dent (yellow).
One hundred parts of the ash contain:					
Silica soluble in soda.....	17.344	20.819	10.314	.....	25.478
Ferric oxide.....	trace.	1.249	6.687	1.822	0.621
Calcium oxide.....	2.189	3.066	2.372	4.995	2.293
Magnesium oxide.....	5.317	4.561	4.989	9.586	3.976
Potassium oxide.....	60.129	59.818	62.362	78.846	54.231
Sodium oxide.....	5.745	2.293	2.907	.....	8.302
Phosphoric acid.....	9.185	8.026	10.363	4.731	5.098

Carbon, sulphur and chloride, not determined.

No actual test regarding the digestibility of the various proximate constituents of corn-cobs has yet been made; hence, their nutritive ratio has never been exactly determined. Their composition is similar to that of corn-stalks, and they compare, also, most favorably with the straws of most of our winter and summer grains. A. Stoeckhardt places dry, ground corn-cobs on an equal scale, in feeding value, pound for pound, with fresh potatoes.