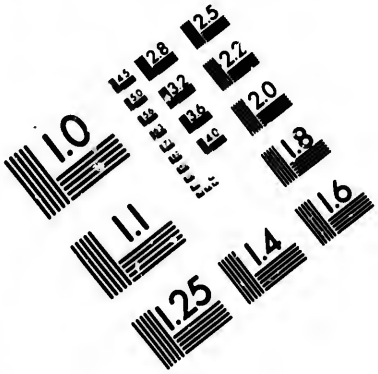


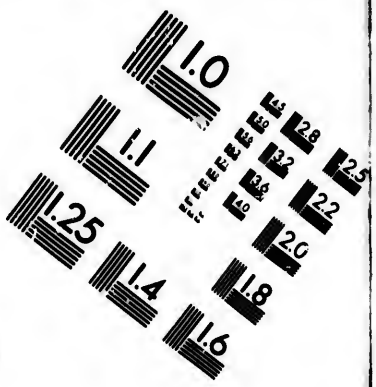
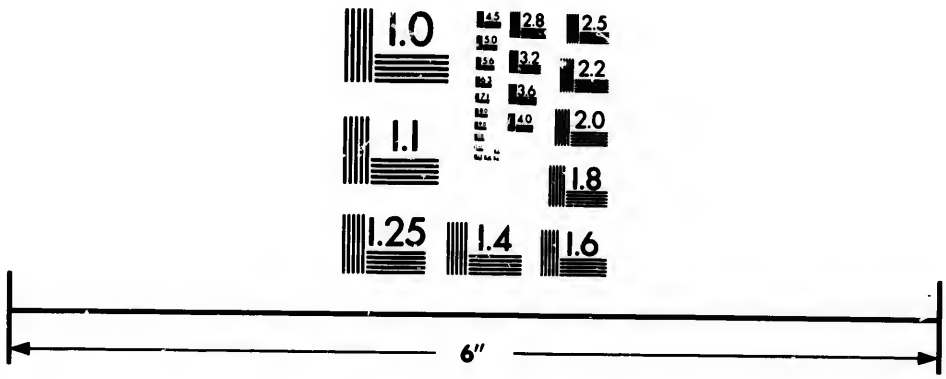
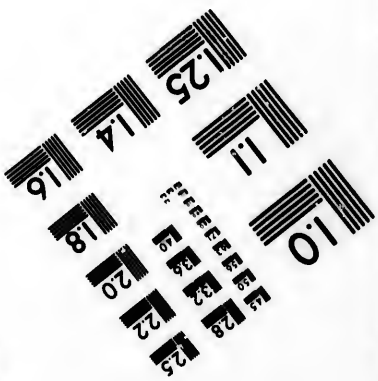


IMAGE EVALUATION TEST TARGET (MT-3)





Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

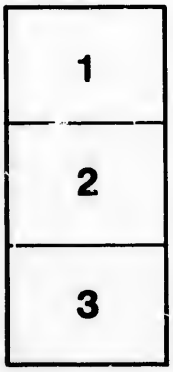
L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

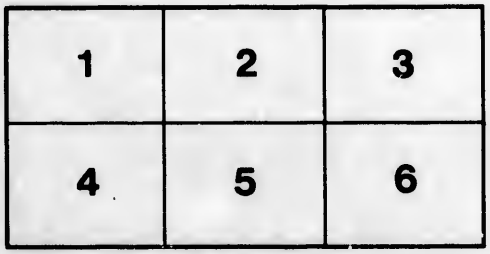
- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distortion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- ☐ Additional comments:/ Commentaires supplémentaires:

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☐ Includes supplementary material/ Comprend du matériel supplémentaire
- ☐ Only edition available/ Seule édition disponible
- ☐ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
				✓							





CENTRAL EXPERIMENTAL FARM.

—:o:—

DEPARTMENT OF AGRICULTURE,

OTTAWA, - - - CANADA.

—:o:—

BULLETIN No 12.

—:o:—

PART I.—Indian Corn or Maize as a Fodder Plant.

PART II.—Report on the Chemical Composition of certain varieties of Indian Corn.

—:o:—

JUNE, 1891.

To the Honourable,

The Minister of Agriculture.

SIR,—I beg to submit for your approval the twelfth Bulletin from the Central Experimental Farm, relating to a crop of very great and growing importance to this country, namely, that of Indian Corn or Maize. The use of this plant for fodder, either dried or made into ensilage, is having the effect of materially lessening the cost of feeding stock through the winter, and from experience already gained it promises to be a most useful factor in stimulating winter dairying. The first part, which has been prepared by myself, treats of the methods of cultivation, the growth and productiveness of the many varieties which have been tested at the Experimental Farm during the past two years, and the cost of preparing ensilage. The second part, prepared under my direction by Mr. Frank T. Shutt, Chemist of the Dominion Experimental Farms, relates to the chemical composition of corn at different stages of its growth, a work which has been undertaken mainly for the purpose of showing at what period this crop can be most profitably cut. Analyses are also given of the ensilage prepared at the Farm.

I have the honour to be,

Your obedient servant,

WM. SAUNDERS,

Director Experimental Farms.

Ottawa, 16th June, 1891.

CENTRAL EXPERIMENTAL FARM.

—:o:—

DEPARTMENT OF AGRICULTURE,

OTTAWA, - - - CANADA.

—:o:—

PART I.

INDIAN CORN OR MAIZE AS A FODDER PLANT.

By Wm. Saunders, F.R.S.C., F.L.S., F.C.S.,
Director Dominion Experimental Farms.

There are few subjects more important at the present time to the farmers of Canada than that of the economical winter feeding of stock. The man who carries on mixed farming is, as a rule, the successful farmer. To depend for returns on the sale of cereals alone, or the disposal of hay grown on the farm is a wasteful course, which, however rich the soil may be, will sooner or later reduce it to such a condition of exhaustion as to make cropping unprofitable. But when the growing of grain and hay is associated with the raising of stock and pasturing, and where a large proportion of what is grown on the land is fed to cattle on the farm, the manurial constituents obtained will, if well cared for and returned to the soil, materially aid in maintaining its fertility for a very long period. Farmers do not always realize that with every load of grain they sell they dispose of a part of the valuable constituents of their land in the important ingredients which this grain has taken from the soil and stored in its substance, and this process of drawing continually on the fertility of the land without making adequate returns is just as certain to result in impoverishment as would frequent drafts without deposits on a limited balance in a bank.

With the immense plains in the North-West to compete with, where the soil is extremely rich and capable of producing grain in abundance and of high quality for many years without the use of fertilizers, it is unlikely that farmers in the eastern Provinces can continue to grow wheat as a staple crop with profit, hence more attention will no doubt be given by them in future to stock-raising and to dairying. Already the annual exports of Canadian cheese amount to over 88 million pounds, and the business has by no means reached its limit, and with similar effort and skill brought to bear on the production of butter, a large and profitable trade could soon be built up in that commodity. During the summer season the pasture lands of most eastern farms usually furnish rich and luxuriant herbage; the great desideratum is cheap and nutritious food for the long winter months when cattle have to be housed, food so stored as to be convenient, and handled with little expense.

In the North-West also Canadian farmers are learning that it is unwise to trust entirely to grain growing, and in Manitoba and the Territories mixed farming is becoming more general. There has been a prodigious increase in the number of cattle in that country within the past five years, and dairying enterprise is beginning to be developed. As long as the number of cattle there was small, and but a limited proportion of the land taken up, the western plains afforded unlimited pasturage for stock, and the lower lands furnished an abundance of hay for winter use, which could be had almost for the cutting. Now the conditions are changing. The land is being rapidly settled and the nearer unoccupied hay lands are no longer sufficient to provide winter sustenance for the increasing herds, and the farmer has either to drive his cattle a long distance from home and put them into rude winter quarters near his hay supply or to draw his hay, in many instances, from 25 to 50 miles to feed his animals at home. With the steady influx of settlers, farmers there must soon face the problem of growing on their own land winter food for their stock.

TIME OF CUTTING, SELECTION OF VARIETIES, ETC.

Indian corn, where it can be successfully grown, produces probably a greater weight of crop per acre than any other fodder plant. It is nutritious and a very large quantity can be grown at a small cost. In the growth of this plant stores of nutriment are gradually laid up in its stalks and leaves until it reaches that stage when the grain is formed, but still in a soft condition, when the

ears are said to be "glazed." Then the plant can be cut and stored at greatest profit to the grower. If cut before this it is soft and watery and deficient in nutritive matter, and if the cutting is delayed much later, portions of the stalks and leaves become impoverished and woody, from the transfer to the growing grain of a part of the nutriment they contain. Hence, whether corn is to be cured and fed dry, or made into ensilage it should be cut when the ears have reached the "glazed" condition. Some of the larger sorts of fodder corn which produce very heavy crops are late in ripening, and in those locations where the growing season is short they do not reach their best condition before frost comes, there, earlier ripening varieties are to be preferred. These earlier sorts usually produce less weight of fodder than the later ones, but it is better for the farmer in such localities to grow a somewhat lighter crop of nutritious food than a larger weight of a more watery character. Experience has shown that fodder corn, especially when made into ensilage, and associated with a little bran or some provender made by grinding the coarser grains, supplies a cheap ration on which cattle may be fed during the winter with good results either for dairy purposes or for beef. In No. 4 Dairy Bulletin, prepared by James W. Robertson, Dairy Commissioner for the Dominion, much useful information has been given on the growing of corn, the construction of the silo and the preparation of ensilage. This subject being so important to farmers in all parts of Canada, experiments have been carried on at the Central Farm at Ottawa during the past two years with a large number of varieties of corn for the purpose of ascertaining their relative earliness and yield. Tests have also been made during the past year at each of the branch experimental farms with a similar object in view. In these experiments the different varieties have been grown side by side on nearly uniform soil. Those classed as dent or tooth corn have in most instances produced the greatest weight of fodder, but have been the latest to ripen. The flint and sweet varieties vary much in their time of ripening, also in the vigour of their growth and relative productiveness. The results obtained at the Central Farm will be given here. The experience gained at the branch farms has already been published in the Annual Report for 1890.

DIFFERENT CLASSES OF CORN.

Indian corn may be conveniently divided into four classes. 1st, the varieties of dent corn, which are readily distinguished from other

sorts by the tooth-like form of the kernels; 2nd, flint corn, in which the upper end of the kernel is rounded and smooth; 3rd, sweet corn, which may be known when ripe by the wrinkled surface of the grain; and 4th, pop corn, the ears of which are small, the kernels small, hard and closely set on the ears and more or less pointed in form.

ESTIMATES OF YIELD, CHARACTER OF SOIL.

All the varieties enumerated in the following lists were sown in rows 3 feet wide with the kernels from 3 to 6 inches apart in the rows, and the calculations of the weight per acre are based in most instances on the yield of two rows of 100 feet each. Estimates based on the yield of small plots usually give larger results than can be obtained where the varieties are grown by the acre. They are, however, sufficiently accurate for the purpose of comparing the relative yield of different sorts. Much also depends on the condition of the land as to fertility. The experimental corn plots in 1889 were on a sandy loam, most of it rather light, which sown with roots in 1887 and received a coating of stable manure about 20 tons to the acre in the spring of 1888. This was followed by a crop of spring wheat. The land was ploughed in the fall and harrowed in the spring of 1889, first with a disc harrow and after that with the common iron harrow, and a dressing of about 200 lbs. per acre of a special corn fertilizer was used on the rows immediately after planting.

The land chosen for the corn plots in 1890 was a light sandy loam which was in pasture for several years before the farm was purchased. It was ploughed in the fall of 1887, a crop of oats was grown on it in 1888, a second crop of oats in 1889, and corn plots in 1890. This land has had no manure whatever nor any other fertilizer applied to it for many years, how many I am not able to say. The poverty of this soil, as compared with that selected for the corn plots last year, and the fact that no fertilizers were applied will probably account for the larger yield obtained in most instances in 1889. This poor piece of unmanured land was selected for the purpose of showing what crops of corn could be raised in the Ottawa district under unfavourable conditions, and at the same time gaining information as to the growth and yield of the different varieties under such circumstances.

VARIETIES OF DENT OR TOOTH CORN.

Name of Variety.	Year when tested	Date of Planting.	When Up.	When Tasselled.	When Cut.	Height.	Leafiness.	Condition of Ears.	Yield per Acre.	
									Tons.	Lbs.
Adams' Early	1889	May 21	June 4	Aug. 24	Sept. 7	7 to 8 ft.	Very leafy	Well filled	26	140
do	1890	do 22	do 1	do 6	do 9	6 to 7 ft.	Fairly leafy	Well filled	19	78
Brazilian Flour	1889	do 21	do 4		do 7	8 ft.	Very leafy	No ears formed	39	1200
Blunt's Prolific	1889	do 21	do 4		do 7	8 to 9 ft.	Very leafy to tip	Just forming	30	1380
do	1890	do 22	do 2	Aug. 24	do 9	8 to 10 ft.	Very leafy	Scarcely formed	25	747
Cranberry White Dent	1889	do 21	do 4	do 24	do 7	8 to 10 ft.	Fairly leafy	About half grown	23	530
Coen	1889	do 21	do 4	do 24	do 7	8 to 10 ft.	Very leafy	Just formed	25	490
Calico Dent	1889	do 21	do 4	do 24	do 7	7 to 8 ft.	Very leafy	About half grown	18	1620
Chester County Mammoth	1890	do 22	do 2	do 15	do 9	8 to 11 ft.	Very leafy	Soft and watery	26	925
Edmund's Premium Dent	1889	do 21	do 4	do 24	do 9	7 to 9 ft.	Fairly leafy	One-third grown	21	1890
Golden Dent	1889	do 21	do 3	do 24	do 7	9 to 11 ft.	Fairly leafy	Scarcely formed	32	680
do	1890	do 22	do 1	do 22	do 9	9 to 10½ ft.	Very leafy	Scarcely formed	26	1361
Golden Beauty	1889	do 21	do 3	do 24	do 7	9 to 10 ft.	Very leafy	About half grown	38	1880
do	1890	do 22	do 1	do 17	do 9	10 to 12 ft.	Fairly leafy	Scarcely formed	31	36
Giant Prolific Ensilage Sweet	1890	do 22	do 2	do 15	do 9	10 to 12 ft.	Fairly leafy	Early milk	21	1451
Hickory King	1889	do 21	do 4	do 24	do 7	8 to 9 ft.	Very leafy	Scarcely formed	24	180
do	1890	do 22	do 1	do 19	do 9	7 to 8 ft.	Very leafy	Early milk	24	859
Hybrid Fodder from P. C. Dempsey, Trenton, Ont	1890	do 22	do 1	do 13	do 9	7 to 8½ ft.	Fairly leafy to tip	In early milk	23	1288
King of the Earlies	1889	do 21	do 3	do 24	do 7	8 to 9 ft.	Fairly leafy	Scarcely formed	23	200
Leaming Yellow	1889	do 21	do 4	do 24	do 7	8 to 9 ft.	Fairly leafy	One-fourth grown	29	80
do do	1890	do 22	do 1	do 14	do 9	7 to 10 ft.	Very leafy	Partly grown	26	235
Mastodon Field	1889	do 21	do 3	do 24	do 7	8 to 10 ft.	Very leafy	Scarcely formed	29	1730
Mammoth White Surprise	1890	do 22	do 2	do 26	do 9	8 to 10 ft.	Fairly leafy	Scarcely formed	19	1784
Mammoth Southern Sweet	1889	do 21	do 4	do 24	do 7	9 to 11 ft.	Very leafy	Half grown	28	1575
do do	1890	do 22	do 1	do 27	do 9	9 to 10 ft.	Fairly leafy	Half grown	27	87
Maryland White Ground Seed	1890	do 22	do 1	do 18	do 9	9 to 10 ft.	Fairly leafy	Scarcely in early milk	23	1117

VARIETIES OF DENT OR TOOTH CORN—*Continued.*

Name of Variety.	Year when tested	Date of Planting.	When Up.	When Tasselled.	When Cut.	Height.	Leafiness.	Condition of Ears.	Yield per Acre. Tons.	Lbs.
Mammoth Dent	1890	May 22	June 2	Aug. 16	Sept. 9	10 to 11 ft.	Very leafy	Scarcely in early milk.	27	486
North Shore Yellow Dent	1889	do 21	do 4	do 24	do 7	7 to 9 ft.	Fairly leafy	Half grown	19	280
Old Cabin Home	1890	do 22	do 1	do 23	do 9	10 to 12 ft.	Fairly leafy	Scarcely formed	25	747
Parish White Dent	1889	do 21	do 3	do 24	do 7	8 to 10 ft.	Very leafy	Scarcely formed	27	120
Pride of the North	1889	do 21	do 4	do 24	do 7	7 to 8 ft.	Very leafy	One-third grown	21	240
Queen of the Prairie	1889	do 21	do 3	do 24	do 7	8 to 9 ft.	Fairly leafy	One-third grown	30	1030
do do	1890	do 22	do 1	do 5	do 9	8 to 10 ft.	Fairly leafy	Nearly in late milk	22	1919
Red Cob Ensilage	1889	do 21	do 4	do 24	do 7	8 to 9 ft.	Very leafy	Scarcely formed	26	1130
do do	1890	do 22	do 1	do 12	do 9	10 to 11 ft.	Fairly leafy	Scarcely formed	28	10
Southern Ensilage	1889	do 21	do 4	do 24	do 7	8 to 10 ft.	Very leafy	Just forming	24	180
Snowflake	1890	do 22	do 2	do 11	do 9	9 to 10 ft.	Fairly leafy	Early milk	22	1219
Wisconsin White Dent	1889	do 21	do 3	do 24	do 7	8 to 9 ft.	Fairly leafy	Early milk	27	120
Wisconsin Yellow Dent	1889	do 21	do 3	do 24	do 9	8 to 9 ft.	Fairly leafy	Just formed	21	1890
Woodward's Dent	1889	do 21	do 4	do 24	do 7	7 to 8 ft.	Fairly leafy	Just formed	17	1310
Virginia Horse Tooth	1889	do 21	do 3	do 24	do 7	9 to 11 ft.	Very leafy	Scarcely formed	36	930
do do	1890	do 22	do 1	do 26	do 9	9 to 12 ft.	Very leafy	Scarcely formed	31	653

VARIETIES OF FLINT CORN.

Angel of Midnight	1889	May 21	June 3	Aug. 24	Sept. 7	7 to 8 ft.	Quite leafy	Nearly in early milk	17	980
do do	1890	do 22	do 2	do 1	do 9	5 to 6 ft.	Fairly leafy	Nearly ripe	15	129
Adams' Extra Early	1889	do 21	do 3	do 20	do 7	4 ft.	Fairly leafy	Ripe	8	170
do do	1890	do 22	do 1	do 19	do 9	4 to 5 ft.	Fairly leafy	Ripe	13	1660
Canada Yellow	1890	do 22	do 1	July 31	do 9	5 to 6 ft.	Very leafy	Nearly ripe	18	9

Golden Dew Drop	1890	do 22	do 1	Aug. 1						
King Philip										

Canada Yellow	1890	do	22	do	1	July	31	do	9	5 to 6	ft.	Very leafy	Nearly ripe	18

Golden Dew Drop	1890	do	22	do	1	Aug.	1	do	9	6 to 7	ft.	Fairly leafy	Ripe	15	1726
King Phillip	1889	do	21	do	4	do	20	do	7	7 to 8	ft.	Fairly leafy.	Nearly ripe	20	920
do	1890	do	22	do	1	do	10	do	9	6 to 7	ft.	Fairly leafy	Almost ripe	19	1675
Long White Flint	1889	do	21	do	3	do	24	do	7	8 to 10	ft.	Very leafy	Scarcely formed	30	720
do do	1890	do	22	do	1	do	13	do	9	6 to 7	ft.	Very leafy	In early milk	22	286
Longfellow	1889	do	21	do	4	do	18	do	7	6 to 7	ft.	Fairly leafy	Nearly ripe	25	1150
do	1890	do	22	do	1	do	2	do	9	5 to 6½	ft.	Very leafy	Late milk	18	1425
Long Yellow Flint	1889	do	21	do	4	do	20	do	7	7 to 8	ft.	Very leafy	Ab't two-thirds ripe	20	1910
do do	1890	do	22	do	1	do	4	do	9	8 to 10	ft.	Fairly leafy	Late milk	26	1433
Large White Flint	1890	do	22	do	1	do	3	do	9	7 to 8	ft.	Fairly leafy	Early milk	24	1077
Landreth's Early Summer Yellow Flint	1890	do	22	do	2	do	1	do	9	6 to 7½	ft.	Fairly leafy	Nearly ripe	19	1966
Mitchell's Extra Early Flint	1890	do	22	do	2	July	29	do	9	5 to 6½	ft.	Fairly leafy	Ripe	12	1083
Pearce's Prolific	1890	do	22	do	2	July	29	do	9	7 to 8	ft.	Fairly leafy	Nearly ripe	23	1843
Self Husking	1889	do	21	do	3	Aug.	15	do	7	6 to 7	ft.	Fairly leafy	Ripe	13	400
do do	1890	do	23	do	3	July	30	do	9	6 to 7½	ft.	Fairly leafy	Ripe	17	339
Smut-Nose Flint	1889	do	21	do	4	Aug.	18	do	7	6 to 7	ft.	Fairly leafy	Nearly ripe	15	1350
Thoroughbred White Flint	1889	do	21	do	4	do	14	do	7	8 to 9	ft.	Very leafy to the top	Late milk	40	380
do do	1890	do	22	do	1	do	12	do	9	8 to 10	ft.	Very leafy	Early milk	25	1255
Yellow Dutton	1890	do	22	do	1	do	13	do	9	8 to 9	ft.	Very leafy	Early milk	25	239

VARIETIES OF SWEET CORN.

Amber Cream	1889	May	21	June	4	Aug.	25	Sept.	7	6 to 7	ft.	Fairly leafy	Two-thirds ripe	19	1930
do do	1890	do	22	do	2	do	6	do	9	5 to 6	ft.	Fairly leafy.	Late milk	17	775
Asylum Sweet	1889	do	21	do	4	do	20	do	7	7 to 8	ft.	Fairly leafy.	Late milk	25	160
do do	1890	do	22	do	1	do	6	do	9	7 to 8	ft.	Fairly leafy.	Late milk	24	460
Burbank's Early	1889	do	21	do	4	do	14	do	7	4 to 5	ft.	Fairly leafy.	Nearly ripe	15	690
Black Mexican	1889	do	21	do	4	do	14	do	7	6 to 6½	ft.	Fairly leafy.	Two-thirds ripe	12	750
do do	1890	do	22	do	2	do	9	do	9	6½ to 7½	ft.	Fairly leafy.	Late milk	18	1897
Ballard's Early	1890	do	22	do	1	July	26	do	9	5 to 6	ft.	Not very leafy	Almost ripe	13	1588
Crosby	1889	do	21	do	3	Aug.	10	do	7	6¼ to 7	ft.	Fairly leafy.	Ripe	25	780
do	1890	do	22	do	1	do	1	do	9	4½ to 5½	ft.	Very leafy	Nearly ripe	18	1062
Chicago Market	1889	do	21	do	4	do	10	do	7	5½ to 6	ft.	Very leafy	Three-fourths ripe	16	1530
do do	1890	do	23	do	3	July	28	do	9	5½ to 6½	ft.	Fairly leafy.	Nearly ripe	12	974
Dolly Dutton	1890	do	22	do	2	do	26	do	9	5 to 6	ft.	Fairly leafy.	Past late milk	14	1257

VARIETIES OF SWEET CORN—*Continued.*

Name of Variety.	Year when tested	Date of Planting.	When Up.	When Tasselled.	When Cut.	Height.	Evenness.	Condition of Ears.	Yield per Acre.
									Tons. Lbs.
Darling's Early	1890	May 23	June 2	Aug. 3	Sept. 9	6 to 7 ft.	Fairly leafy.	Past late milk	18 626
Eight-rowed Sugar	1889	do 21	do 2	do 14	do 7	7 to 8½ ft.	Very leafy	Early milk	26 1905
do do	1890	do 22	do 2	do 7	do 9	7 to 8 ft.	Fairly leafy	One-third grown	21 1890
Excelsior	1889	do 21	do 4	do 20	do 7	6 to 7 ft.	Fairly leafy.	Two-thirds ripe	13 1390
do	1890	do 22	do 2	do 2	do 9	6 to 7 ft.	Fairly leafy.	Late milk	8 988
Egyptian Sugar	1889	do 21	do 5	do 20	do 7	6 to 7 ft.	Very leafy	One-third grown	24 1830
do do	1890	do 22	do 4	do 13	do 9	8 to 9 ft.	Very leafy	Early milk	26 54
Early Golden Yellow Sugar.	1890	do 22	do 4	July 31	do 9	5 to 6½ ft.	Fairly leafy.	Late milk	16 524
Extra Early Cory	1889	do 21	do 4	Aug. 4	do 7	4 to 4½ ft.	Fairly leafy.	Ripe	8 170
do do	1890	do 22	do 1	July 17	do 9	4 to 5 ft.	Fairly leafy.	Ripe	13 664
Ford's Early	1889	do 21	do 4	Aug. 14	do 7	6 to 6½ ft.	Fairly leafy.	Ripe	15 360
Golden Coin	1890	do 23	do 2	do 21	do 9	7 to 9 ft.	Very leafy	Early milk	21 362
Hickox	1889	do 21	do 4	do 18	do 7	6 to 7½ ft.	Very leafy	Two-thirds ripe	19 610
do	1890	do 22	do 1	do 6	do 9	6 to 7 ft.	Very leafy	Nearly ripe	20 38
Honey Sweet	1890	do 23	do 4	do 6	do 9	6 to 7 ft.	Fairly leafy.	Late milk	17 1864
Livingston's Evergreen.	1889	do 21	do 4	do 14	do 7	6½ to 7½ ft.	Very leafy	Nearly ripe	18 630
Landreth Sugar	1890	do 22	do 3	do 6	do 9	6 to 7 ft.	Fairly leafy.	Late milk	16 379
Landreth's Early Market	1890	do 22	do 2	July 31	do 9	7 to 8 ft.	Very leafy	Nearly ripe	22 1556
Minnesota	1890	do 22	do 3	do 30	do 9	6 to 7 ft.	Fairly leafy.	Past late milk	20 1599
Marblehead Early	1889	do 21	do 3	Aug. 4	do 7	5 to 6 ft.	Very leafy at bottom	Ripe	12 1080
do do	1890	do 22	do 2	July 20	do 9	5 to 6 ft.	Fairly leafy.	Nearly ripe	13 862
Moore's Early Concord	1889	do 21	do 4	Aug. 10	do 7	7 ft.	Very leafy.	Two-thirds ripe	20 590
do do	1890	do 22	do 2	do 3	do 9	5 to 6 ft.	Fairly leafy.	Late milk	16 1967
Mammoth Sugar	1889	do 21	do 4	do 20	do 7	7 to 8½ ft.	Fairly leafy.	Just formed	29 80
Mammoth Early	1890	do 22	do 3	do 16	do 9	7 to 9 ft.	Fairly leafy.	Early milk	19 586
Mammoth Late	1890	do 22	do 2	do 14	do 9	7 to 9 ft.	Fairly leafy.	Early milk	22 1266
Narragansett Early	1889	do 21	do 4	do 4	do 7	6 to 7 ft.	Fairly leafy.	Two-thirds grown	16 670
do do	1890	do 22	do 1	July 25	do 9	5 to 6 ft.	Fairly leafy.	Past late milk	15 972

Narragansett Early		1889	do	21..	do	4..	do	4..	do	7..	5 to 6	ft.	Fairly leafy.	...	Past late milk.		15	975
do	do	1890	do	22..	do	1..	July	25..	do	9..								
Ne Plus Ultra		1889	do	21..	do	4..	Aug.	14..	do	7..	7 to 8	ft.	Fairly leafy.	..	Late milk.		21	1230
do	do	1890	do	22..	do	2..	do	8..	do	9..	6 to 7	ft.	Not very leafy.	..	Early milk.		13	1987
Northern Pedigree Sweet		1889	do	21..	June	4..	do	14..	do	7..	4	ft.	Fairly leafy.		Nearly ripe		6	870
Old Colony		1889	do	21..	do	4..	do	20..	do	7..	7 to 9	ft.	Fairly leafy.		Three-fourths ripe	..	22	550
do		1890	do	23..	do	3..	do	8..	do	9..	7	ft.	Very leafy.	..	Late milk.		14	1584
Potter's Excelsior		1889	do	21..	do	3..	do	20..	do	7..	6 to 8	ft.	Fairly leafy.		Almost ripe.	..	20	1910
do	do	1890	do	22..	do	2..	do	6..	do	9..	6 to 7	ft.	Fairly leafy.		Past late milk.	..	20	438
Pee and Kay.		1889	do	21..	do	3..	do	14 .	do	7..	5 to 6	ft.	Very leafy.	..	Ripe		20	920
do		1890	do	22..	do	1..	July	31..	do	9..	5 to 6	ft.	Fairly leafy.		Nearly ripe.	..	18	989
Perry's Hybrid Early		1889	do	21..	do	4 .	do	4..	do	7..	5½ to 6½	ft.	Fairly leafy.		Nearly ripe.	..	18	1299
do	do	1890	do	22..	do	1..	July	25..	do	9..	4 to 5	ft.	Very leafy.		Nearly ripe.	..	14	59
Stowell's Evergreen		1889	do	21..	do	3..	Aug.	20..	do	7..	5½ to 7	ft.	Very leafy	..	Half ripe.		19	1270
do	do	1890	do	22..	do	2..	do	10..	do	9.	5 to 6½	ft.	Very leafy.		Late milk.		18	481
Shaker's Early		1889	do	21..	do	4..	do	4..	do	7..	5 to 6	ft.	Fairly leafy.		Nearly ripe		20	590
Sweet Fodder		1890	do	22..	do	2..	do	8..	do	9..	6 to 7½	ft.	Very leafy.		Early milk.	..	19	1058
Stabler's Second Early		1890	do	22..	do	2..	do	8..	do	9..	6 to 8	ft.	Fairly leafy.		Early milk.		21	579
Triumph Sugar		1889	do	21..	do	3..	do	14..	do	7..	6 to 8	ft.	Very leafy below		Late milk.		24	30
do	do	1890	do	22..	do	2..	do	6 .	do	9..	5 to 6½	ft.	Fairly leafy.	..	Late milk.		18	481
Tuscarora		1890	do	23..	do	3..	do	5..	do	9..	7 to 9	ft.	Very leafy.		Early milk.		23	827
Talbot's First and Best		1890	do	22..	do	1..	July	19..	do	9..	3 to 4	ft.	Fairly leafy.		Ripe		10	1380

POP CORN.

Pop Corn from P. C. Dempsey		1890	do	22..	do	2..	do	23..	do	9..	6 to 7	ft.	Fairly leafy	.	Ripe		15	637
Cinquantine		1890	do	22..	do	1..	do	28..	do	9..	6 to 7	ft.	Very leafy.	..	Ripe		18	300

The Cinquantine is a Greek Corn, which has been placed in this group for the reason that it closely resembles the Pop Corn, though of larger size.

One of the incidental advantages of a corn crop is that when well cultivated it thoroughly cleans the land, no matter how weedy it may be, and hence is as useful in this respect as a summer fallow or a root crop.

MODES OF CULTIVATION.

While the usual method of growing corn for fodder is in rows, it may also be planted in hills 3 feet apart each way with almost equally good results as to the weight of yield, while the plants being thus more exposed to sunlight will produce ears more freely. Some varieties grow much stronger than others, are more leafy, and stool more, sending up several shoots from the base. The Thoroughbred White Flint is probably the best example of this class. An acre of this variety grown at the Central Experimental Farm in 1890, cut and weighed green gave a little over thirty tons. Twenty tons to the acre is a fairly good yield.

RELATIVE VALUE OF ENSILAGE AND HAY.

Opinions differ as to the relative value of ensilage and hay; some careful observers claim that two tons of well-prepared ensilage are equal to one ton of hay, while others hold that three tons are required to furnish the same quantity of nutriment. It is not easy to demonstrate accurately the relative value of the two, for the reason that the corn when converted into ensilage has undergone changes which make it more easily digested, and hence in feeding, the nutritious matter is more completely assimilated and is not subject to so much waste as when hay is fed.

METHODS OF PRESERVATION.

Corn may be cut green, stacked in the field until dry—when it loses about half its weight—and stored near the barn during winter and cut up as required, or it may be placed in a silo and converted into ensilage. The early forms of silos were constructed of stone or brick and partly below ground, but the more recent structures are of wood with air spaces between to keep out frost. They can be made most cheaply in a mow of the barn, but when it is not convenient to do this a silo may be built against the barn, on the outside of it. It may be built of 2x12 timber sheeted with rough inch lumber on either side, then covered with dressed lumber with the joints broken. Full particulars for the construction of such a building will be found in the bulletin already mentioned, No. 4, of the Dairy series.

COST OF PRODUCING ENSILAGE.

The following are the details of cost of growing two acres of corn, in 1890, and putting it in the silo at the Central Experimental Farm. One acre was Thoroughbred White Flint, which yielded 30 tons; the other was two-thirds Giant Prolific Ensilage, and one-third acre divided between Pearce's Prolific, Virginia Horse-tooth and Golden Dent, the yield from this acre being 22 tons, 1,151 lbs., or a total on the two acres of 52 tons, 1,151 lbs. It was sown May 24, and cut September 10. The land chosen for this crop was adjoining that which was selected for the experimental corn plots in 1890 and had been cropped and treated in the same manner. For particulars of this see page 6. The only fertilizer used was the mixture referred to below, which was sown broadcast.

		$ cts.
Ploughing in Fall of 1889, $2 per acre		4 00
Disk harrowing, once, in Spring, 1890		0 80
Harrowing with iron harrow		0 40
Cost of seed, one bushel		1 75
Team, sowing, 2½ hours at 30c		0 75
Four times cultivating, with one-horse cultivator, 2½ hours each time at 50c		2 00
One man hoeing 3 days: 1½ days June 19 and 20; 1½ days June 29 and 30		3 75
Sept. 10, 2 men cutting one day		2 50
Drawing corn by teams to silo, 27 hours at 30c. per hour		8 10
Men loading, cutting and tramping in silo, 7 or 8 in all, 108 hours at 12½c		13 50
Two-thirds cost of Special Fertilizer—		
100 lbs. Sulphate Ammonia	$4 60	
400 lbs. Capleton Superphosphate at $16 per ton (Mixed and spread first.)	3 20	
400 lbs. unleached wood ashes. Applied separately afterwards	1 20	
	9 00	6 00
Use of engine and cutter, 1¼ days at $5		6 25
Foreman's wages, supervising work, say		7 50
Rent of land, say		8 00
		65 30

This is equal to about $1.25 per ton. Two-thirds only of the cost of the special fertilizer is charged to this crop, as it is believed that future crops would be benefitted to the extent of the other third; if the whole be charged this would add nearly six cents per ton to the

cost of production. Supposing a silo with a capacity for 100 tons to cost $100, twelve cents per ton might be added to cover interest and depreciation for this item. The waste on 100 tons at the Central Experimental Farm was 2,528 lbs., which would further add about three cents per ton, making the total cost $1.40 per ton, or including the full price of the fertilizers, $1.46. No other food so nutritious for the winter feeding of stock can be produced so cheaply as this. The silo, which is divided into two compartments of 16 x 18 feet and high enough to allow of its being filled to a depth of about 18 feet, each thus capable of holding about 100 tons, was filled from the 10th to the 20th of September.

The corn was cut in lengths of one-half to three-quarters of an inch and well trodden down, especially around the margins, and when filled the surface of one compartment was covered with about a foot of cut straw and not weighted, the other had no straw but was covered with boards and weighted with stones. When opened on the 1st of December the former was found in good condition, with but a small proportion of the top spoiled, the latter was blackened and partly decayed for from 4 to 6 inches in depth. In 1889 both divisions were covered with about a foot of cut straw and one only weighted with boards and stones, and in that instance there was less waste on the side weighted. Both years the ensilage came out in good condition, was sweet and malty in odour with a very slight acidity, and kept well throughout the winter. That put up in September, 1889, retained its good qualities to the time the last of it was used in July, 1890; that cured last season, is almost, if not quite as good now as when it was opened in December.

CORN SOWN AT DIFFERENT DISTANCES.

Tests were also made with several varieties of corn sown two kernels to the foot, four to the foot and twelve to the foot, also in rows 4 feet apart, 3½ feet, 3 feet, 2½ feet, 2 feet, and 14 inches, these latter with kernels all from 3 to 6 inches apart. Other plots were sown broadcast at the rate of three bushels per acre. In the following table the results of these several operations are given. The corn was sown on the 23rd of May, came up on the 2nd and 3rd of June, tasselled from the 15th to the 25th of August, and was cut on the 12th and 13th of September.

EXPERIMENTS WITH CORN PLANTED AT DIFFERENT DISTANCES.

Name of Variety.	Distance Apart.	Yield per Acre.	
		Tons.	Lbs.
Golden Beauty	2 kernels to the foot	26	362
do	4 do do	24	642
do	12 do do	24	1186
Giant Prolific Ensilage	2 do do	19	1204
do do	4 do do	20	1200
do do	12 do do	20	1654
Red Cob Ensilage	2 do do	26	216
do	4 do do	26	1451
do	12 do do	28	83
Thoroughbred White Flint	2 do do	29	1259
do do	4 do do	24	912
do do	12 do do	27	813
Edmunds' Premium Dent	3 do do	26	1460
do do	12 do do	30	700
Leaming Yellow Dent	3 do do	27	780
do do	12 do do	25	1480
Excelsior Sweet	3 do do	15	1020
do	12 do do	21	1560
Giant Prolific Ensilage	In rows 4 feet apart	18	821
do do	do 3½ do	21	1279
do do	do 2½ do	18	24
do do	do 2 do	17	531
do do	do 14 inches apart	14	245
do do	Sown broadcast	19	1520
Thoroughbred White Flint	In rows 4 feet apart	19	890
do do	do 3½ do	24	9
do do	do 2½ do	22	1193
do do	do 2 do	17	303
do do	do 14 inches apart	19	1446
do do	Sown broadcast	19	926

From the results given it would appear that the Thoroughbred White Flint, Long White Flint, Long Yellow Flint, Yellow Dutton, Large White Flint, Pearce's Prolific, and Longfellow are the most productive of the Flint varieties, ranging in yield in the order named, and all of them excepting the Long White Flint attained a sufficient degree of maturity to make excellent ensilage.

Among the different sorts of Dent corn, none of which, however, mature as well as the Flint varieties, the following have been found to yield the greatest weight of crop: Virginia Horse-tooth, Golden Beauty, Golden Dent, Blunt's Prolific, Mammoth Southern Sweet, and Red Cob Ensilage.

Many sorts of sweet corn have given a large yield, the most prolific being Mammoth Sugar, Crosby, Eight-rowed Sugar, Egyptian Sugar, and Asylum Sweet. The earliest ripening among these is the Crosby.

PART 2.

REPORT

ON THE

Chemical Composition of certain varieties of Indian Corn.

By FRANK T. SHUTT, M.A., F.I.C., F.C.S.

Chemist, Dominion Experimental Farms.

OBJECTS OF THE INVESTIGATION.

The following work was undertaken with two principal objects in view. First, to ascertain the relative values of certain varieties of Indian corn for fodder purposes; and, secondly, to arrive at a knowledge as to the best time for cutting, whether for the silo or for preservation in the dry condition. Incidentally, however, other points regarding the growth of the corn plant have received elucidation, and the information thus gained will, it is hoped, prove of service to the corn grower.

VARIETIES ANALYSED.

The varieties of corn experimented with are as follows: Queen of the Prairie, Angel of Midnight, Virginia Horsetooth, Golden Beauty, Early Adams, Long White Flint and Mammoth Southern. They were all cultivated in the same manner, viz., in rows 3 feet apart, and the soil was fairly uniform throughout. The samples taken for analysis were from the crop of 1889, and were cut at two stages of their growth, the first on the 26th August, and the second on the 19th September. In each case the sample consisted of not less than six average stalks, cut close to the ground. These were subsequently cut in fine pieces and a portion of the thoroughly mixed corn reserved for chemical examination.

The stages of growth at which the samples were taken are indicated in the table of analyses.

COMPOSITION OF FODDERS.

To a right appreciation of the results hereafter to be discussed a knowledge of the composition of fodder plants in general is necessary. On pages 116 and 117 of the Annual Report of the Experimental Farms for 1890 I have made some remarks on the origin, relative value and functions of the various constituents which make up the composition of fodders. To these pages the reader is therefore referred for such explanations regarding the terms albuminoids, fat, fibre, carbohydrates, &c., as he may require in order to understand the conclusions here stated.

INDIAN CORN AND ENSILAGE.

In the table that follows will be found in the several columns the data obtained on examination of the samples of Indian corn and ensilage. The two samples of corn ensilage were taken from the silos of the Central Experimental Farm on the dates recorded. Both were in an excellent state of preservation, and mildly acid. The silos were filled indiscriminately with the corn of many varieties grown on the farm, including those analysed.

An inspection of the figures and averages in the following table reveals the following facts:—

1. That there is a general similarity in the composition of the dry matter of all the corns examined, so that between those cut on the same date no great difference, except in one or two isolated cases, are to be noticed.

2. That the percentage of water in the corn fodder cut 26th August, was considerably greater than that in the samples taken 19th September. This means that the percentage of "dry matter" in the corn of the latter date exceeded that in the corn of 26th August. Thus one ton (2,000 lbs.) of the corn of the later period contains on an average 455 lbs. of dry matter, while the same quantity of that of earlier growth (August 26th) contains but 384·8 lbs.

3. That the percentage of ash in the dry matter decreased materially as the plant matured.

4. That the percentage of albuminoids had decreased slightly in the dry matter during the period of growth between 26th August and 19th September.

5. That the percentages of fat, fibre and carbohydrates had increased during the same period—the two former, however, not to any marked extent.

TABLE I.—Analyses of Indian Corn and Ensilage.

Name of Variety.	Stage of Growth.	Date of Cutting.	Water.	Dry Matter.	Percentage Composition of Dry Matter.				
					Ash.	Albuminoids.	Fat.	Fibre.	Carbohydrates.
Queen of the Prairie	Ears partially developed	Aug. 26	79·14	20·86	6·73	9·81	·72	26·72	56·02
Angel of Midnight	Tasselling	do 26	80 30	19·70	6·88	7·94	·94	26·92	57·32
Virginia Horsetooth	Ears not out, very high	do 26	83·04	16·96	8 27	9·06	1·03	26·34	55·30
Golden Beauty	do do	do 26	80·30	19·70	7·47	9·81	1·24	26·17	55·31
Early Adams	Ears partially developed	do 26	80·16	19·84	7·09	9·87	·98	27·87	54·19
Long White Flint	Ears not developed	do 26	80·64	19·36	6·29	7·94	1·48	27·87	56·42
Mammoth Southern	do	do 26	81·76	18·24	7·45	9·75	1·16	27·00	54·64
Average			80·76	19·24	7·17	9·17	1·08	26·98	55·60
Queen of the Prairie	In early milk	Sept. 19	75·22	24·78	5·70	7·50	1·05	26·40	59·35
Angel of Midnight	do	do 19	78·12	21·88	5·69	9·94	1·91	25·87	56·59
Virginia Horsetooth	Tasselling	do 19	78·67	21·33	6·31	9·81	1·49	27·60	54·79
Golden Beauty	In late milk	do 19	75·62	24·38	5·29	8·75	1·18	25·83	58·95
Early Adams	Some leaves brown; stalks thin; ears well filled.	do 19	76·12	23·88	3·96	6·25	1·32	28·75	59·72
Long White Flint	Ears partially developed	do 19	79·42	20·58	4·94	7·00	1·72	30 55	55·79
Mammoth Southern	do do	do 23	77·57	22·43	5·47	8·69	1·70	26·93	57·21
Average			77·25	22·75	5·33	8·28	1·45	27·36	57·58
Ensilage—									
Corn	Central Experimental Farm	Dec. 4	78·09	21·91	5·69	9·00	3·31	22·99	59·01
do	do do	Mar. 5	78·00	22·00	5·98	9 43	4·37	28 37	51·85

From these facts the following conclusions may be drawn :—

1. That a gradual increase of dry matter takes place until the corn plant arrives at its maturity. The concensus of opinion prevailing among the agricultural chemists of the United States is that the greatest amount of nourishment is in the plant about the time when the ear is glazing—after it has passed what is known as the "milk stage." At this period there is the largest yield of nutritive matter per acre, and if then cut and preserved most profit will accrue to the farmer. The stalks at the time of cutting should only be beginning to urn yellow near the ground. If the corn is left standing after this stage the amount of digestible albuminoids is lessened and the quantity of indigestible fibre increased—an example of this is seen in the analysis of the varieties Early Adams and Queen of the Prairie.

Since the composition of the dry matter in different varieties of Indian corn varies within such small limits, it becomes clear that the corn to grow for fodder purposes is that variety which yields the heaviest crop per acre, and comes to maturity in the locality in which the grower lives.

In support of the statements regarding the increase of food constituents during the latter stages of the growth of corn, I have taken the liberty to insert the following table copied from a Bulletin issued by the Experiment Station of Cornell University, New York, which gives the increased percentage of the nutritive constituents per acre, as derived from the work of four Experiment Stations in the United States.

TABLE II.—Increase in percentages of Nutritive Ingredients of Corn in maturing.

Year.	Place.	Variety.	Stage of Maturity.		Date.		Gains between First and Last Cutting.			
			First cutting.	Last cutting.	First cutting.	Last cutting.	Dry matter.	Albuminoids.	Fat.	Carbohydrates.
							Per cent.	Per cent.	Per cent.	Per cent.
1889..	Cornell Agricultural Experiment Station..	Pride of the North	Bloom	Mature	Aug. 2	Sept. 24	150	90	129	169
1888..	do do ..	do ..	do	Nearly mature	July 24	do 3	217	134	374	300
1889..	New York Agricultural Experiment Station	King Philip.	Tasselled..	Ripe	do 30	do 23	389	183	335	462
1887..	New Hampshire Agricultural Experiment Station.....	Average 4 varieties	*Tasselled	*Glazed	Aug. 5	do 16	112	50	84	130
1889..	Pennsylvania Agricultural Experiment Station.....	do ..	†Tasselled	†Ripe & cured	..... .	.. ....	155	....	.....	.....
Average of all trials							205	114	230	265

*The average condition of the four, as near as may be.
†The actual condition of each, dates not given.

This enormous increase, in spite of lessened albuminoids and larger percentages of fibre, means that some tons per acre of digestible food is stored up in the corn plant during the last stages of its growth, and points undoubtedly and emphatically to the time for harvesting the fodder.

2. The decreased percentage of ash in the dry matter as the corn arrives at maturity shows that it is the young plant more particularly that absorbs the mineral constituents from the soil, and the same is no doubt true, though not to the same extent perhaps, as regards its nitrogen. This clearly advises that the previous tillage of the soil should be thorough, and that during the early part of the season especially should the corn be well cultivated and kept free from weeds.

3. Attention has been called to the fact that the albuminoids decrease as the plant matures. This is, perhaps, but partially correct. The albuminoids are calculated by multiplying the total amount of nitrogen found by 6·25—as one part of nitrogen is equivalent to 6·25 parts of albuminoids. Now, as some of this nitrogen, more particularly in the young plant, exists in the condition of amides, it would be more accurate to state that the amount of nitrogen decreases during mature growth. It is considered that the nitrogen of the amides in the young plants is transformed into that of the more valuable albuminoids as ripeness approaches. Therefore, though the maturer plant may contain the less nitrogen, the loss may be more than compensated for in the increased percentage of true albuminoids. It is, therefore, the wisest policy to allow the corn to reach the glazed condition, especially when we remember the tremendous increase of dry matter, of which the albuminoids form a part, as the plant approaches maturity.

4. Fibre may be regarded as the framework of the plant, supporting the more tender tissues, and carrying by means of its tubes and vessels the nourishment elaborated by the roots and leaves. After it has been allowed to become dry and hard by over-ripeness, its digestibility is to a large degree impaired. Such change is usually accompanied by alteration in colour—the stem becoming yellow or brown. Want of light and room to grow often cause this discolouration prematurely.

Intimately connected with this matter of plant development is that of room—room for the roots and room for the stalks. For a rapid and generous growth of the plant, both are necessary. Plenty of loose soil is required for the roots and rootlets to pene-

trate, thus securing an ample supply of nitrogenous and mineral matter. Sunlight and air are essentials to a large development of the carbohydrates. Crowding due to over-thick seeding will result in a diminished yield per acre.

DIGESTIBLE MATTER IN GREEN FODDER.

In table III will be found the weight in pounds of the digestible constituents per ton of the green fodder and ensilage. These weights have been calculated from the percentage composition of the corns, using the following co-efficients of digestion:—

Albuminoids, 73.	Fat, 75.
Fibre, 72.	Carbohydrates, 67.

Referring to the averages given in this table, it will be noticed that one ton of green fodder cut August 26th contains 256·31 lbs., while one ton of that cut September 9th contains 297·72 lbs. of digestible matter, an increase of 41½ lbs. This is principally due to the lessened percentage of water in the maturer corn.

It is not in one class of ingredients alone that this augmentation has taken place, though, as might have been expected from what has already been said about decreased nitrogen in the riper corn, the albuminoids have not increased in the same ratio as the other nutrients.

Data has already been quoted (table II) to show that the yield per acre of food constituents increases in the ripening corn. The results in table III prove that weight for weight this riper corn is the more valuable fodder.

TABLE III.—DIGESTIBLE Matter and Nutritive Ratio

TABLE III.—Digestible Matter and Nutritive Ratio.

Name of Variety.	Stage of Growth.	Date of Cutting.	Pounds of Digestible Matter per Ton of Green Fodder.					Nutritive Ratio.
			Albuminoids.	Fat.	Fibre.	Carbohydrates.	Total Digestible Matter.	
Queen of the Prairie	Ears partially developed	Aug. 26	29·88	2·25	80·22	156·51	268·86	1 : 8·1
Angel of Midnight	Tasselling	do 26	22·83	2·78	76·36	151·19	253·16	1 : 10·3
Virginia Horsetooth	Ears not out; very high	do 26	22·42	2·62	80·28	125·60	230·92	1 : 9·5
Golden Beauty	do do	do 26	28·21	3·67	74·24	146·01	252·13	1 : 8·1
Early Adams	Ears partially developed	do 26	28·61	2·92	79·66	144·14	255·33	1 : 8·1
Long White Flint	Ears not developed	do 26	22·43	4·29	78·37	146·29	251·38	1 : 10·5
Mammoth Southern	do do	do 26	24·66	3·17	70·96	133·62	232·41	1 : 8·6
Average			25·58	3·10	77·16	143·91	256·31	1 : 9·0
Queen of the Prairie	In early milk	Sept. 19	27·10	3·89	94·09	196·83	321·91	1 : 11·1
Angel of Midnight	do	do 19	31·78	6·28	81·58	166·07	285·71	1 : 8·3
Virginia Horsetooth	Tasselling	do 19	30·54	4·77	84·88	156·76	276·95	1 : 8·3
Golden Beauty	In late milk	do 19	31·17	4·32	90·76	192·75	319·00	1 : 9·4
Early Adams	Cobs ripe; some leaves brown; stalks thin; ears well filled	do 19	21·80	4·73	98·94	191·26	316·72	1 : 13·9
Long White Flint	Ears partially developed	do 19	21·05	5·32	90·63	154·00	271·00	1 : 12·2
Mammoth Southern	do do	do 23	28·42	5·71	86·87	171·72	292·72	1 : 9·6
Average			27·41	5·00	89·68	175·77	297·72	1 : 10·4
Ensilage—								
Corn	Central Experimental Farm	Dec. 4	28·78	10·87	72·50	173·17	285·32	1 : 9·5
do	do do	Mar. 5	30·29	14·42	89·88	152·85	287·44	1 : 9·2

ENSILAGE.

The *exact* feeding value of corn ensilage, as compared with that of corn preserved in the dry condition, has as yet not been positively ascertained. There appears to be plenty of evidence on the one hand to support the superiority of dry corn fodder, while on the other hand, from different sources, there seems to be proof positive that the ensilage is the more nutritious of the two. In the process of ensiling a portion of the true albuminoids become converted into compounds supposed to have a lower feeding value, and some of the carbohydrates are transformed into organic acids, while in preserving in the dry condition much of the fibre is rendered indigestible. The silo forms a ready and cheap means of preserving in small compass a large quantity of corn, and when the proper precautions are taken in constructing the silo and protecting the ensilage, there can be but little doubt that this method of storing fodder is an economical one.

Chemistry teaches that the one great principle to be remembered and practised in preserving by means of the silo is *exclusion of air*. The more air-tight the walls of the silo, the closer the cut corn is packed, and the more completely it is protected from the air, the better will the ensilage be. Access of air causes fermentation, development of acid, and finally, decay.

As the samples of corn ensilage were not composed wholly of the varieties of corn analysed, no strict comparison can be drawn between their composition and that of the corns examined. The percentage of dry matter is slightly lower, and that of the ash somewhat higher than in the corn of September 19th. The albuminoids do not seem to have suffered by the process—though possibly to some extent albuminoids here represent amides and other nitrogenous compounds. The development of organic acids in fermentation has increased the figures that represent the percentage of fat, since in the process of analysis they are determined largely with the latter ingredient.

From the present analyses, and using the same co-efficients of digestion as for corn fodder, it appears that one ton of corn ensilage contains somewhat less (about 10 lbs.) of digestible nutrients than the same weight of the corn cut September 9th. (See table III.)

We may, therefore, conclude that between well-preserved ensilage and mature green fodder there exists but little difference in feeding value.