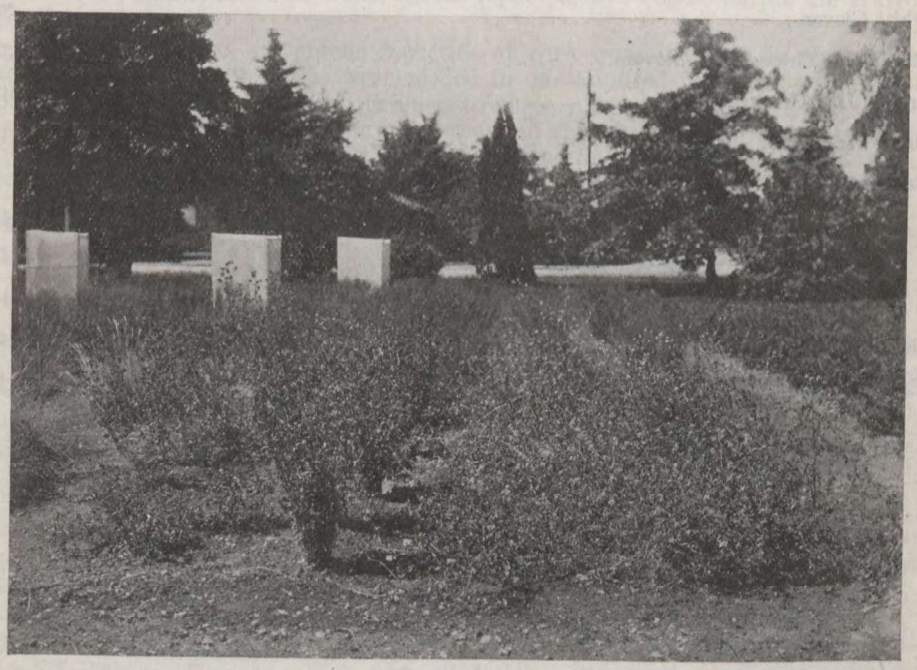
DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

REPORT OF THE

DIVISION OF FORAGE PLANTS

FOR THE YEAR 1923

G. P. McROSTIE, Ph.D., DOMINION AGROSTOLOGIST



Two distinct varieties of alfalfa obtained by isolation and self-fertilization.

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DIVISION OF FORAGE PLANTS

REPORT OF THE DOMINION AGROSTOLOGIST, G. P. McROSTIE, Ph.D.

INTRODUCTION

During the season of 1923, the chief changes in the work of the Forage Crop Division were along lines of increasing accuracy in experimentation. Borders were removed from all plots and yields figured, in most cases, on the basis of absolute dry matter, rather than on green weights or field-cured matter. As in former years, the chief aim of the work was the separation of superior strains of forage plants from the great mixtures commonly found in commerce. Somewhat slow, but nevertheless sure, advance is being made in this direction and several improved strains of grasses and legumes are now being multiplied for general distribution.

The area added to the Experimental Station at Harrow, Ont., in 1923, has permitted of marked expansion in the corn breeding work at that point. A special assistant to take charge of corn breeding was appointed in April, 1923, in the person of Mr. A. E. Matthews. Unfortunately Mr. Matthews, who was doing excellent work, died before the first summer's work was completed. Mr. F. Dimmock has been appointed to the position thus left vacant.

FIELD CORN

Owing to the lack of ground for experimental purposes, no variety test work with corn was conducted at Ottawa during the summer of 1923. This work and considerable new work, herein reported, was conducted at the Harrow Station.

VARIETY TESTS.—Seventeen varieties of corn were included in the variety test. The different varieties were seeded in one-hundred-foot rows—planted in hills 3 feet 6 inches apart and thinned to three plants to a hill. Each variety was replicated ten times in different sections of the experimental area. One-half of each row was harvested for fodder and one-half for grain, and all yields reported in terms of absolute dry matter.

TABLE I.—CORN VARIETIES

Variety	Source	Average Yield per Acre of Grain											
		As Harvested			Moisture free dry weights								
		Corn and Cob			Corn and Cob		Cob		Shelled Corn				
		Ton	Lb.	Bush.	Ton	Lb.	p.c.	Lb.	p.c.	Ton	Lb.	Bush.
Lancaster	United States Dept. of Agriculture B.P.I., Wash.	3	531	93·3	1	1,694	23·52	869	76·47	1	825	50·4
Silver King	" " "	2	919	70·3	1	1,035	18·27	555	81·73	1	480	44·3
U.S. Selection 119	" "	2	1,263	75·2	1	265	28·83	653	71·17		1,612	28·8
Fulton Yellow Dent	" " "	2	528	64·7	1	844	17·73	504	82·26	1	340	41·8
Burr Leaming	Dept. of P.B. Conn. Agr. Expt. Station.	3	140	87·7	1	1,646	18·85	687	81·15	1	959	52·8
White Cap Yellow Dent	Steele Briggs, Toronto	2	1,926	84·6	1	1,557	18·88	671	81·12	1	886	51·5
Wisconsin No. 7	Wisconsin Experimental Station, Madison, Wis.	2	1,856	83·6	1	1,540	19·58	693	80·42	1	847	50·8
White Cap Yellow Dent	J. O. Duke, Ruthven, Ontario	2	1,618	80·3	1	1,291	19·46	640	80·54	1	651	47·3
Golden Glow	Wisconsin Experimental Station, Madison.	2	730	67·6	1	849	21·19	604	78·81	1	245	40·1
Golden Glow	J. O. Duke, Ruthven, Ontario	2	776	68·2	1	829	20·67	585	79·33	1	244	40·1
Disco Pride Yellow Dent	Dakota Improved Seed Co., Mitchell, S.D.	1	1,366	48·1	1	269	16·64	378	83·35		1,891	33·8
Disco N.W. Dent	" "	2	255	60·8	1	836	19·95	566	80·05	1	270	40·5
Cold Resistant	Wisconsin Experimental Station, Madison.	2	1,310	73·3	1	964	20·22	599	79·78	1	365	42·2
North Dakota	Steele Briggs, Toronto	2	824	68·9	1	1,030	20·07	608	79·93	1	422	43·3
Disco Longfellow	Dakota Improved Seed Co.	2	010	56·9	1	872	20·35	585	79·65	1	287	40·8
Twitchell's Pride	Experimental Station, Fredericton, N.B.	1	1,082	44·0								
Compton's Early	J. O. Duke, Ruthven, Ontario	2	646	66·4	1	809	22·17	623	77·82	1	186	39·1

TABLE 2.—CORN VARIETY TESTS

Variety	Source	Average yield per acre of Fodder			
		Green Weight		Absolute Dry Weight	
		tons	lbs.	tons	lbs.
Lancaster	United States Dept. of Agri. B. P. I. Wash	11	1,043	3	199
Silver King	" " "	7	686	1	1,479
U. S. Sel'n 119	" " "	12	240	2	1,999
Fulton Yellow Dent	" " "	6	1,240	2	529
Burr Leaming	Geo. S. Carter, Clinton, Conn	10	1,691	2	1,774
White Cap Yellow Dent	Steele Briggs, Toronto	8	1,543	2	1,438
Wisconsin No. 7	Wisconsin Agr. Station, Madison	6	1,868	2	847
White Cap Yellow Dent	J. O. Duke, Ruthven, Ontario	9	1,155	2	1,519
Golden Glow	Wisconsin Agr. Station, Madison	7	793	2	395
Golden Glow	J. O. Duke, Ruthven, Ontario	7	1,160	2	954
Disco Pride Yellow Dent	Dakota Improved Seed Co., Mitchell	4	1,340	1	1,100
Disco N. W. Dent	" " " "	6	1,003	2	398
Cold Resistant	Wisconsin Agr. Stn., Madison	8	488	2	767
North Dakota	Steele Briggs, Toronto	6	398	1	910
Disco Longfellow	Dakota Improved Seed Co., Mitchell	7	1,752	2	680
Twitchell's Pride	Experimental Farm, Fredericton, N.B	4	463	1	643
Compton's Early	J. O. Duke, Ruthven, Ontario	6	1,963	1	1,602

One year's results cannot be relied on as accurate indications of the yielding capacity of the various corns under test. It is significant, however, that the highest yield of both fodder and shelled corn was secured from a quadruple hybrid corn originated at the Connecticut Experiment Station. Such hybrid corns may have a place in increasing the yield of our Canadian varieties of corn both for fodder and grain.

EXPERIMENTAL METHODS.—An experiment was begun in the spring of 1923 to test the influence of one variety on another when planted side by side. This competitive influence is indicated most clearly by the resulting yields of the varieties under test.

Three row blocks of six varieties representing a fairly wide range of type and length of time to maturity were used. These were planted in a manner designed to test the effect of extreme and similar varieties when planted side by side. Doubtless climatic and soil influences which vary from year to year will alter the competitive effect, but a few years' trial should give valuable information as to the best method of grouping varieties in comparative test work.

CORN BREEDING.—Over three hundred and fifty different lots of corn were gathered together at the Harrow Experimental Station in the spring of 1923. These lots of corn included some of the best breeding material that could be secured from the various experimental stations and agricultural colleges in both Canada and the United States and represented a great many lots of both early, mid-season and late corns. Intensive breeding work with these different varieties and strains is being carried on with the expectation that superior strains of corn may be isolated for the various corn-growing areas of Canada.

SOYBEANS

A variety test with soybeans was begun at the Harrow Experimental Station in the spring of 1923. The following varieties and strains were included in the test:—

TABLE 3.—SOYBEANS

Variety	Yield Bushels per acre
O. A. C. No. 81	8·877
Ste. Anne's No. 92	9·862
Black 216	5·90
Green 217	5·84
Golden 207	4·04
Yellow 200	8·70
Chinaton Echo (Green)	9·37
Yellow 212	6·88
Yellow 210	6·30
Early Korean 209	7·614

Weather and soil conditions were not favourable for the optimum production of soybeans consequently all yields are very low.

In 1924 a number of new varieties will be included in the test and yields of forage as well as yields of grain will be secured for each variety tested.

CLASSIFICATION OF FIELD ROOTS

Obvious confusion exists with regard to so-called "varieties" of field roots as sold throughout Canada at the present time. In an endeavour to bring order out of this confusion, an analysis of field root varieties has been undertaken by the Forage Crop Division and a mechanical classification has been attempted based on approximately ten thousand actual measurements.

An examination of the seed catalogues listing field roots for sale will reveal the frequent use of certain descriptive terms—reference to the mangel crop will serve to illustrate this point. Included in the variety name or in connection with the descriptive matter pertaining to this crop we generally see one of the following six terms, long, half-long, intermediate, tankard, ovoid or globe. These terms are used to indicate the general type of the root. Our classification has been based on an attempt to obtain sufficient actual measurements and general notes of the types as indicated by the seed catalogues to define clearly such types in as far as field roots are concerned.

Our preliminary classification of the mangel crop is the only one as yet sufficiently advanced to offer with the belief that it will continue to be reasonably accurate for practical application in future years. Of course small modifications may be expected after additional years of test.

Fig. 1, illustrates our system of measurement. The junction of the lines A, B, and C, B, which lines are drawn parallel with the line of slope at the base of the root, indicates the point which is considered in all types of roots to be the lower termination of the root in question.

The following four measurements were made on all roots under investigation: 1, length—distance from B to F; 2, width taken at the widest part of the root; 3, depth of root in the ground (distance from B to ground line D); 4, distance from B to the widest part of the root.

The actual length, width or depth in the ground of any root is not enough in itself to determine the general type to which it should belong. It is the relationship between these measurements that is important from the standpoint of classification. In order to reduce the various measurements to a common standard the width, depth in ground, and distance to widest point were all divided into the length of each individual root. In this manner the length-width, length-depth in ground, and length-distance to widest point ratios were obtained. The length-width ratio was used as the primary basis on which type was determined.

Mangel seed was obtained from all the leading firms carrying the seed of such crops in Canada and the United States also from representative seed firms in England and Scandinavian countries. Representative roots from the more uniform of these various varieties were measured and the types determined by averaging the similar measurements from varieties belonging to a common type. Thus all of the long varieties from various sources were grouped together, and so with the other types.

Table No. 4 records the average of the length-width, length-depth and length-distance to widest point ratios for the various types. The ovoid type could not be included because of insufficient varieties to obtain a representative average. This type occurs mostly in connection with lots of globes and intermediates and is about half way in type between these two kinds. A few varieties of the ovoid type are being introduced however, consequently it is included in the classification and the definite type ratios will be established as soon as possible.

TABLE 4.—AVERAGES OF ALL MEASUREMENTS

——	Length-width Ratio	Length-depth Ratio	Length-distance to widest point
Long	3·310	1·981	1·279
Half Long	2·915	2·044	1·329
Intermediate	2·065	2·261	1·511
Tankard	1·594	3·088	
Globe	1·074	2·405	1·597

Fig. No. 2, illustrates by line drawings the relative proportions of the five mangel types classified.

An examination of the line drawings of the various types will bear out the fact that the types as illustrated represent more than purely mechanical divisions. Each particular type has a different proportion of the root in the ground and in many cases also a different structure of the root. These variations have a definite bearing on the adaptability of the type in question to various kinds of soil. The shallow-rooted types represented by the tankard and globe sorts are obviously better suited for shallow soils than the long or half-long types. On the other hand, the long and half-long types seem to be able to reach proportionally greater development on deep rich soils than the shallow rooted sorts.

In this connection it seems opportune to emphasize at the present time the desirability, if not the actual necessity, of applying the term tankard only to mangels having an abrupt termination. Such types are usually also more or less rectangular and very frequently constricted in the middle although they may also be parallel sided or slightly convex sided. Such types are distinctly shallow rooted, easy to harvest and well adapted for shallow soils. The fairly common practice of seedsmen calling certain types which properly belong in the intermediate type by the name of tankard is undesirable and misleading.

The accompanying tables will illustrate the amount of variation that may be expected to occur within the range limits of any type with regard to the different ratios reported.

The variation illustrated in the tables is partly a varietal variation but even within each variety there exists a very appreciable difference in the individual roots. A part of this is due to changes in shape because of varying soil conditions, and a part is due to genetic impurity of the variety in question and to other causes. It is quite apparent, however, that in an open-textured, fairly rich soil that uniformity within the variety increases almost in direct ratio with genetic purity.

Plates 3-4-5-6 illustrates roots of the various types selected to show as well as possible with such few numbers the range of variation existing within each type in so far as shape is concerned.

In the long and half-long types three distinct variations in shape exist with intergrades between such shapes. These forms are roots tending to be parallel sided, roots which have the widest portion near the top and roots which have the widest portion near the middle of the root.

In the intermediate types similar variations occur but in addition roots tending to the ovoid shape are found. In the tankard type we find roots slightly convex-sided, roots parallel-sided, roots in which the portions above and below the constriction are approximately the same size, roots in which the portion above the constriction is the larger, and vice versa.

In the ovoid types various degrees of ovalness are found, while in the globes are found true globes, flat globes, globes with the widest portion near the top, and vice versa.

Table No. 10, lists the varieties tested during the summer of 1923 under the particular type, according to the classification herein presented. Most varieties could be quite easily placed according to their type, but a few were so badly mixed that no one type would accommodate them.

TABLE 5.—LONG TYPE

Variety	Source	Length—Width Ratio																										
		2·6	2·7	2·8	2·9	3·0	3·1	3·2	3·3	3·4	3·5	3·6	3·7	3·8	3·9	4·0	4·1	4·2	4·3	4·4	4·5	4·6	4·9	5·0	5·3	5·5
Elvetham Long Red	Suttons	5·12	5·12	5·12	.....	17·94	10·25	5·12	10·25	5·12	5·12	7·69	.....	5·12	.....	7·69	.....	2·56	7·69	.....	.....	.....	.....	.....	.....	.....
Mammoth Long Red	Dupuy and Ferguson	2·77	2·77	5·55	5·55	11·11	8·33	2·77	8·33	2·77	11·11	8·33	5·55	5·55	2·77	13·88	.....	.....	.....	.....	.....	.....	2·77	.....	.....	.....
Elevtham Mammoth	Hjalmar Hartmann Co.	6·44	6·44	3·21	19·34	3·21	12·88	6·44	16·11	3·21	3·21	6·44	3·21	6·44	.....	3·21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gatepost	J. A. Bruce	2·85	2·85	2·85	5·70	5·70	14·28	2·85	17·13	5·70	14·28	.....	8·56	.....	.....	2·85	.....	2·85	5·70	.....	.....	.....	.....	2·85	.....	2·85
Long Red Mammoth	Wm. Ewing	.....	5·12	5·12	10·25	10·25	23·07	5·12	15·38	2·56	2·56	.....	5·12	2·56	.....	10·25	2·56	.....	.....	.....	.....	.....	.....	.....	.....	.....
Suttons Mammoth Long Red.	Suttons	8·10	2·7	8·10	13·51	10·81	.....	8·10	8·10	5·4	5·4	5·4	5·4	.....	.....	5·4	.....	.....	2·7	.....	.....	.....	.....	.....	.....	.....
Improved Mammoth Long Red.	Carters	.....	7·5	5·5	5·0	22·5	10·0	10·0	7·5	7·5	2·5	5·0	.....	2·5	.....	2·5	.....	.....	7·5	2·5	2·5	.....	.....	.....	.....	.....
Prize Mammoth Long Red.	Steele Briggs	6·45	.....	6·45	3·22	9·67	12·9	3·22	9·67	6·45	12·9	3·22	6·45	6·45	.....	6·45	.....	.....	3·22	.....	.....	.....	3·22	.....	.....	.....
Long Red Mammoth	Graham Bros	2·7	2·7	10·81	2·7	5·4	13·51	8·1	8·1	2·7	5·4	2·7	10·81	2·7	.....	13·51	.....	.....	5·4	.....	.....	.....	.....	.....	2·7	.....
Mammoth Long Red	Halifax Seed Co	.....	.....	8·32	2·77	.....	5·54	5·54	13·88	5·54	8·32	2·77	2·77	8·32	5·54	2·77	.....	2·77	8·32	.....	5·54	8·32	.....	.....	2·77	.....
		34·43	35·20	60·53	68·04	96·59	110·76	57·26	114·45	46·95	70·80	41·55	47·87	39·64	8·31	68·51	2·56	8·18	40·53	2·5	8·04	8·32	2·77	6·07	5·47	2·85
Average		3·443	3·520	6·053	6·804	9·659	11·076	5·726	11·445	4·695	7·080	4·155	4·787	3·964	0·831	6·851	0·256	0·818	4·053	0·25	0·804	0·832	0·277	0·607	0·547	0·285

Average length—width ratio 3·310092.

TABLE 5.—LONG TYPE—*Concluded*

Variety	Source	Length—Depth Ratio													Length to Widest Point Ratio										
		1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·1	2·2	2·3	2·4	2·5	2·6	1·0	1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0
Elvetham Long Red	Suttons	2·85	.....	.....	.....	5·71	8·57	8·57	22·85	8·57	19·99	8·57	11·42	2·85	2·5	15·0	20·0	7·5	12·5	20·0	17·5	2·5	.....	2·5	.....
Mammoth Long Red	Dupuy and Ferguson	.....	.....	.....	3·11	6·24	3·11	15·61	21·86	15·61	15·61	3·11	9·36	6·24	5·55	2·77	11·11	33·33	13·88	11·11	13·88	5·55	.....	.....	2·77
Elvetham Mammoth	Hjalmar Hartmann Co.	.....	.....	.....	5·71	2·85	11·42	20·0	5·71	17·14	14·28	2·85	14·28	5·71	.....	14·28	42·85	28·57	5·71	8·57	.....	.....	.....	.....	.....
Gatepost	J. A. Bruce	.....	.....	2·93	2·93	8·81	8·81	26·46	20·57	17·63	11·76	.....	.....	.....	2·7	10·81	18·91	21·62	21·62	16·21	2·7	2·7	2·7	.....	.....
Long Red Mammoth	Wm. Ewing	.....	.....	5·12	5·12	7·69	5·12	20·51	10·25	15·38	12·82	5·12	2·56	10·25	2·5	10·0	17·5	22·5	22·5	5·0	17·5	2·5	.....	.....	.....
Suttons Mammoth Long Red.	Suttons	.....	.....	.....	5·12	12·82	23·7	25·64	10·25	7·69	5·12	5·12	2·56	2·56	5·0	20·0	20·0	25·0	10·0	10·0	7·5	2·5	.....	.....	.....
Improved Mammoth Long Red.	Carters	7·99	23·78	18·52	13·26	10·52	2·73	13·26	5·26	.....	2·73	.....	2·73	.....	.....	40·0	27·5	12·5	10·0	7·5	.....	.....	.....	2·5	.....
Prize Mammoth Long Red.	Steele Briggs	9·99	3·32	13·32	16·65	19·99	16·65	9·99	9·99	.....	.....	.....	.....	.....	.....	12·9	35·48	25·8	22·58	.....	3·22	.....	.....	.....	.....
Long Red Mammoth	Graham Bros	3·03	9·09	3·03	6·06	12·13	12·13	24·26	12·13	.....	12·13	3·03	.....	3·03	5·4	13·51	21·62	24·32	10·81	10·81	8·1	2·7	2·7	.....	.....
Mammoth Long Red	Halifax Seed Co	.....	2·7	5·4	10·81	18·91	18·91	10·81	18·91	.....	8·1	2·7	.....	2·7	10·81	13·51	21·62	27·02	10·81	10·81	5·4	.....	.....	.....	.....
		23·86	38·89	48·32	68·77	105·67	111·15	175·11	137·78	82·02	102·54	30·50	42·91	33·34	34·46	152·78	236·59	228·16	140·41	100·01	75·8	18·45	5·4	5·0	2·77
Average		2·386	3·889	4·832	6·877	10·567	11·115	17·511	13·778	8·202	10·254	3·050	4·291	3·334	3·446	15·278	23·659	22·816	14·041	10·001	7·58	1·845	0·54	0·5	0·277

Average length—depth ratio 1·980962

Average length—widest point ratio 1·279110.

TABLE 6—HALF-LONG TYPE

Variety	Source	Length—Width Ratio													
		2·0	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0	3·1	3·2	3·3
Jumbo	Wm. Rennie, Toronto	3·56	.....	17·85	3·56	21·41	7·13	7·13	14·28	7·13	3·56	3·56	7·13	3·56	.....
Half Sugar White	Harris McFayden, Winnipeg	2·63	.....	10·52	.....	5·26	.....	5·26	18·42	7·89	15·78	2·63	15·78	2·63	13·15
Improved Giant	William Rennie, Toronto	.....	.....	11·76	2·93	2·93	2·93	8·81	20·57	8·81	14·69	.....	5·87	5·87	14·69
Monarch Sugar	A. E. McKenzie, Brandon	.....	.....	7·69	3·84	26·92	.....	7·69	19·23	3·84	7·69	3·84	11·53	3·84	3·84
Giant White Sugar	Wm. Rennie, Toronto	.....	2·76	5·54	5·54	11·10	.....	8·32	2·76	13·87	19·43	16·65	8·32	.....	5·54
Imperial Giant	Halifax Seed Co, Halifax	16·65	3·32	13·32	13·32	13·32	3·32	19·99	3·32	3·32	6·66	3·32	.....	.....	.....
Giant White Feeding Sugar	Steele Briggs, Toronto	.....	.....	8·1	.....	29·74	10·81	13·51	5·4	16·21	2·7	2·7	2·7	2·7	5·4
Danish Half Sugar wh. gr. top	Hjalmar Hartmann Co., Cop'hagen	3·02	.....	15·14	9·08	24·23	6·05	3·02	9·08	12·11	6·95	6·05	3·02	.....	3·02
Long White	Dupuy and Ferguson, Montreal	.....	.....	.....	.....	.....	.....	16·61	.....	.....	.....	33·22	16·61	8·29	24·93
Giant White Sugar	J. M. Steves, Steveston, B.C.	2·84	.....	11·42	.....	28·55	2·84	5·70	17·13	11·42	14·27	.....	.....	5·70	.....
Improved Tankard Cream	Wm. Rennie, Toronto	19·98	2·84	25·70	.....	17·13	5·70	5·70	5·70	8·55	2·84	5·70	.....	.....	.....
Giant White Half Sugar	Wm. Ewing Co., Montreal	.....	.....	8·10	5·39	10·80	8·10	24·31	5·39	8·10	10·80	5·39	10·80	.....	2·69
Half Sugar White	Dupuy and Ferguson, Montreal	2·85	.....	5·4	8·56	17·13	11·42	14·28	19·98	11·42	5·7	.....	2·85	.....	.....
Giant White Sugar	Steele Briggs, Toronto	4·87	.....	9·75	2·43	2·43	7·31	2·43	17·06	9·75	12·18	2·43	.....	2·43	4·87
Suttons Sugar	Suttons, England	2·55	2·55	20·5	7·68	7·68	10·25	5·12	7·68	7·68	7·68	5·12	7·68	2·55	5·12
Giant Sugar Mangel White	Graham Bros., Ottawa	.....	.....	17·94	2·56	15·39	.....	10·25	10·25	17·94	5·12	5·12	7·68	2·56	5·12
Giant White Feeding	Wm. Rennie, Toronto	9·36	3·12	21·85	9·36	18·73	3·12	9·36	9·36	.....	3·12	6·24	6·24	.....	.....
Giant Half Sugar	K. McDonald & Sons, Ottawa	19·98	6·65	6·65	9·99	9·99	9·99	13·32	3·32	9·99	6·65	.....	.....	.....	3·32
Leviathan	Wm. Rennie, Toronto	2·69	10·80	24·32	5·39	16·21	13·50	8·09	2·69	8·09	2·69	2·69	2·69	.....	.....
Select Giant Rose Interm Sugar	Wm. Ewing, Montreal	.....	3·11	9·37	6·24	9·37	9·37	9·37	12·48	6·24	12·48	6·24	9·37	3·11	3·11
Red Top White Sugar	Wm. Ewing, Montreal	.....	.....	2·85	5·70	2·85	8·56	8·56	11·41	22·84	8·56	2·85	17·13	2·85	5·70
Royal Giant Sugar	Steele Briggs, Toronto	.....	.....	6·23	3·11	9·36	.....	12·48	12·48	18·73	9·36	9·36	12·48	.....	6·23
Giant Sugar	Wm. Rennie, Toronto	.....	2·77	5·55	2·77	11·10	13·87	11·10	5·55	11·10	8·32	8·32	8·32	8·32	2·77
Danish Improved	Halifax Seed Co, Halifax	4·99	2·49	2·49	4·99	7·49	19·99	4·99	7·49	12·49	22·48	4·99	4·99	.....	.....
Bruces Giant Red Sugar	J. A. Bruce, Hamilton	18·74	15·62	18·74	6·23	15·62	6·23	3·11	9·37	.....	.....	.....	6·23	.....	.....
Half Sugar Red	Harris McFayden, Winnipeg	.....	2·77	5·55	5·55	5·55	13·87	2·77	11·10	13·87	2·77	16·65	8·32	.....	11·10
Giant Sugar Mangel Rose	Graham Bros., Ottawa	.....	.....	.....	8·56	5·71	8·56	11·42	11·42	14·66	14·66	5·71	2·85	14·27	2·85
Half Sugar Rose No. 1141	Trifolium, Copenhagen	.....	5·88	8·82	5·88	23·52	8·82	5·88	11·76	14·7	8·82	2·94	.....	.....	2·94
Giant Rose Sugar	A. E. McKenzie, Brandon	4·76	2·38	2·38	2·38	21·42	9·52	4·76	9·52	21·42	9·52	.....	7·14	4·76	.....
Bruces Giant Rose Sugar	J. A. Bruce, Hamilton	.....	.....	2·94	5·88	11·76	11·76	2·94	8·82	11·76	2·94	11·76	23·52	2·94	2·94
Giant Half Rose	Dupuy and Ferguson, Montreal	2·93	.....	2·93	2·93	14·69	11·75	8·82	5·87	14·69	5·87	11·75	11·75	2·93	2·93
		122·40	67·06	309·7	149·85	439·25	204·77	275·1	308·89	328·62	253·39	185·23	221·01	79·31	132·26
Average		3·948	2·163	9·99	4·833	14·169	7·25	8·874	9·964	10·6	8·173	5·975	7·129	2·558	4·266

Average length—width ratio 2·914961.

TABLE 6—HALF-LONG TYPE—*Continued*

Variety	Source	Length—Depth Ratio																
		1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0
Jumbo	Wm. Rennie, Toronto	.....	.....	.....	.....	.....	.....	19·99	.....	11·99	3·98	3·98	15·99	3·98	3·98	11·99	3·98	19·99
Half Sugar White	Harris McFayden, Winnipeg	5·0	.....	2·5	5·0	10·0	7·5	30·0	7·5	10·0	5·0	5·0	.....	5·0	2·5	5·0	.....	.....
Improved Giant	William Rennie, Toronto	.....	.....	2·84	2·84	8·56	5·70	5·70	2·84	8·56	11·42	8·56	8·56	11·42	11·42	5·70	.....	.....
Monarch Sugar	A. E. McKenzie, Brandon	2·5	2·5	2·5	7·5	7·5	2·5	25·0	2·5	15·0	10·0	7·5	.....	7·5	2·5	2·5	.....	2·5
Giant White Sugar	Wm. Rennie, Toronto	.....	.....	.....	.....	3·31	.....	16·65	6·65	19·98	.....	9·98	.....	13·31	6·65	16·65	.....	6·65
Imperial Giant	Halifax Seed Co, Halifax	8·57	5·71	5·71	25·71	17·14	11·42	14·28	5·71	.....	2·85	2·85	.....	.....	.....	.....	.....	.....
Giant White Feeding Sugar	Steele Briggs, Toronto	2·77	.....	8·32	5·54	13·88	5·54	13·88	2·77	13·88	5·54	8·32	5·54	5·54	2·77	2·77	2·77	.....
Danish Half Sugar wh. gr. top	Hjalmar Hartmann Co., Copenhagen	2·85	2·85	8·57	14·28	11·42	14·28	22·85	.....	11·42	.....	5·71	2·85	.....	2·85	.....	.....	.....
Long White	Dupuy and Ferguson, Montreal	2·93	2·93	5·87	.....	.....	26·46	20·58	5·87	2·93	14·69	2·93	5·87	.....	2·93	2·93	.....	2·93
Giant White Sugar	J. M. Steves, Steveston, B.C.	.....	.....	2·84	.....	14·26	.....	14·27	.....	19·99	.....	8·56	5·70	.....	5·70	8·56	2·84	17·13
Improved Tankard Cream	Wm. Rennie, Toronto	.....	.....	.....	.....	.....	.....	7·49	2·49	24·99	.....	7·49	7·49	12·49	.....	14·99	12·49	9·99
Giant White Half Sugar	Wm. Ewing Co., Montreal	.....	5·39	.....	.....	5·39	5·39	8·10	13·51	18·90	8·10	10·80	2·69	5·39	5·39	8·10	.....	2·69
Half Sugar White	Dupuy and Ferguson, Montreal	.....	.....	.....	2·77	.....	.....	5·54	2·77	13·88	11·10	22·21	11·10	8·32	5·54	8·32	.....	8·32
Giant White Sugar	Steele Briggs, Toronto	2·56	2·56	2·56	2·56	7·68	2·56	5·12	.....	17·93	2·56	17·93	10·25	.....	2·56	2·56	10·25	10·25
Suttons Sugar	Suttons, England	.....	.....	2·62	2·62	2·62	.....	7·88	5·26	10·52	7·88	15·78	18·40	7·88	.....	5·26	2·62	10·52
Giant Sugar Mangel White	Graham Bros., Ottawa	.....	.....	2·63	15·78	7·89	2·63	7·89	5·26	15·78	5·26	5·26	5·26	2·63	7·89	15·78	.....	.....
Giant White Feeding	Wm. Rennie, Toronto	.....	.....	.....	2·85	11·42	5·7	11·42	.....	17·13	2·85	17·13	8·56	5·7	2·85	5·7	8·56	.....
Giant Half Sugar	K. McDonald & Sons, Ottawa	.....	2·84	5·70	2·84	22·85	8·56	22·85	.....	8·56	2·84	8·56	5·70	5·70	.....	2·84	.....	.....
Leviathan	Wm. Rennie, Toronto	.....	.....	2·76	.....	.....	.....	19·43	.....	8·32	16·65	5·54	22·21	13·87	.....	8·32	.....	2·76
Select Giant Rose Interm Sugar	Wm. Ewing, Montreal	5·87	8·82	14·69	14·69	26·46	5·87	20·58	.....	.....	2·93	.....	.....	.....	.....	.....	.....	.....
Red Top White Sugar	Wm. Ewing, Montreal	35·27	11·75	20·57	20·57	5·87	5·87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Royal Giant Sugar	Steele Briggs, Toronto	5·12	10·25	23·07	7·69	17·94	12·82	10·25	2·56	2·56	7·69	.....	.....	.....	.....	.....	.....	.....
Giant Sugar	Wm. Rennie, Toronto	10·52	.....	2·63	15·78	15·78	7·89	15·78	2·63	5·26	5·26	5·26	7·89	2·63	.....	.....	.....	2·63
Danish Improved	Halifax Seed Co, Halifax	12·49	4·99	17·49	19·99	12·49	7·49	9·99	4·99	2·49	.....	2·49	.....	2·49	.....	2·49	.....	.....
Bruces Giant Red Sugar	J. A. Bruce, Hamilton	.....	.....	2·56	15·38	15·38	2·56	25·64	2·56	17·94	5·12	7·69	2·56	2·56	.....	.....	.....	.....
Half Sugar Red	Harris McFayden, Winnipeg	2·63	.....	15·78	10·52	10·52	10·52	31·57	5·26	7·89	.....	5·26	.....	.....	.....	.....	.....	.....
Giant Sugar Mangel Rose	Graham Bros., Ottawa	7·89	.....	.....	10·52	18·42	15·78	23·68	5·26	10·52	7·89	.....	.....	.....	.....	.....	.....	.....
Half Sugar Rose No. 1141	Trifolium, Copenhagen	2·94	.....	8·82	8·82	20·58	23·52	17·64	2·94	8·82	2·94	.....	.....	.....	.....	.....	2·94	.....
Giant Rose Sugar	A. E. McKenzie, Brandon	7·14	9·52	9·52	14·28	23·8	4·76	7·14	11·9	9·52	.....	.....	.....	.....	.....	2·38	.....	.....
Bruces Giant Rose Sugar	J. A. Bruce, Hamilton	.....	2·56	2·56	5·12	15·38	10·25	23·07	2·56	10·25	12·82	2·56	2·56	.....	.....	5·12	.....	5·12
Giant Half Rose	Dupuy and Ferguson, Montreal	.....	2·85	8·57	5·71	11·42	14·28	25·71	5·71	2·85	5·71	5·71	11·42	.....	.....	.....	.....	.....
		117·05	75·52	181·68	239·36	337·97	219·85	489·97	109·5	327·86	161·08	203·06	160·6	116·41	65·53	137·96	52·15	101·48
Average		3·775	2·436	5·86	7·721	10·902	7·091	15·805	3·532	10·576	65·196	6·55	5·18	3·755	2·113	4·45	1·682	3·273

Average length—depth ratio 2·044344.

TABLE 6—HALF-LONG TYPE—*Concluded*

Variety	Source	Length to Widest Point Ratio												
		1·0	1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·3	2·4
Jumbo	Wm. Rennie, Toronto			3·44	3·44	10·34	10·34	27·58	20·68	17·24		6·89		
Half Sugar White	Harris McFayden, Winnipeg		5·0	17·5	10·0	22·5	15·0	15·0	5·0	7·5		2·5		
Improved Giant	William Rennie, Toronto		2·77	19·44	16·66	13·88	16·66	25·0		2·77	2·77			
Monarch Sugar	A. E. McKenzie, Brandon		15·0	15·0	22·5	27·5	7·5	7·5	5·0					
Giant White Sugar	Wm. Rennie, Toronto				2·43	21·95	9·75	26·82	19·51	12·19	7·31			
Imperial Giant	Halifax Seed Co	2·85	14·28	48·56	22·85	5·71				5·71				
Giant White Feeding Sugar	Steele Briggs, Toronto		16·21	13·51	16·21	18·91	10·81	5·4	10·81	5·4	2·7			
Danish Half Sugar wh. gr. top	Hjalmar Hartmann Co., Copenhagen		20·0	31·42	28·57	8·57	5·71	2·85		2·85				
Long White	Dupuy and Ferguson, Montreal		5·71	11·42	31·42	11·42	14·28	20·0	5·71					
Giant White Sugar	J. M. Steeves, Steveston, B.C		2·77	8·33	13·88	25·0	11·11	16·66	8·33	5·55		8·33		
Improved Tankard Cream	Wm. Rennie, Toronto					21·95	14·63	29·26	29·26		2·43	2·43		
Giant White Half Sugar	Wm. Ewing Co., Montreal		7·69	10·25	12·82	23·07	15·38	15·38	5·12	7·69			2·56	
Half Sugar White	Dupuy and Ferguson, Montreal		2·7	18·91	18·91	27·02	18·91	8·1	2·7		2·7			
Giant White Sugar	Steele Briggs, Toronto		7·14	7·14	9·52	35·71	9·52	11·9	14·28	2·38		2·38		
Suttons Sugar	Suttons, England	2·32	2·32	2·32	6·97	18·6	16·27	18·6	20·93	2·32	4·65	2·32		2·32
Giant Sugar Mangel White	Graham Bros., Ottawa		25·0	15·0	25·0	15·0	25·0	12·5	5·0					
Giant White Feeding	Wm. Rennie, Toronto		27·0	5·4	21·62	29·74	13·51	18·91	2·7	2·7			2·7	
Giant Half Sugar	K. McDonald & Sons, Ottawa	2·77	27·77	22·22	30·55	13·88		2·77						
Leviathan	Wm. Rennie, Toronto		2·43	2·43	12·19	19·51	12·19	17·07	12·19	17·07		4·87		
Select Giant Rose Interm Sugar	Wm. Ewing, Montreal	2·85	28·57	40·0	20·0	8·57								
Red Top White Sugar	Wm. Ewing, Montreal	7·69	51·28	23·07	15·38	2·56								
Royal Giant Sugar	Steele Briggs, Toronto	2·56	20·51	43·59	17·94	15·38								
Giant Sugar	Wm. Rennie, Toronto	2·63	23·68	21·05	34·21	10·52	5·26	2·63						
Danish Improved	Halifax Seed Co, Halifax		35·71	38·09	21·42	4·76								
Bruces Giant Red Sugar	J. A. Bruce, Hamilton		5·12	5·12	10·25	43·58	17·94	5·12	5·12	7·69				
Half Sugar Red	Harris McFayden, Winnipeg		18·42	42·10	26·31	13·15								
Giant Sugar Mangel Rose	Graham Bros., Ottawa	2·63	21·05	31·57	28·94	10·52	2·63	2·63						
Half Sugar Rose No. 1141	Trifolium, Copenhagen		26·47	35·29	26·47	5·88		2·94	2·94					
Giant Rose Sugar	A. E. McKenzie, Brandon	2·38	35·71	45·23	9·52	7·14								
Bruces Giant Rose Sugar	J. A. Bruce, Hamilton		30·0	22·5	15·0	12·5	7·5	7·5	2·5			2·5		
Giant Half Rose	Dupuy and Ferguson, Montreal	2·85	17·14	34·28	25·71	14·28	5·71							
		31·53	473·15	634·17	556·69	519·1	243·11	302·12	177·78	99·06	22·56	32·22	5·26	2·32
Average		1·017	15·262	20·457	17·957	16·745	7·842	9·745	5·734	3·195	0·727	1·039	0·169	0·074

Average length—widest point ratio1 ·329204.

TABLE 7.—INTERMEDIATE TYPE

Varieties	Source	Length—Width Ratio												
		1·6	1·7	1·8	1·9	2·0	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8
Champion or Gatepost	Halifax Seed Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14·27	.....	85·66
Barres Stryno V 7024	Trifolium	.....	12·49	4·99	12·49	12·49	7·49	12·49	7·49	12·49	4·99	2·49	4·99	2·49
Yellow Intermediate 5312	McDonald College	.....	2·27	4·55	4·55	11·36	15·91	27·27	6·82	9·09	4·55	2·27	4·55	6·82
Giant Yellow Intermediate	Wm. Ewing	4·54	4·54	9·09	4·54	27·26	9·09	4·54	4·54	27·26	.....	.....	4·54	.....
Best of All	Dupuy and Ferguson	3·57	7·14	7·14	10·71	17·85	7·14	21·42	10·71	3·57	3·57	3·57	.....	3·57
Giant Yellow Intermediate	Halifax Seed Co	.....	.....	6·24	15·61	12·48	21·86	12·48	9·37	3·11	6·24	6·24	3·15	.....
Yellow Intermediate	C. E. F	4·99	.....	9·99	27·48	12·49	17·49	12·49	.....	7·49	.....	4·99	.....	2·49
Barres Stryno	Hjalmar Hartmann Co	2·21	11·11	15·55	15·55	6·66	17·77	8·89	6·66	11·11	4·44	.....	.....	.....
Taaroje Barres	Hjalmar Hartmann Co	.....	3·33	20·0	10·0	36·66	10·0	13·33	3·33	3·33	.....	.....	.....	.....
Suttons Yellow Intermediate	Suttons	2·93	5·87	11·75	11·75	26·46	5·87	17·64	2·93	11·75	.....	.....	.....	2·93
Sludstrup Barres	Hjalmar Hartmann Co	9·67	9·67	38·70	12·90	12·90	6·45	3·22	6·45	.....	.....	.....	.....	.....
		27·91	56·42	128·00	125·58	176·61	119·08	136·27	58·30	89·20	23·79	23·83	17·19	103·96
Average		2·537	5·129	11·636	11·416	16·055	10·824	12·388	5·300	8·109	2·162	2·075	1·562	9·450

Average Length—width ratio 2·065111

TABLE 7—INTERMEDIATE TYPE—*Continued*

Varieties	Source	Length—Depth Ratio																	
		1·6	1·7	1·8	1·9	2·	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0	3·1	3·2	3·3
Champion or Gatepost	Halifax Seed Co	6·06	3·03	15·15	18·18	33·33	6·06	6·06	3·03	6·06	.....	3·03	.....	.....	.....	.....	.....	.....	.....
Barres Stryno V 7024	Trifolium	2·55	2·55	5·11	7·68	20·50	2·55	23·06	5·11	15·37	5·11	2·55	.....	5·11	.....	.....	2·55	.....	.....
Yellow Intermediate 5312	McDonald College	.....	.....	.....	.....	7·14	.....	9·52	4·76	7·14	19·04	2·37	2·37	19·04	7·14	16·66	2·37	.....	2·37
Giant Yellow Intermediate	Wm. Ewing	.....	.....	.....	4·75	4·75	.....	9·51	9·51	.....	23·79	9·51	.....	4·75	9·51	9·51	.....	4·75	9·51
Best of All	Dupuy and Ferguson	.....	.....	.....	.....	.....	.....	3·99	15·99	3·99	23·98	3·99	3·99	3·99	.....	19·99	3·99	3·99	12·21
Giant Yellow Intermediate	Halifax Seed Co	6·05	.....	.....	3·02	6·05	.....	9·08	24·23	12·10	12·10	6·05	.....	3·02	.....	6·05	.....	6·05	6·05
Yellow Intermediate	C. E. F	.....	2·43	14·63	7·31	12·19	7·31	26·82	12·19	4·87	4·87	4·87	.....	.....	2·43	.....	.....	.....	.....
Barres Stryno	Hjalmar Hartmann Co	6·81	4·54	11·36	4·54	20·45	9·09	13·63	4·54	4·54	13·63	.....	2·26	2·26	.....	.....	2·26	.....	.....
Taaroje Barres	Hjalmar Hartmann Co	.....	6·88	13·78	6·88	6·88	10·34	10·34	17·23	6·88	6·88	3·44	.....	3·44	.....	3·44	.....	3·44	.....
Suttons Yellow Intermediate	Suttons	.....	.....	.....	2·95	11·75	2·93	11·75	17·64	11·75	23·51	8·82	.....	8·82	.....	.....	.....	.....	.....
Sludstrup Barres	Hjalmar Hartmann	3·03	3·03	9·09	6·06	21·21	6·06	.....	27·27	9·09	6·06	3·03	.....	3·03	.....	3·03	.....	.....	.....
		24·50	22·46	69·12	61·35	144·25	44·34	123·76	141·50	81·79	138·97	47·66	8·62	53·46	19·08	58·68	11·17	18·23	30·14
		2·227	2·041	6·283	5·577	13·113	4·030	11·250	12·863	7·435	12·633	4·332	0·783	4·860	1·734	5·334	1·015	1·657	2·74

Average Length—depth ratio 2·260699

TABLE 7—INTERMEDIATE TYPE—*Concluded*

Varieties	Source	Length—widest Point Ratio												
		1·0	1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·1	2·4
Champion or Gatepost	Halifax Seed Co	.....	3·03	15·15	9·09	27·27	18·18	18·18	6·06	3·03	.....	.....	.....	.....
Barres Stryno V 7024	Trifolium	.....	7·31	4·87	19·51	29·26	9·75	19·51	9·75	.....	.....	.....	.....	.....
Yellow Intermediate 5312	McDonald College	2·27	2·27	6·81	4·55	15·91	4·55	22·73	25·0	6·81	4·55	4·55	.....	.....
Giant Yellow Intermediate	Wm. Ewing	.....	.....	.....	8·69	4·34	17·39	21·73	30·43	8·69	.....	4·34	.....	4·34
Best of All	Dupuy and Ferguson	.....	.....	.....	7·14	14·28	17·85	10·71	21·42	14·28	7·14	7·14	.....	.....
Giant Yellow Intermediate	Halifax Seed Co	.....	2·85	.....	8·57	8·57	14·28	17·14	14·28	17·14	2·85	11·42	.....	2·85
Yellow Intermediate	C. E. F	.....	2·43	7·31	14·63	19·51	21·95	17·07	12·19	2·43	.....	.....	2·43	.....
Barres Stryno	Hjalmar Hartmann Co	.....	6·52	2·17	13·04	19·57	26·09	15·22	15·22	2·17	.....	.....	.....	.....
Taaroje Barres	Hjalmar Hartmann Co	.....	.....	.....	3·33	30·0	20·0	10·0	20·0	13·33	.....	3·33	.....	.....
Suttons Yellow Intermediate	Suttons	.....	.....	2·85	5·71	11·42	28·57	17·14	17·14	8·57	5·71	.....	2·85	.....
Sludstrup Barres	Hjalmar Hartmann Co	.....	.....	3·03	21·21	12·12	27·27	15·15	9·09	6·06	3·03	3·03	.....	.....
		2·27	24·41	42·19	115·47	192·25	205·88	184·58	180·58	72·51	23·28	33·81	5·28	7·19
Average		0·206	2·219	3·835	10·497	17·477	18·716	16·78	16·416	6·591	2·116	3·073	0·48	0·653

Average Length—widest point ratio 1·510699

TABLE 8.—TANKARD TYPE

Varieties	Source	Length—Width Ratio												
		1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·1	2·2	2·3
Ideal	Wm. Rennie	.....	3·57	3·57	.....	7·14	7·14	21·42	25·0	7·14	.....	7·14	10·71	7·14
Eclipse	A. E. McKenzie	.....	2·94	5·88	14·7	11·76	14·7	11·76	17·64	5·88	2·94	.....	.....	11·76
New Ideal	Steele Briggs	3·23	6·46	19·36	19·36	16·13	19·36	3·23	12·9	.....	.....	.....	.....	.....
Red Tankard	K. McDonald	.....	3·03	3·03	21·21	6·06	15·15	9·09	24·24	6·06	6·06	6·06	.....	.....
Eckendorffer Yellow	Hjalmar Hartmann	6·45	3·22	12·9	19·35	19·35	22·58	6·45	9·67	.....	.....	.....	.....	.....
Eckendorffer Red	" "	.....	.....	20·0	13·33	16·66	20·0	10·0	20·0	.....	.....	.....	.....	.....
		9·68	19·22	64·83	87·95	77·10	98·93	61·95	109·45	19·08	9·00	13·20	10·71	18·90
Average		1·613	3·203	10·805	14·658	12·85	16·488	10·325	18·241	3·18	1·5	2·2	1·785	3·15

Length—width ratio 1·593939

TABLE 8—TANKARD TYPE—*Continued*

Varieties	Source	Length—Depth Ratio																
		2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0	3·1	3·2	3·3	3·4	3·5	3·6	3·7	3·8	4·0
Ideal	Wm. Rennie	.....	3·57	17·85	7·14	3·57	3·57	3·57	10·71	3·57	7·14	3·57	.....	10·71	.....	10·71	3·57	10·71
Eclipse	A. E. McKenzie	6·44	.....	9·67	.....	29·02	16·12	.....	6·44	.....	3·22	.....	3·22	9·67	6·44	.....	.....	8·82
New Ideal	Steele Briggs	6·66	9·99	9·99	.....	16·65	6·66	.....	16·65	.....	6·66	3·32	.....	12·85	3·32	.....	3·32	3·32
Red Tankard	K. McDonald	6·98	.....	.....	6·98	31·41	6·98	3·49	3·49	.....	10·47	3·49	.....	10·47	3·49	.....	3·49	10·47
Eckendorffer Yellow	Hjalmar Hartmann	.....	.....	.....	.....	3·56	.....	.....	13·38	.....	10·70	3·56	.....	28·55	7·13	3·56	.....	28·55
Eckendorffer Red	" "	3·69	3·69	.....	.....	.....	.....	.....	7·39	.....	11·10	.....	3·69	25·91	7·39	.....	14·80	22·21
		23·77	17·25	37·54	14·12	84·21	33·33	7·06	58·06	3·57	49·29	13·94	6·91	98·16	27·77	14·27	25·18	84·08
Average		3·961	2·875	6·251	2·353	14·035	5·555	1·176	9·676	0·595	8·215	2·323	1·155	16·36	4·628	2·378	4·896	14·013

Average length—depth ratio 3·088235

TABLE 8—TANKARD TYPE—*Concluded*

Varieties	Source	Length to Widest Point Ratio																						
		1·1	1·2	1·3	1·8	1·9	2·0	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	3·0	3·2	3·3	3·5	3·7	3·8	4·0	P	C
Ideal	Wm. Rennie	3·57	.....	3·57	3·57	3·57	3·57	3·57	.....	7·14	3·57	7·14	3·57	3·57	.....	.....	.....	.....	.....	.....	.....	.....	27·57	25·0
Eclipse	A. E. McKenzie	.....	2·94	2·94	8·82	5·88	17·64	2·94	.....	14·7	.....	.....	.....	.....	.....	2·94	.....	.....	.....	.....	.....	.....	20·58	20·58
New Ideal	Steele Briggs	.....	.....	.....	.....	9·37	.....	.....	.....	3·12	3·12	3·12	.....	.....	.....	9·37	.....	.....	3·12	.....	.....	.....	53·12	15·62
Red Tankard	K. McDonald	3·03	.....	.....	3·03	.....	6·06	.....	.....	21·21	3·03	.....	.....	6·06	.....	.....	.....	3·03	.....	.....	.....	.....	27·27	27·27
Eckendorffer Yellow	Hjalmar Hartmann	3·22	.....	.....	.....	.....	3·22	.....	3·22	12·9	.....	.....	.....	12·9	6·45	3·22	3·22	.....	.....	3·22	3·22	.....	16·12	29·03
Eckendorffer Red	" "	3·33	6·66	3·33	.....	.....	.....	.....	.....	6·66	6·66	10·0	.....	13·33	3·33	13·33	.....	3·33	.....	.....	.....	3·33	.....	26·66
		13·15	9·60	9·84	15·42	18·82	30·49	6·51	3·22	65·73	16·38	20·26	3·57	35·86	9·78	28·86	3·22	6·36	3·12	3·22	3·22	3·33	145·66	144·16
Average		2·191	1·6	1·64	2·57	3·136	5·081	1·085	0·536	10·955	2·73	3·376	0·595	5·976	1·63	4·81	0·536	1·06	0·52	0·536	0·536	0·555	24·276	24·026

TABLE 9.—GLOBE TYPE

Varieties	Source	Length—Width Ratio						
		0·8	0·9	1·0	1·1	1·2	1·3	1·4
Golden Globe Mangel	Suttons	.....	6·45	38·70	29·03	19·35	6·45	.....
Giant Yellow Globe	Steele Briggs	.....	6·66	40·0	26·66	16·66	10·0	.....
Red Globe	J. A. Bruce	6·25	9·37	25·0	28·12	21·87	9·37	.....
Prizewinner Globe	Suttons	6·06	6·06	30·30	24·24	64·24	6·06	3·03
Devan Yellow Globe	Suttons	8·33	4·16	33·33	20·83	25·0	8·33	.....
Special Yellow Globe	Suttons	.....	20·83	45·83	16·66	8·33	8·33	.....
		20·64	53·53	213·16	145·54	115·45	48·54	3·03
Average		3·44	8·921	35·526	24·256	10·241	8·09	0·505

Average Length—width ratio 1·073930

TABLE 9.—GLOBE TYPE—*Continued*

Varieties	Source	Length—Depth Ratio										
		2·0	2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3·0
Golden Globe Mangel	Suttons	6·66	.....	9·99	13·32	19·99	19·99	9·99	3·32	6·66	.....	9·99
Giant Yellow Globe	Steel Briggs	7·39	3·69	11·10	11·10	7·39	14·80	14·80	.....	18·50	.....	11·10
Red Globe	J. A. Bruce	29·62	.....	11·10	11·10	3·69	3·69	7·40	.....	14·81	3·69	14·81
Prizewinner Globe	Suttons	25·92	.....	14·81	14·81	22·21	14·81	.....	.....	3·70	.....	3·70
Devan Yellow Globe	Suttons	47·04	.....	11·75	5·87	5·87	23·51	.....	.....	5·87	.....	.....
Special Yellow Globe	Suttons	7·99	.....	11·99	3·99	7·99	7·99	7·99	.....	19·99	3·99	15·99
		124·62	3·69	70·74	60·19	67·14	84·79	40·18	3·32	69·53	7·68	55·49
Average		20·77	0·615	11·79	10·031	11·19	14·131	6·696	0·553	11·588	1·28	9·248

Average Length—Depth ratio, 2·404891

TABLE 9—GLOBE TYPE—*Concluded*

Varieties	Source	Length—To Widest Point Ratio										
		1·3	1·4	1·5	1·6	1·7	1·8	1·9	2·0	2·1	2·2	2·3
Golden Globe Mangel	Sutton	6·45	9·67	19·35	19·35	35·48	9·67	.....	.....	.....	.....	.....
Giant Yellow Globe	Steele Briggs	3·33	16·66	20·0	33·33	6·66	16·66	.....	3·33	.....	.....	.....
Red Globe	J. A. Bruce	1·25	18·75	25·0	12·5	9·37	21·87	3·12	3·12	.....	.....	.....
Prizewinner Globe	Suttons	9·09	15·15	33·33	21·21	9·09	3·03	6·06	3·03	.....	.....	.....
Devan Yellow Globe	Suttons	33·33	12·5	20·83	8·33	16·66	8·33	.....	.....	.....	.....	.....
Special Yellow Globe	Suttons	.....	3·84	.....	11·53	11·53	15·38	11·53	30·76	.....	11·53	3·84
		53·45	76·57	118·51	106·25	88·79	74·94	20·71	40·24	.....	11·53	3·84
Average		8·908	12·761	19·751	17·708	14·798	12·49	3·451	6·706	.....	1·921	0·64

Average Length—Widest point ratio 1·597318

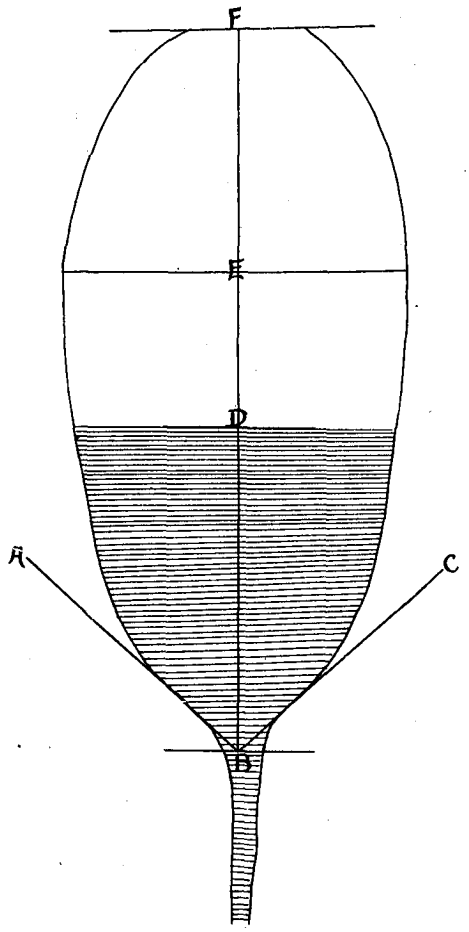

Fig. 1—System of measurement. Mangel classification.

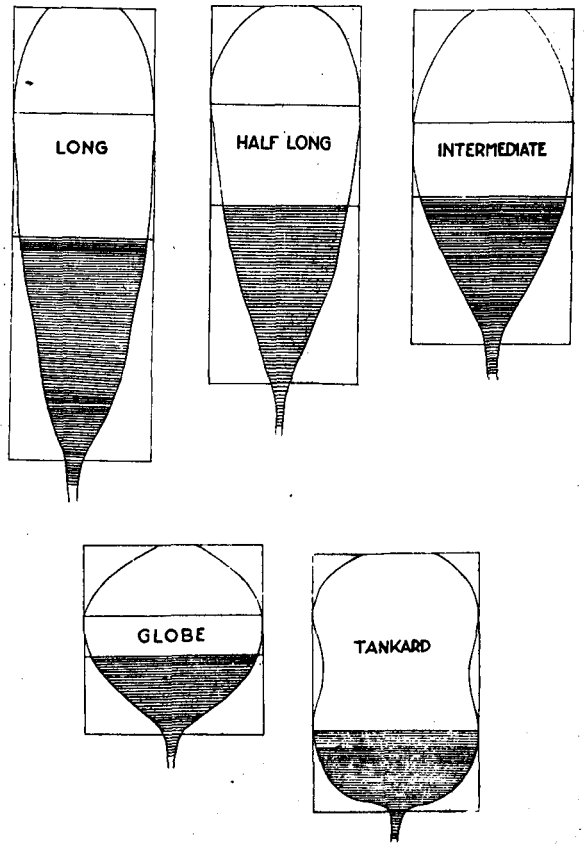

Fig. 2—Illustrating the relative proportions of the classified mangel types

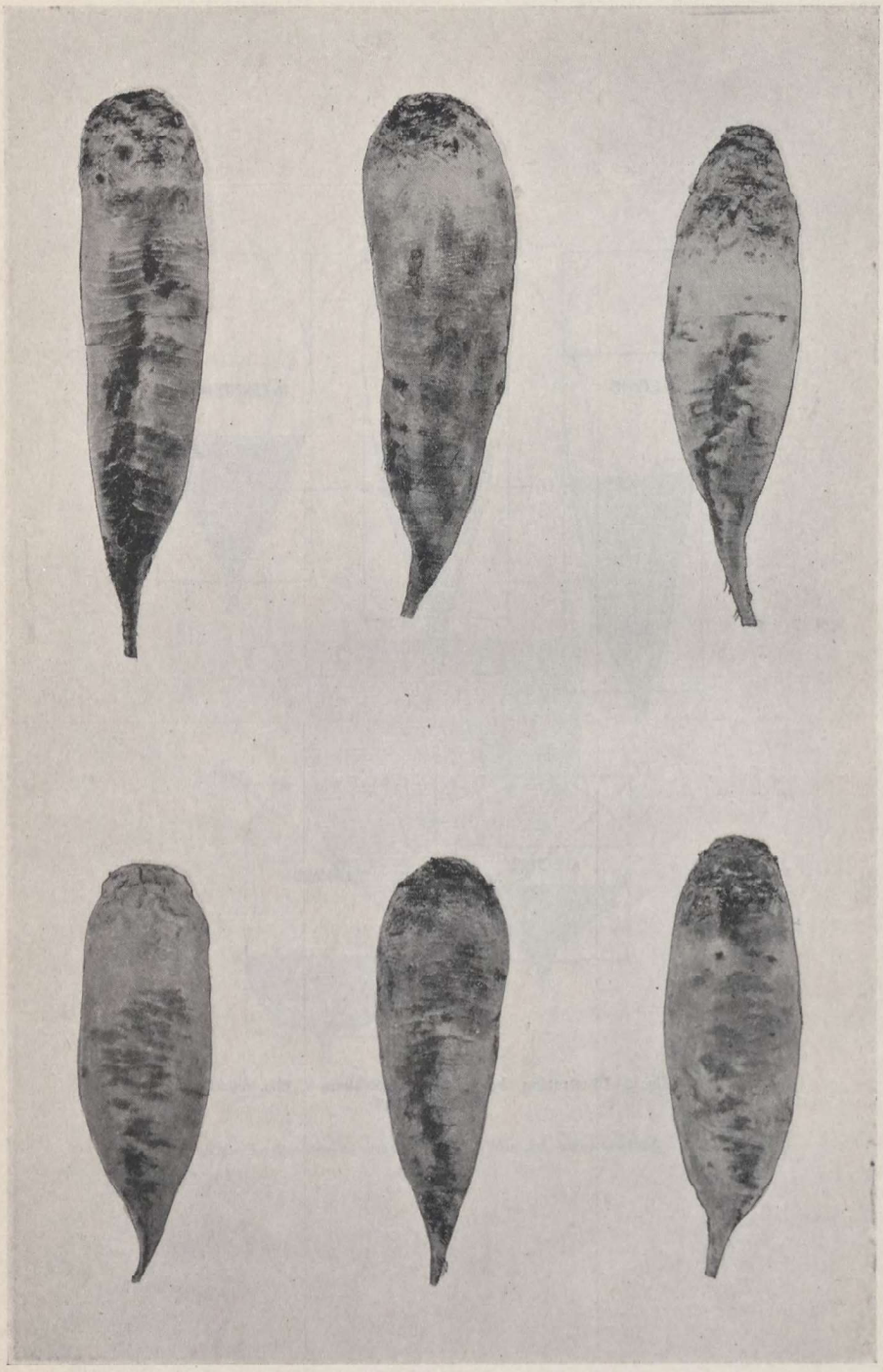

Fig. 3—Some of the variations occurring in the long (upper) and half long (lower) mangel types.

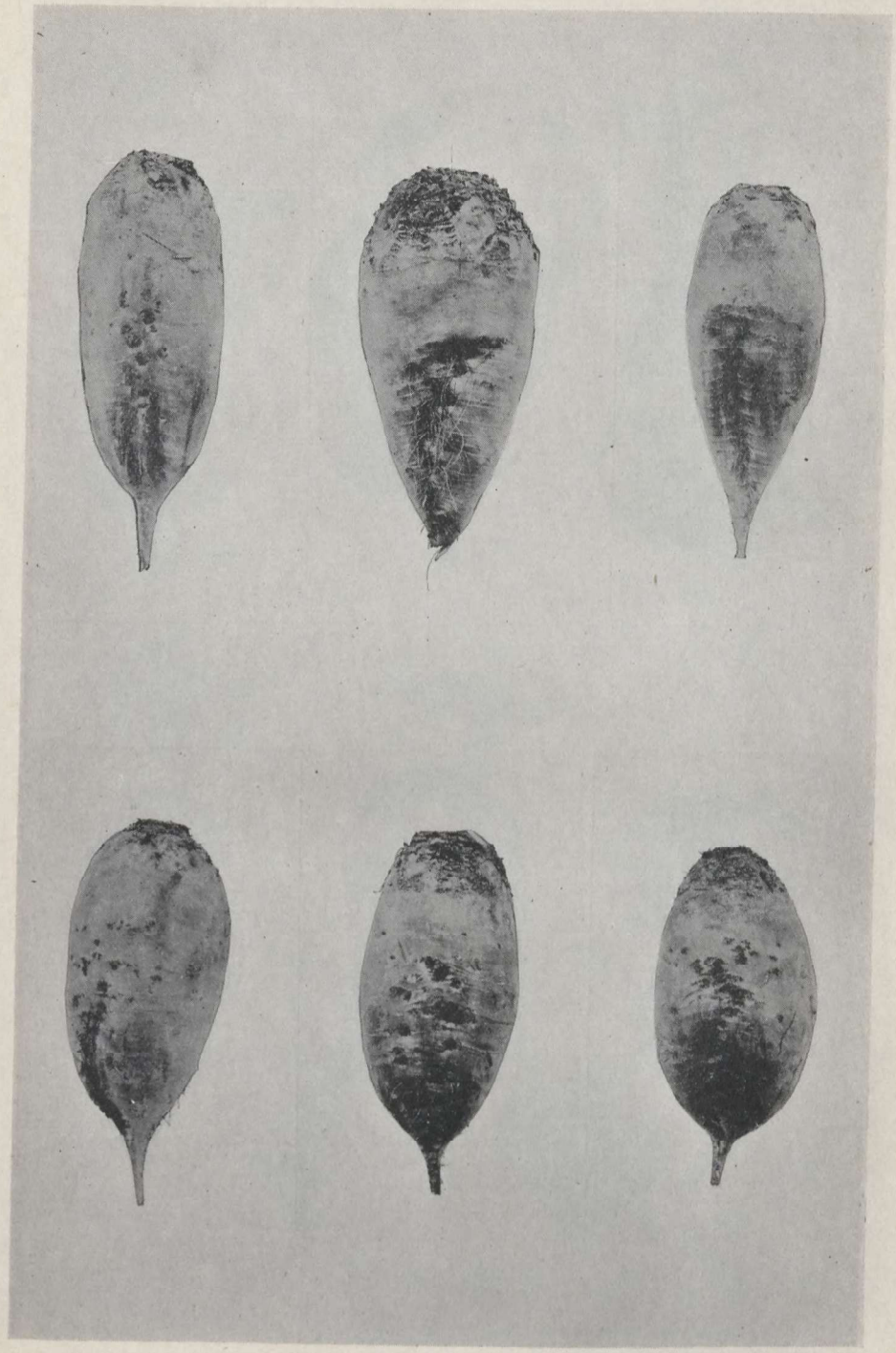

Fig. 4—Some of the more common variations occurring in the intermediate type of mangels.

90504—3¼

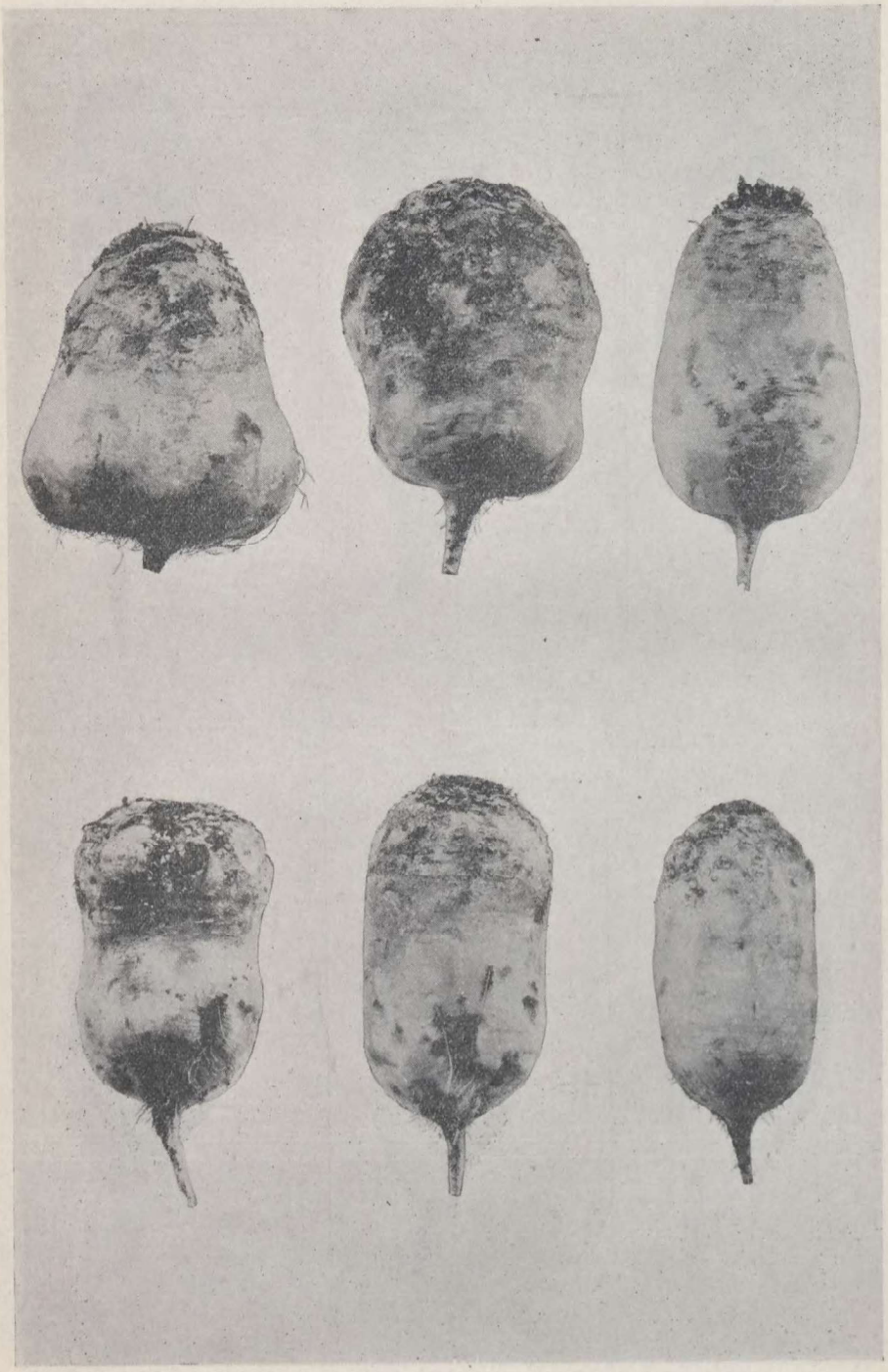

Fig. 5—Some variations of the tankard type of mangel.

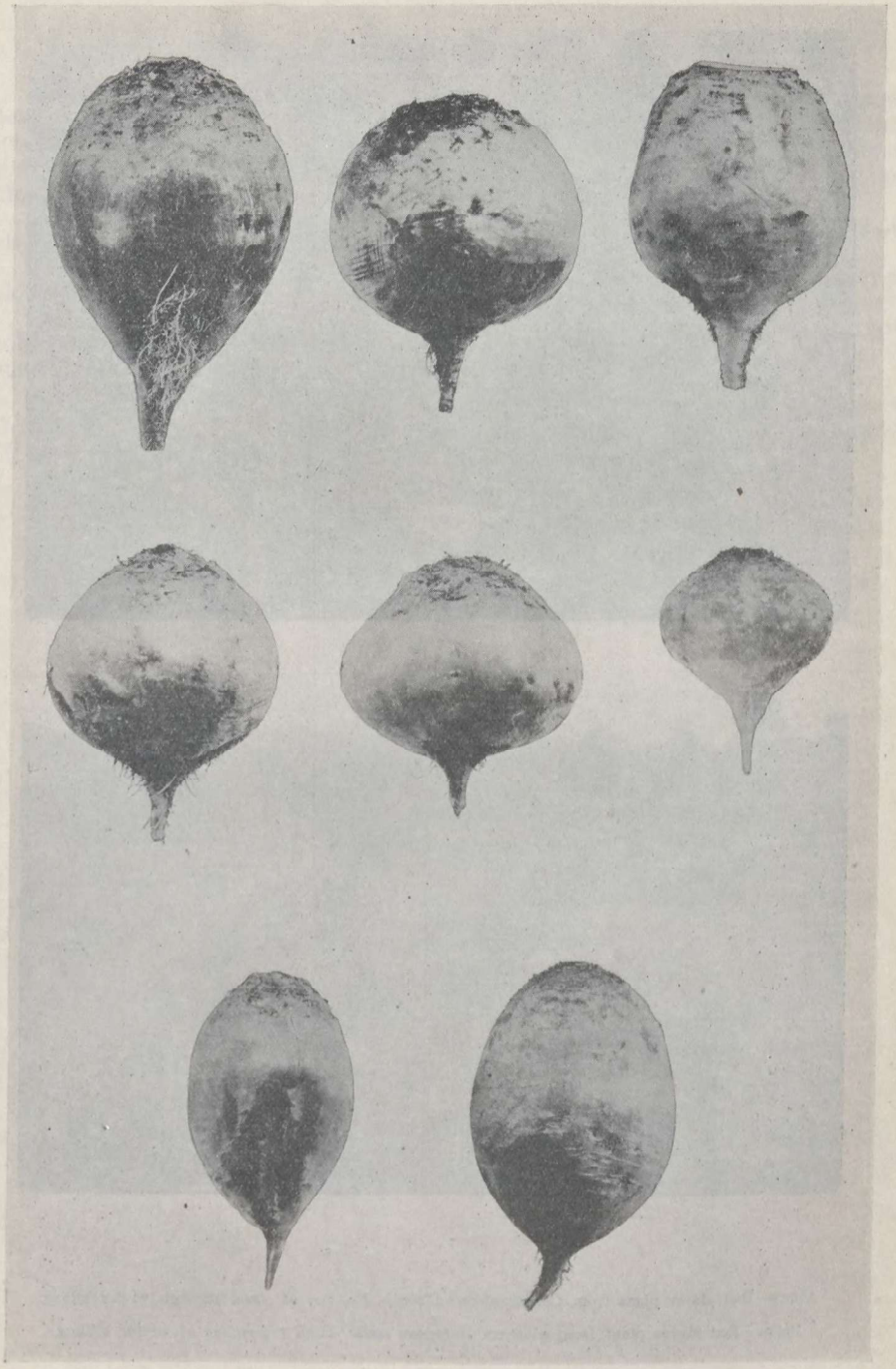

Fig. 6—Variations in the shape in the globe and in the ovoid (lower two) types of mangels.

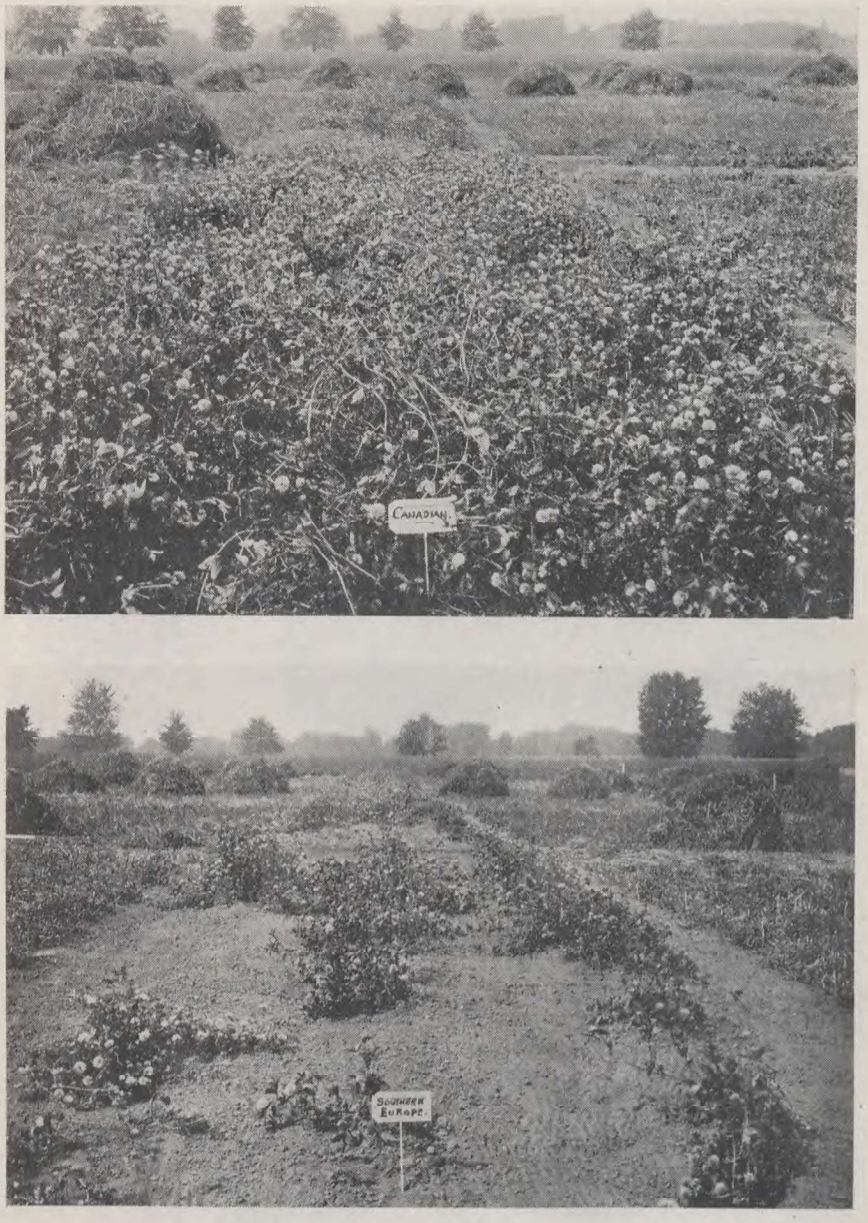

FIG. 7.

Above—Red clover plant from Canadian-grown seed. No loss of stand through winter killing.

Below—Red clover plant from southern European seed. High percentage of winter killling.

FIELD ROOTS

The following kinds of field roots were tested for comparative yield, trueness to type, and general suitability:—One hundred and twenty-six commercial lots of mangels, one hundred and eighteen commercial lots of Swedes, fifteen commercial lots of fall turnips, forty-seven commercial lots of field carrots and nine commercial lots of sugar beets.

The data secured are summarized in the following tables. The varieties in all cases are arranged in order of decreasing dry-matter yield per acre.

The different lots of roots were all planted in triplicate $\frac{1}{200}$ acre single row plots, and the reported yields are the result of the average of the three plantings.

An examination of the portion of the tables recording the trueness to type will indicate the necessity of legislation which will enable the grower to receive pure varieties.

The production of such pure varieties is not a very difficult task as is evidenced by the fact that over ten per cent of the varieties tested showed ninety per cent or over of morphological similarity.

TABLE 10.—SOURCE OF SEED AND

Long		Half Long		Intermediate	
Variety	Source	Variety	Source	Variety	Source
Elvetham Long Red..	Suttons.....	Giant White Feeding.	J. A. Bruce.....	Yellow Intermediate.	C. E. Farm.....
Selected Mammoth Prize Long Red.	K. McDonald & Sons.	Jumbo.....	Wm. Rennie.....	Danish Sludstrup...	Wm. Ewing.....
Mammoth Long Red..	Harris McFayden	Half Sugar White..	Harris McFayden	Danish Sludstrup...	Dupuy & Ferguson.
Giant Long Red.....	A. E. McKenzie..	Improved Giant....	Wm. Rennie.....	New Ideal.....	Steele Briggs.....
Perfection, Mammoth Long Red.	Wm. Rennie.....	Monarch Sugar.....	A. E. McKenzie..	Taaroje Barres.....	Hjalmar Hartmann Co.
Improved Mammoth Long Red.	Carters.....	Giant White Sugar..	Wm. Rennie.....	Golden Giant Intermediate.	Dupuy & Ferguson.
Prize Mammoth Long Red.	Steele Briggs.....	Imperial Giant.....	Halifax Seed Co..	Sludstrup.....	J. M. Steves.....
Long Red Mammoth..	Graham Bros.....	Giant White Feeding Sugar.	Steele Briggs.....	Giant Yellow Intermediate.	Steele Briggs.....
Mammoth Long Red..	Halifax Seed Co..	Danish Half Sugar White Green Top.	Hjalmar Hartmann Co.	Yellow Leviathan..	John A. Bruce.....
Champion or Gatepost	Halifax Seed Co..	Long White.....	Dupuy and Ferguson.	Fjerritslev Barres..	Hjalmar Hartmann Co.....
Long Yellow.....	J. A. Bruce.....	Giant White Sugar..	J. A. Steeves.....	Giant Yellow Intermediate.	John A. Bruce....
Long Yellow.....	Dupuy and Ferguson.	Improved Tankard Cream.	Wm. Rennie.....	Leviathan.....	Wm. Rennie.....
Long Yellow.....	Wm. Ewing.....	Giant White Half Sugar.	Wm. Ewing.....	Rosted Barres.....	Hjalmar Hartmann Co.
Mammoth Long Red..	Dupuy and Ferguson.	Half Sugar White...	Dupuy and Ferguson.	Yellow Intermediate No. 5312.	McDonald College
Elvetham Mammoth.	Hjalmar Hartmann Co.	Giant White Sugar..	Steele Briggs.....	Barres Sludstrup No. 3084.	Trifolium.....
Gatepost.....	J. A. Bruce.....	Suttons Sugar.....	Suttons.....	Yellow Leviathan..	Steele Briggs.....
Long Red Mammoth..	Wm. Ewing.....	Giant Sugar Mangel White.	Graham Bros.....	Danish Sludstrup...	F. J. James.....
Suttons Mammoth Long Red.	Suttons.....	Giant White Feeding.	Wm. Rennie.....	Gatepost Yellow Intermediate.	Suttons.....
		Select Giant Rose Interm. Sugar.	Wm. Ewing.....	Sutton Yellow Intermediate.	Suttons.....
		Red Top White Sugar.	Wm. Ewing.....	Mammoth Golden Giant.	Graham Bros.....
		Royal Giant Sugar.	Steele Briggs.....	Yellow Leviathan..	Wm. Rennie.....
		Giant Sugar.....	Wm. Rennie.....	Danish Sludstrup...	Graham Bros....
		Danish Improved...	Halifax Seed Co..	Mammoth Red Intermediate.	J. A. Bruce.....
		Bruces Giant Red Sugar.	J. A. Bruce.....	Gisnt Yellow Half Long Interm.	Wm. Rennie.....
		Half Sugar Red.....	Harris McFayden	Sludstrup Barres....	Hjalmar Hartmann Co.
		Giant Sugar Mangel Rose.	Graham Bros.....	Best of All.....	Dupuy and Ferguson.
		Half Sugar Rose No. 1141.	Trifolium.....	Danish Sludstrup...	K. McDonald.
		Giant Rose Sugar..	A. E. McKenzie..	Manitoba Giant Yellow.	A. E. McKenzie
		Giant Rose Sugar...	J. A. Bruce.....	Barres Stryno, B.L. 748.	Danske L. Froforsyning.
		Giant Half Rose....	Dupuy and Ferguson.	Barres Stryno V 7034.	Trifolium.....
		Sugar Mangel 760...	Danske L. Froforsyning.	Giant Yellow Intermediate.	Wm. Ewing.....
				Giant Half Sugar...	K. McDonald.
				Barres Tystofte B.L. 749.	Danske L. Froforsyning.
				Sutton's Red Intermediate.	Suttons.....
				Giant Yellow Intermediate.	K. McDonald.
				Devan Yellow Globe.	Suttons.....
				Giant Yellow Oval or Intermediate.	Steele Briggs.....
				Giant Yellow Intermediate.	Halifax Seed Co.
				Barres Sludstrup B.L. 752.	Danske L. Froforsyning.
				Stryno Barres.....	Hjalmar Hartmann Co.

TYPES OF MANGELS TESTED IN 1923

Tankard		Globe		Mixture of Types	
Variety	Source	Variety	Source	Variety	Source
Ideal	Wm. Rennie	Golden Globe	Suttons	Golden Fleshed Tankard.	Steele Briggs.
Eclipse	A. E. McKenzie	Giant Yellow Globe	Steele Briggs	Golden Tankard	A. E. McKenzie.
Suttons Golden Tankard.	Suttons	Giant Yellow Globe	Wm. Ewing	Golden Tankard	J. A. Bruce.
Golden Tankard	Halifax Seed Co	Yellow Globe	Dupuy and Ferguson	Peerless	A. E. McKenzie.
Golden Tankard	Dupuy and Ferguson.				
Red Tankard	K. McDonald	Prizetaker Yellow Globe.	McKenzie	Golden Tankard	Wm. Ewing.
Golden Tankard	Wm. Rennie	Champion Yellow Globe.	Graham Bros.		
Eckendorfer Yellow	Hjalmar Hartmann Co.	Red Globe	J. A. Bruce		
Eckendorfer Red		Red Globe	Wm. Ewing		
		Prizewinner Globe	Suttons		
		Devon Yellow Globe.	Suttons		
		Yellow Globe	Steele Briggs		
		Yellow Globe	K. McDonald		
		Windsor Yellow Globe.	Carters		
		Large Yellow Globe	J. A. Bruce		
		Special Yellow Globe.	Suttons		
		Giant Yellow Globe	Halifax Seed Co		
		Giant Yellow Globe	Wm. Rennie		
		Giant Yellow Globe	A. E. McKenzie		
		Red Globe	Dupuy and Ferguson		

TABLE 11.—MANGEL VARIETIES

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield dry matter per acre	General type
			tons lbs.			tons lbs.	
Yellow Intermediate	C. E. F. Ottawa	88	49 453	4·53	11·76	5 1,578	Intermediate
Giant White ½ sugar	Wm. Ewing, Montreal	88	39 1,579	4·42	14·31	5 1,388	Half long
Eckendorffer yellow	Hjalmar Hartmann, Copenhagen.	65	53 1,157	2·32	10·59	5 1,348	Tankard
Danish Sludstrup	Wm. Ewing, Montreal	88	40 409	7·34	13·95	5 1,217	Intermediate
Mammoth Long Red	Halifax Seed Co., Halifax	76	33 1,695	6·60	16·55	5 1,204	Long
Giant Sugar Mangel White	Graham Bros., Ottawa	77	37 932	5·19	14·53	5 888	Half long
Danish Sludstrup	Dupuy and Ferguson, Montreal.	87	40 1,866	6·75	13·30	5 888	Intermediate
New Ideal	Steele Briggs, Toronto	79	49 1,114	4·05	10·93	5 833	Intermediate
Half Sugar White	Dupuy and Ferguson, Montreal.	92	36 1,699	5·39	14·68	5 819	Half long
Taaroje Barres	Hjalmar Hartmann, Copenhagen.	82	49 277	5·67	10·92	5 732	Intermediate
Select Giant Rose Interm. Sugar.	Wm. Ewing, Montreal	86	36 137	7·45	14·70	5 604	Half long
Golden Giant Interm	Dupuy and Ferguson, Montreal.	84	45 407	4·94	11·50	5 397	Intermediate
Yellow Globe	K. McDonald & Sons, Ottawa.	65	41 1,098	5·02	12·49	5 379	Globe
Half Sugar Red	Harris McFayden, Winnipeg	72	33 132	7·00	15·59	5 310	Half long
Long Yellow	Dupuy and Ferguson, Montreal.	90	39 1,534	5·12	12·89	5 252	Long
Sludstrup	J. M. Steves, Steveston, B.C	88	41 1,783	6·04	12·20	5 222	Intermediate
Elvetham Long Red	Suttons (England)	72	40 148	5·64	12·69	5 171	Long
Improved Mammoth Long Red.	Carter's, Toronto	91	35 267	8·24	14·44	5 147	Long
Giant Yellow Intermediate.	Steele Briggs, Toronto	75	36 516	8·63	13·97	5 130	Intermediate
Red Tankard	K. McDonald & Sons, Ottawa.	63	52 1,576	4·06	9·58	5 114	Tankard
Yellow Leviathan	John A. Bruce, Hamilton	53	36 1,873	5·01	13·67	5 98	Intermediate
Giant White Sugar	Steele Briggs, Toronto	74	37 1,343	4·82	13·35	5 58	Half long
Giant Half Rose	Dupuy and Ferguson, Montreal.	88	34 1,880	5·51	14·39	5 56	Half long
Golden Globe	Suttons (England)	88	34 384	4·48	14·72	5 66	Globe
Mammoth Long Red	Dupuy and Ferguson, Montreal.	84	41 657	4·81	12·11	5 10	Long
Fjerritslev Barres	Hjalmar Hartmann, Copenhagen.	66	48 13	4·96	10·41	4 1,995	Intermediate
Giant White Feeding	John A. Bruce, Hamilton	78	43 1,831	2·02	11·37	4 1,986	Half long
Giant Yellow Globe	Wm. Rennie, Toronto	91	40 124	4·82	12·43	4 1,959	Globe
Giant Yellow Intermediate.	John A. Bruce, Hamilton	84	33 659	7·03	14·93	4 1,952	Intermediate
Mammoth Long Red	Harris McFayden, Winnipeg	61	35 401	7·91	14·11	4 1,934	Long
Leviathan	Wm. Rennie, Toronto	73	37 424	4·74	13·26	4 1,869	Intermediate
Rosted Barres	Hjalmar Hartmann, Copenhagen.	58	47 1,442	5·64	10·28	4 1,811	Intermediate
Long Yellow	Wm. Ewing, Montreal	73	33 340	8·47	14·77	4 1,798	Long
Half Sugar White	Harris McFayden, Winnipeg	53	34 109	7·81	14·36	4 1,780	Half long
Long White	Dupuy and Ferguson, Montreal.	93	37 1,837	5·02	12·87	4 1,760	Half long
Golden Fleshed Tankard	Steele Briggs, Toronto	79	37 1,707	3·61	12·87	4 1,743	Mixture of types
Monarch Sugar	A. E. McKenzie, Brandon	93	40 438	4·62	12·09	4 1,725	Half long
Prizetaker Yellow Globe	A. E. McKenzie, Brandon	46	45 567	2·72	10·72	4 1,709	Globe
Yellow Intermediate No. 5312.	McDonald College, Quebec	85	41 421	2·92	11·75	4 1,684	Intermediate
Gatepost	John A. Bruce, Hamilton	85	38 858	6·75	12·60	4 1,684	Long
Barres Sludstrup No. 3084	Trifolium, Copenhagen	47	40 1,858	6·64	11·66	4 1,545	Intermediate

TABLE 11.—MANGEL VARIETIES—*Continued*

General Colour		Other types present
Skin	Flesh	
Orange chrome (a few rose red)	White with a few lemon yellow rings in the rose red.	1·71% Oval, 0·85% Globe.
Light yellowish olive above ground, white below.	White with greenish tint	18·96% Interm., 0·86% Yel. Interm., 3·45% Globe, 2·59% Oval.
Yellow	White	0·79% Orange coloured, 0·79% White coloured, constricted at the centre.
Different colours represented	White to white with cadmium yellow rings.	1·75% Long Red, 1·75% Long Yellow, 1·75% Red Interm., 0·88% Rose Interm., 3·51% Yellow Globe, 0·88% Red Globe.
Carmine	White, light rose to rose red rings	1·64% Interm., 0·82% Yellow Interm., 0·82% Globe.
Light yellowish olive above ground, white below.	White with greenish tint	15·83% Interm., 3·33% Long, 1·67% Half Sugar Rose, 1·67% Ovals, 0·83% Globe, 0·83% Sugar Beets.
Different colours represented	White to white with cadmium yellow rings.	1·71% Long Red, 3·42% Long Yellow, 2·56% Red Globe, 4·27% Yellow Globe, 6·84% Half Sugar White, 0·85% Half Sugar Rose, 4·27% Rose Interm.
Light cadmium yellow	White	4·06% Yellow Interm., 2·44% Red Interm., 5·69% White Tankard, 2·44% Red Tankard, 1·63% Globe, 2·44% Half Sugar White, 0·81% Half Sugar Rose.
Light yellowish olive above ground, white below.	White with greenish tint	25·66% Interm., 0·88% Yellow Interm., 6·19% Oval, 1·77% Long, 0·88% Globe, 0·88% Half Sugar Rose.
Orange chrome	White with lemon yellow rings	7·32% Oval.
Old rose graduated to white on under ground parts.	White with a little greenish shade in some.	9·92% Half Sugar White, 7·44% Interm., 2·48% Globe, 2·48% Oval, 1·65% Long (rose), 0·83% Long Red.
Orange chrome to grenadine red	White	8·13% Long, 2·44% Oval.
Light yellow to orange	White with light yellow rings in the orange colour.	10·34% Yellow Interm., 0·86% Red Interm., 2·59% Red Globe, 1·72% Flat.
Begonia rose to old rose	White	18·49% Interm., 9·24% Half Sugar White, 1·68% Oval, 0·84% Long, 0·84% Globe.
Salmon orange to orange chrome	White with lemon yellow rings	1·71% Yellow Interm., 0·85% Half Sugar White.
Salmon orange to orange chrome.	Almost pure white few small rings of lemon yellow.	Fairly uniform.
Carmine to rose red	White with rings of light rose to rose red.	11·11% Interm., 4·23% Globe (a number of small roots, unclassified).
Carmine to rose red	White with light rose to rose red rings.	12·10% Interm., 3·22% Yellow Interm.
Orange chrome	White with lemon to cadmium yellow rings.	3·57% Globe, 12·68% Oval, 0·89% Tankard, 0·89% Half Sugar Rose.
Carmine	White	1·67% Red Interm., 2·5% Yellow Interm., 1·67% Globe. The tankards constricted at the centre.
Orange chrome a few salmon orange.	White with lemon and cadmium yellow rings.	1·74% Long, 1·74% Oval, 0·87% Globe.
Light yellowish olive above ground, white below.	White with greenish tint	22·66% Interm., 0·78% Red Interm., 6·25% Ovals, 0·78% Globe, 0·78% Long.
Begonia rose to old rose	White with a shade of green	3·39% Interm., 2·54% Oval, 1·69% Globe.
Smooth reddish	White with heady golden rings	5·6% Interm., 1·6% Oval, 0·8% Flat.
Carmine	From pure white to white with light rose rings.	12·93% Interm., 3·45% Globe (some very small roots unclassified).
Orange chrome	White with lemon yellow rings	2·52% Yellow Oval, 0·84% Long.
Light yellowish olive above ground, white below.	White with greenish tint	23·08% Interm., 4·27% Globe, 2·56% Oval, 1·71% Long.
Light yellow to orange	White with yellow rings	2·61% Intermediate.
Orange chrome	White with cadmium yellow rings	2·27% Oval, 1·51% Rose Red.
Carmine	White with rose rings.	5·83% Interm., 0·83% Yellow, Interm.
Carmine to rose red	White with light rose rings	10·4% Globe, 6·04% Oval, 1·6% Long Red, 0·8% Half Sugar White, 0·8% Tankard.
Orange chrome	Almost pure white with a shade of yellow rings.	2·78% Oval 0·92% Long.
Different colours from lemon yellow to orange chrome.	White to lemon yellow to cadmium yellow rings.	5·93% Interm., 1·69% Oval.
Light yellowish olive above ground, white below.	White with greenish tint	17·5% Interm., 7·5% Long, 5% Globe, 5% Oval.
Light yellowish olive above ground, white below.	White with greenish tint	29·82% Interm., 0·88% Globe, 0·88% Oval, 0·88% Half Long Red, 0·88% Yellow Interm., 0·88% Red Interm.
Orange chrome	White lemon to cadmium yellow rings.	35·04% Interm., 34·19% Globe, 8·55% Oval, 2·56% Long.
Light yellowish olive above ground, white below.	White with greenish tint	28% Interm., 4·84% Oval, 4·03% Long, 1·61% Globe.
From light yellow to light orange	White light yellow rings in the orange colour.	6·67% Interm., 2·5% Tankard, 2·05% Flat.
Orange chrome	White with lemon to cadmium yellow rings.	Uniform.
Rose red to carmine	White with light rose to rose red rings.	11·03% Interm., 0·79% Globe (a number of small roots).
Salmon orange to orange chrome.	White lemon yellow rings in some roots.	5·93% Long Orange, 0·85% Long Yellow.

TABLE 11.—MANGEL VARIETIES—*Continued*

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield dry matter per acre	General type
			tons lbs.			tons lbs.	
Giant White Feeding	Wm. Rennie, Toronto	79	39 202	3·02	12·19	4 1,533	Half long
Yellow Globe	Steele Briggs, Toronto	64	39 1,529	4·81	11·90	4 1,464	Globe
Half sugar rose No. 1141	Trifolium, Copenhagen	76	31 527	8·01	15·12	4 1,454	Half long
Giant White Sugar	Wm. Rennie, Toronto	82	40 1,619	3·53	11·54	4 1,419	Half long
Yellow Leviathan	Steele, Briggs, Toronto	86	33 376	8·82	14·17	4 1,405	Half long
Bruces Giant Red Sugar	J. A. Bruce, Hamilton	79	37 765	4·13	12·49	4 1,338	Intermediate Half long
Danish Sludstrup	F. J. James, B.C.	56	40 749	2·52	11·53	4 1,310	Intermediate
Prizewinner Globe	Suttons (England)	72	41 416	3·83	11·29	4 1,305	Globe
Giant Sugar	Wm. Rennie, Toronto	72	33 894	5·92	13·88	4 1,285	Half long
Improved Tankard Cream	Wm. Rennie, Toronto	74	37 415	5·55	12·47	4 1,280	Half long
Danish Half Sugar White Green top.	Hjalmar Hartmann, Copenhagen.	54	37 921	3·83	12·35	4 1,253	Half long
Gatepost Intermediate	Suttons (England)	84	42 536	2·52	10·94	4 1,248	Intermsdiate
Giant Rose Sugar	John A. Bruce, Hamilton	67	27 1,625	8·03	16·57	4 1,217	Half long
Peerless	A. E. McKenzie	60	40 1,275	5·25	11·33	4 1,208	Mixture of types
Suttons Yellow Intermediate.	Suttons (England)	88	41 1,789	4·57	10·95	4 1,175	Intermediate
Royal Giant Sugar	Steele Briggs, Toronto	90	32 1,466	4·51	13·99	4 1,159	Half long
Jumbo	Wm. Rennie, Toronto	67	44 674	1·72	10·32	4 1,151	Half long
Imperial Giant	Halifax Seed Co., Halifax	77	30 1,078	6·49	14·96	4 1,137	Half long
Long Red Mammoth	Graham Bros., Ottawa	71	30 383	7·75	15·07	4 1,100	Long
Mammoth Golden Giant	Graham Bros., Ottawa	65	32 952	6·66	14·01	4 1,100	Intermediate
Champion or Gatepost	Halifax Seed Co., Halifax	76	33 1,734	7·24	13·29	4 1,002	Long
Giant Yellow Globe	Steele Briggs, Toronto	84	43 488	2·53	10·39	4 986	Globe
Suttons Sugar	Suttons (England)	79	36 1,071	4·74	12·25	4 951	Half long
Windsor Yellow Globe	Carter's Tested Seeds, Toronto.	65	45 402	3·23	9·90	4 950	Globe
Suttons Golden Tankard	Suttons (England)	80	38 896	5·16	11·63	4 943	Tankard
Golden Tankard	Halifax Seed Co., Halifax	75	40 1,116	5·95	11·02	4 939	Tankard
Danish Improved	Halifax Seed Co	74	28 1,531	6·49	15·45	4 889	Half long
Yellow Leviathan	Wm. Rennie, Toronto	54	36 1,987	2·72	11·99	4 871	Intermediate
Suttons Mammoth Long Red.	Suttons (England)	79	41 25	3·42	10·81	4 867	Long
Golden Tankard	Dupuy and Ferguson, Montreal.	79	37 1,025	6·15	11·81	4 860	Tankard
Spscial Yellow Globe	Suttons (England)	73	43 172	3·76	10·28	4 858	Globe
Danish Sludstrup	Graham Bros., Ottawa	46	35 964	7·34	12·45	4 835	Intermediate
Mammoth Red Intermediate.	John A. Bruce, Hamilton	81	42 923	6·26	10·40	4 832	Intermediate
Idsal	Wm. Rennie, Toronto	83	40 1,587	4·12	10·82	4 828	Tankard
Giant White Sugar	J. M. Stevss, Stevsston, B.C.	82	38 21	3·24	11·61	4 826	Half long
Giant Rose Sugar	A. E. McKenzie, Brandon	86	31 11	7·23	14·22	4 818	Half long
Eclipse	A. E. McKenzie	85	44 1,069	1·42	9·88	4 800	Tankard
Red Globe	Wm. Ewing, Montreal	77	37 1,893	6·56	11·49	4 720	Globe
Long Yellow	J. A. Bruce, Hamilton	41	26 991	6·82	16·32	4 648	Long
Giant Yellow ½ long intermediate.	Wm. Rennie, Toronto	70	37 692	4·32	11·56	4 634	Intermediate
Red Globe	J. A. Bruce, Hamilton	63	37 517	5·73	11·58	4 629	Globe
Giant White Fesding Sugar.	Steele Briggs, Toronto	71	37 119	5·65	11·59	4 590	Half long
Sludstrup Barres	Hjalmar Hartmann, Copenhagen.	72	35 1,725	4·95	11·96	4 578	Intermediate

TABLE 11.—MANGEL VARIETIES.—*Continued*

General Colour		Other types present
Skin	Flesh	
Light yellowish olive above ground, white below.	White with greenish tint	20·45% Long, 5·3% Interm., 3·79% Oval, 0·76% Long Yellow, 0·76% Half Sugar Rose.
Light yellow to dark orange	White with light yellow rings in the orange coloured.	5·9% Interm., 0·73% Tankard.
Begonia rose to old rose	White with a shade of green	22·69% Interm., 3·36% Oval, 2·52% Globe, 2·52% Long, 0·84% Half Sugar White.
Light yellowish olive above ground, white below.	White with greenish tint.	26·27% Interm., 3·39% Long, 2·54% Oval.
Salmon orange chrome and carmine.	White with lemon to cadmium yellow rings. Light rose rings in the carmine coloured.	3·73% Long, 1·49% Globe, 0·75% Oval.
Carmine	White with very light rings of light rose.	17·8% Red Interm., 9·32% Globe, 3·39% Oval, 1·69% Half Sugar White.
Orange chrome	White with a few white lemon yellow rings.	0·85% Long Red.
Yellow	White with yellow rings	11·68% Interm., 1·46% Oval, 0·73% Flat.
Begonia to old rose	White with greenish tint	24·8% Intermediate, 4% Oval, 4% Globe, 1·6% Half Sugar White.
Light yellowish olive above ground white below.	White with greenish tint	18·64% Interm., 6·78% Oval, 1·69% Globe, 1·69% Long.
Light yellowish olive above ground white below.	White with greenish tint	19·51% Interm., 7·32% Globe, 2·44% Oval.
Salmon orange	White with a shade of lemon yellow rings.	7·89% Globe, 2·63% Oval.
Begonia rose to old rose	White with a shade of green	9·45% Interm., 3·15% Globe, 1·57% Half Sugar White, 0·79% Oval, 0·79% Red Interm., 0·79% Long
Salmon orange to orange chrome.	White	44·8% Interm., 11·81% Globe, 2·36% Oval, 1·57% Long, 3·15% Yellow Tankard.
Salmon orange	White with a little of lemon yellow rings.	3·57% Oval, 0·89% Globe.
Old rose to Begonia rose	White	8·55% Half Sugar White, 7·69% Interm., 5·13% Globe, 0·85% Oval, 0·85% Long Red.
Light yellowish olive above ground, white below.	White with greenish tint	21·14% Interm., 8·13% Oval, 5·69% Long.
Begonia rose, white below ground	White with greenish tint	23·08% Interm., 5·13% Globe, 1·71% Oval, 1·71% Long, 1·71% Half Sugar White.
Carmine	White with heavy rose red rings	3·3% Interm., 1·65% Yellow Interm.
Salmon to orange chrome	White with lemon yellow rings	5·15% Carmine Red Intermediate, 2·94% Oval, 1·47% Globe.
Apricot orange	White with lemon chrome tinge	7·25% Interm. (a number of small roots unclassified).
Yellow to light orange	White with very light yellow rings	11·67% Interm., 2·50% Oval, 0·83% Tankard, 0·83% Flat.
Light yellowish olive above ground, white below.	White with greenish tint	17·80% Interm., 0·85% Red Interm., 4·24% Globe, 2·54% Long, 0·85% Oval.
Light yellow to orange	White with yellow rings in the orange coloured.	10·17% Yellow Interm., 0·85% Red Interm., 0·85% Flat.
Orange chrome	White with rings from lemon to cadmium yellow.	26·15% Interm., 9·25% Globe, 3·84% Oval, 1·54% Long.
Orange chrome	White with cadmium yellow rings.	18·64% Interm., 0·85% Yellow Interm., 9·32% Globe, 4·24% Oval.
Begonia rose to old rose	White	9·32% Interm., 8·47% Half Sugar White, 2·54% Oval, 1·69% Globe, 1·69% Sugar Beet.
Orange chrome	White	3·42% Long, 0·85% Oval.
Rose red to carmine	White with light rose to rose red	8·4% Interm.
Orange chrome	White with cadmium yellow rings.	28·46% Interm., 6·15% Globe, 0·77% Oval.
Yellow	White with light yellow rings.	2·59% Interm., 0·86% Tankard, 0·85% Flat.
From light yellow to carmine red	Pure white to white with lemon yellow rings.	4·35% Globe, 1·74% Long Red, 1·74% Long Yellow, 0·87% Yellow Interm.
Carmine	White with rings of light rose and rose red.	12·6% Globe, 3·76% Oval, 0·84% Half Sugar White.
Salmon orange	White with a few lemon yellow rings.	0·83% Red Coloured. The roots constricted at the centre.
Light yellowish olive above ground, white below.	White with greenish tint	38·79% Interm., 5·17% Oval, 3·45% Globe.
Begonia rose to old rose	White with a shade of green	10·17% Interm., 0·85% Red Interm., 9·32% Half Sugar White, 7·63% Globe, 1·69% Oval, 0·85% Half Long Yellow.
Lemon yellow to salmon orange	White	1·74% Oval, 2·61% Interm., 2·61% White Tankard, 0·17% Rose Tankard.
Carmine	White with red rings	8·33% Interm., 2·5% Long Red, 0·88% Orange Coloured Globe.
Salmon and orange chrome	White with lemon yellow rings	4·19% Interm.
Orange chrome	White	4·88% Long, 0·81% Red Interm.
Carmine	White with red rings	4·03% Flat, 2·42% Interm., 0·81% Orange Coloured Globe.
Light yellowish olive above ground, white below.	White with greenish tint	4·54% Globe, 8·79% Oval, 3·03% Long, 0·76% Sugar Rose.
Salmon orange to orange chrome.	Almost pure white with a few small rings of lemon yellow.	Fairly uniform.

TABLE 11.—MANGEL VARIETIES.—*Concluded*

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield dry matter per acre	General type
			tons lbs.			tons lbs.	
Eckendorffer Red	Hjalmar Hartmann, Copenhagen.	48	42 1,837	1·22	9·99	4 575	Tankard
Golden Tankard	Wm. Ewing, Montreal	73	36 432	6·55	11·81	4 554	Mixture of types
Best of All	Dupuy and Ferguson, Montreal.	70	32 1,646	2·72	13·01	4 541	Intermediate
Danish Sludstrup	K. McDonald & Sons, Ottawa.	73	39 1,408	3·32	10·71	4 505	Intermediate
Manitoba Giant Yellow	A. E. McKenzie, Brandon	68	38 835	3·75	11·05	4 490	Intermediate
Mammoth Long Red	Steele Briggs, Toronto	72	33 1,868	6·36	12·50	4 484	
Barres Stryno B.L. 748	*D. L. F. Roskilde, Denmark.	48	37 484	5·35	11·32	4 432	Intermediate
Red Globe	Dupuy and Ferguson, Montreal.	65	33 1,541	5·70	12·41	4 382	Globe
Golden Tankard	Wm. Rennie, Toronto	80	37 1,930	3·73	11·01	4 360	Tankard
Barres Stryno V 7034	Trifolium, Copenhagen	50	36 554	6·47	11·50	4 344	Intermediate
Giant Sugar Mangel Rose	Graham Bros., Ottawa	79	30 1,102	6·06	13·64	4 334	Half long
Devan Yellow Globe	Suttons (England)	72	40 1,350	2·74	10·22	4 314	Globe
Giant Yellow Globe	Wm. Ewing, Montreal	63	36 1,211	4·33	11·32	4 287	Globe
Large Yellow Globe	J. A. Bruce, Hamilton	69	40 273	4·56	10·29	4 260	Globe
Giant Yellow Intermediate.	Wm. Ewing, Montreal	93	32 552	2·42	12·70	4 198	Intermediate
Giant Half Sugar	K. McDonald & Sons, Ottawa.	77	28 953	5·52	14·22	4 99	Intermediate
Yellow Globe	Dupuy and Ferguson, Montreal.	51	37 609	4·04	10·85	4 95	Globe
Golden Tankard	J. A. Bruce, Hamilton	72	36 622	6·26	11·12	4 76	Mixture of types
Yellow Intermediate	A. E. McKenzie, Brandon	61	41 989	5·16	9·72	4 67	
Perfection Mammoth Long Red.	Wm. Rennie, Toronto	91	34 1,169	6·65	11·62	4 37	Long
Long Red Mammoth	Wm. Ewing, Montreal	90	31 1,341	4·01	12·68	4 32	Long
Barres Tystofte B. L. 749	*D. L. F. Roskilde, Denmark.	63	28 282	4·30	14·25	4 20	Intermediate
Suttons Red Intermediate	Suttons (England)	67	38 1,177	5·27	10·35	3 1,988	Intermediate
Improved Giant	Wm. Rennie, Toronto	63	30 1,980	6·62	12·87	3 1,977	Half long
Prize Mammoth Long Red.	Steele Briggs, Toronto	83	30 1,913	7·15	12·86	3 1,962	Long
Giant Yellow Globe	A. E. McKenzie, Brandon	72	38 852	5·95	10·25	3 1,877	Globe
Selected Mammoth Prize Long Red.	K. McDonald, Ottawa	71	29 984	5·70	13·30	3 1,845	Long
Golden Tankard	A. E. McKenzie, Brandon	80	35 1,790	6·33	10·85	3 1,789	Mixture of types
Giant Yellow Intermediate.	K. McDonald, Ottawa	56	36 1,783	3·45	10·32	3 1,614	Intermediate
Devan Yellow Globe	Suttons (England)	85	34 157	6·04	11·13	3 1,586	Intermediate
Champion Yellow Globe	Graham Bros., Ottawa	75	29 1,994	7·36	12·49	3 1,493	Globe
Giant Yellow Oval or Intermediate.	Steele Brigge, Toronto	83	33 720	3·22	11·22	3 1,486	Intermediate
Giant Long Red	A. E. McKenzie, Brandon	53	25 96	6·31	14·90	3 1,464	Long
Elvetham Mammoth	Hjalmar Hartmann, Copenhagen.	66	31 1,212	6·06	11·47	3 1,250	Long
Giant Yellow Intermediate.	Halifax Seed Co., Halifax	79	29 409	7·48	11·99	3 1,003	Intermediate
Barres Sludstrup B. L. 752	*D. L .F. Roskilde, Denmark.	66	27 789	6·24	12·44	3 816	Intermediate
Sugar Mangel B. L. 760	*D. L. F. Roskilde, Denmark.	35	20 1,555	5·52	14·33	2 1,955	Half long
Stryno Barres	Hjalmar Hartmann, Copenhagen.	49	51 1,806	.....	.....	.....	Intermediate
Giant Yellow Globe	Halifax Seed Co., Halifax	89	40 1,612	.....	.....	.....	Globe

* Danske Landboforeningers Froforsyning, Roskilde, Denmark.

TABLE 11.—MANGEL VARIETIES—*Concluded*

General Colour		Other types present
Skin	Flesh	
Carmine	White	A fairly uniform lot (although a few roots a little long for tankard type).
Orange chrome	White with heavy rings of cadmium yellow.	27·12% Interm., 21·19% Globe, 1·69% Long Orange, 1·69% Oval.
Salmon orange	White with rings of lemon cadmium and light rose.	3·76% Globe, 2·25% Tankard, 1·5% Red Interm., 0·75% Oval.
Salmon orange to orange chrome.	Pure white to lemon yellow	2·46% Oval, 1·64% Globe.
Salmon yellow	White with lemon yellow rings	5·26% Oval, 2·25% Globe.
Apricot orange	White with lemon yellow rings	21·95% Interm. (orange colour), 0·81% Yellow Interm., 1·63% Globe.
Salmon orange to orange chrome.	White with lemon yellow rings in the chrome coloured.	4·35% Long.
Carmine	White	3·45% Interm., 2·07% Yellow Globe, 2·07% Flat, 0·69% Half Sugar White.
Yellow orange to dark orange	White with rings of lemon chrome to cadmium yellow.	11·96% Interm., 3·42% Globe.
Orange chrome to wax yellow	White with lemon yellow rings	2·54% Oval, 1·69% Long.
Begonia rose to old rose	White	11·3% Interm., 6·96% Globe, 0·86% Carmine Globe, 1·74% Oval, 0·87% Long, 0·87% Half Sugar White.
Yellow	White with lemon rings	2·5% Interm., 1·67% Tankard, 0·83% Flat.
Yellow to light orange	White with yellow rings in the orange coloured.	5·98% Interm., 5·98% Red Globe, 3·42% Oval, 1·71% Flat, 0·85% Tankard.
Light yellow to orange yellow	White with light yellow rings	8% Interm., 1·6% Tankard.
Wax yellow	White with lemon yellow rings	6·2% Oval, 3·87% Globe.
Begonia rose	White with little greenish tint	0·91% Half Sugar White, 0·91% Red Globe.
Yellow to light orange	White with light yellow rings in the orange coloured.	2·48% Red Globe, 4·13% Interm., 1·65% Oval, 1·65% Tankard, 0·83% Flat.
Orange chrome to rose red	White with very heavy rings of cadmium yellow.	35·34% Interm., 0·85% Long, 14·65% Globe, 10·34% Oval.
.....	.....	.....
Carmine	White very light rings of light rose in some roots.	8·53% Interm.
Rose red to carmine	White with light rose rings	4·54% Interm., 2·73% Yellow Interm., 1·82% Globe, 0·91% Long Yellow.
Salmon to orange chrome	White with a few lemon yellow rings.	6·31% Long Yellow, 0·9% Globe.
Carmine to spectrum red	White with a few light rose rings	29·69% Globe, 3·91% Oval, 1·56% Tankard.
Begonia rose above, white below.	White	19·64% Interm., 5·36% Long, 2·68% Globe, 1·78% Oval.
Carmine to rose red	White with rings of light rose red	4·24% Interm., 3·39% Globe.
Yellow to orange yellow	White	6·61% Interm., 3·30% Tankard, 0·83% Flat.
Carmine	White with rose rings	5·17% Interm.
Orange chrome to rose red	White with a few heavy rings of cadmium yellow.	55·15% Interm., 19·85% Globe, 7·35% Oval, 2·20% Long.
Salmon orange	White with lemon yellow rings	5·98% Oval, 1·71% Globe, 1·71% Long.
Salmon orange	White with a few lemon yellow rings.	8·47% Yellow Tankard, 7·63% Globe, 1·69% Oval.
Dark orange	White with heavy yellow rings	2·5% Flat.
Spectrum red	White, light rose to rose red	This lot seems to be giant red Intermediate.
Carmine	White with rose rings	2·34% Intermediate.
Carmine	Pure white to white with light rose rings.	12·93% Interm., 3·45% Globe (and some very small roots unclassified).
Salmon orange	White	7·44% Globe, 3·3% Oval, 0·82% Long, 0·82% Sugar Beet.
Salmon orange to orange chrome.	White, lemon yellow rings in a few roots.	78·5% true to variety.
Light yellowish olive	White with greenish tint	75% true to variety.
Salmon orange to orange chrome.	Almost pure white with white to yellow rings.	1·75% Long, 0·88% Oval, 0·88% Globe.
Yellow to orange	White with light yellow rings	6·25% Interm., 2·34% Flat.

TABLE 12.—SWEDE TURNIP VARIETIES

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield per acre dry matter
			tons lbs.			tons lbs.
Suttons Crimson King	Suttons (England)	91	32 1,931	0·81	11·60	3 1,648
Russian Swede	Graham Bros., Ottawa	49	30 1,105	1·01	12·48	3 1,626
Suttons Up to Date	Suttons (England)	89	33 1,249	0·51	11·13	3 1,485
Shepherd's Swede No. 2056	Trifolium, Copenhagen	91	28 1,490	0·71	11·73	3 744
Durham S/825-23	Steele Briggs, Toronto	86	29 1,060	0·71	10·55	3 231
New Century	Wm. Rennie, Toronto	71	23 1,992	0·61	12·79	3 138
Selected Magnum Bonum	Wm. Rennie, Toronto	67	25 679	0·91	12·10	3 132
Kangaroo Bronze Green Top	Wm. Rennie, Toronto	83	22 1,242	0·91	12·94	2 1,854
Giant King	John A. Bruce, Hamilton	91	23 1,829	0·30	12·15	2 1,811
Skirvings	Graham Bros., Ottawa	90	24 113	0·61	12·03	2 1,788
Halewood Green Top	Wm. Ewing, Montreal	39	25 284	1·01	11·48	2 1,773
Improved Jumbo or Elephant	Wm. Rennie, Toronto	91	23 1,392	0·70	12·13	2 1,749
Suttons Caledonian	Suttons (England)	99	21 911	0·61	13·39	2 1,746
Ferguson's Perfection	Dupuy & Ferguson, Montreal.	85	24 817	0·51	11·77	2 1,746
New Century	J. A. Bruce, Hamilton	86	23 473	0·81	12·31	2 1,721
Derby Bronze Green Top	Wm. Rennie, Toronto	85	23 1,572	1·01	11·75	2 1,590
Prize Purple Top	Wm. Rennie, Toronto	76	24 1,118	0·71	11·17	2 1,486
Bangholm	Wm. Ewing, Montreal	88	23 81	0·82	11·44	2 1,272
Elephant	Carter's Tested Seeds, Toronto	73	23 1,257	0·71	11·11	2 1,250
Suttons Magnum Bonum	Suttons (England)	96	24 535	0·81	10·71	2 1,198
Elephant or Monarch	Graham Bros., Ottawa	79	21 1,168	0·70	12·00	2 1,181
Suttons Champion Purple Top	Wm. Ewing, Montreal	90	21 250	1·21	12·26	2 1,180
Bangholm Purple Top	Wm. Rennie, Toronto	62	22 1,979	0·71	11·24	2 1,168
Breadstone Green Top 236	A. E. McKenzie, Brandon	91	16 163	0·70	15·93	2 1,124
Hall's Wstbury	J. A. Bruce, Hamilton	99	20 529	0·81	12·56	2 1,090
Derby Green Top	J. A. Bruce, Hamilton	99	20 1,472	0·71	12·27	2 1,089
Prizewinner Purple Top	Carter's Tested Seeds, Toronto	93	22 644	0·20	11·30	2 1,045
Hall's Westbury	Wm. Ewing, Montreal	99	21 1,248	0·91	11·57	2 1,004
Monarch or Elephant 33-239	McKenzie, Brandon	84	24 708	0·92	10·24	2 994
Invicta Bronze Top	Wm. Ewing, Montreal	99	23 957	1·01	10·59	2 973
Canadian Gem S-935-23	Steele Briggs, Toronto	89	21 1,702	0·91	11·36	2 965
Canadian Gem	J. A. Bruce, Hamilton	80	21 212	0·30	11·74	2 956
Best of All	Wm. Rennie, Toronto	78	22 945	0·71	10·91	2 903
Superlative 33-249	A. E. McKenzie, Brandon	92	21 1,542	0·51	11·23	2 890
Kangaroo	Wm. Ewing, Montreal	99	21 917	0·91	11·39	2 888
North Western 33209	A. E. McKenzie, Brandon	85	22 186	0·81	11·00	2 860
Hall's Westbury	Graham Bros., Ottawa	94	20 1,810	0·30	11·60	2 850
Elephant or Monrach Improved	Wm. Ewing, Montreal	91	22 784	0·71	10·81	2 841
Champion Purple Top	K. McDonald, Ottawa	94	18 874	0·61	13·11	2 834
Canadian Gem	Wm. Rennie, Toronto	75	21 252	0·92	11·33	2 787
Elephant or Monarch	Dupuy & Ferguson, Montreal	81	21 654	0·50	11·22	2 786
Kangaroo Bronze Top	Graham Bros., Ottawa	55	21 403	0·91	11·26	2 775
Hartley's Bronze Top	J. A. Bruce, Hamilton	99	20 1,633	0·71	11·37	2 734
Superlative	Graham Bros., Ottawa	82	19 1,824	0·71	11·88	2 731
Magnum Bonum Purple Top	Graham Bros., Ottawa	89	19 1,152	0·61	12·07	2 726
Mammoth Clyde Purple Top	Dupuy & Ferguson, Montreal	92	17 1,604	0·91	13·08	2 657
Jumbo S/867-23	Steele Briggs, Toronto	89	21 1,804	0·51	10·63	2 656
Good Luck Purple Top S-877-23	Steele Briggs, Toronto	75	21 352	0·41	10·93	2 629
Sutton's Champion Purple Top	Wm. Rennie, Toronto	64	20 1,485	0·51	11·15	2 626
Magnum Bonum Purple Top	J. A. Bruce, Hamilton	92	21 284	0·71	10·93	2 622
Skirvings Improved Purple Top	K. McDonald, Ottawa	75	19 1,798	0·81	11·59	2 613
Magnum Bonum	Wm. Ewing, Montreal	97	18 1,917	0·51	12·11	2 592
Sutton's Acquisition	Suttons, (England)	97	20 641	0·91	11·29	2 588
Elephant or Monarch	J. A. Bruce, Hamilton	45	21 1,563	0·71	10·53	2 587
Invicta Bronze Top	Wm. Rennie, Toronto	86	22 1,586	0·30	10·05	2 581
Imperial 33-39	A. E. McKenzie, Brandon	91	18 1,223	0·51	12·24	2 556
Hartley's Bronze Top	K. McDonald, Ottawa	92	19 992	0·31	11·68	2 554
D and F's Favorite	Dupuy and Ferguson, Montreal	38	20 1,119	0·51	11·05	2 544
Sutton's Improved Lord Derby	Suttons (England)	82	19 808	0·61	11·70	2 541
Halewood's Bronze Top 3-965-23	Steele Briggs, Toronto	51	18 840	0·91	12·28	2 524
Drummond's Impr. Purple Top	Wm. Ewing, Montreal	95	18 1,377	0·61	12·08	2 515
Selected Prize Elephant	K. McDonald, Ottawa	94	21 1,624	0·61	10·35	2 515
Kaalroe Wilhelmsburger Bl. 770	Danske Landboforningers Froforsyning, Roskilde, Denmark.	99	19 1,347	0·71	11·47	2 513
Kangaroo	K. McDonald, Ottawa	77	21 1,489	0·51	10·34	2 497
Ne Plus Ultra	Dupuy and Ferguson, Montreal	81	19 1,218	0·30	11·45	2 490
Laings Improved Swede	J. A. Bruce, Hamilton	97	18 1,783	0·91	11·88	2 489
Drummond's Purple Top	Dupuy and Ferguson, Montreal	95	19 427	0·51	11·66	2 481
Garton's Superlative	Wm. Ewing, Montreal	87	21 1,771	0·41	10·23	2 478
Invicta	Carter's Tested Seed, Toronto	98	20 618	0·61	11·01	2 472
Magnum Bonum	K. McDonald, Ottawa	81	19 1,470	0·81	11·31	2 464
Hartley's Bronze Top	Graham Bros., Ottawa	29	18 1,726	0·41	11·81	2 455
Irish King	Wm. Rennie, Toronto	88	19 1,054	0·60	11·40	2 452
Universal	Wm. Ewing, Montreal	38	20 385	0·72	10·95	2 422
New Perfect	J. A. Bruce, Hamilton	92	21 947	0·81	10·29	2 419
Early Model	Dupuy and Ferguson, Montreal	73	18 1,493	0·61	11·70	2 387
Kangaroo	Dupuy and Ferguson, Montreal	90	19 715	0·31	11·30	2 375
Hall's Westbury	K. McDonald, Ottawa	75	20 281	0·71	10·83	2 362
Invicta Bronze Top	Wm. Ewing, Montreal	94	20 39	0·41	10·87	2 352
Danish Queen	K. McDonald, Ottawa	86	19 563	1·12	11·25	2 338
Selected Westbury S/846-23	Steele Briggs, Toronto	89	20 1,250	0·51	10·51	2 335

TABLE 12.—SWEDE TURNIP VARIETIES

General Type	General Colour		Remarks
	Top	Flesh	
Oval	Purple	Buff yellow	Uniform, rough.
Globe	Bronze	White	13% oval, 4% flat, rough and rooty.
Oval	" purplish	Buff yellow	11% globe, 2% flat, fairly smooth.
"	"	" "	35·57% globe, 5·55% flat. rough.
Globe	"	" "	5% flat', 3% oval.
Oval	Purple	" "	13·54% globe, 3·12% bronze top, fairly smooth.
"	"	" "	36·67% globe, 2·22% green top, smooth.
"	Bronze green	" "	9·19% globe, 7·14% purple top, fairly smooth.
"	Purple	" "	3·12% globe, 9·37% bronze top, smooth.
Globe	"	" "	47·91% oval, rough.
Oval	Bronze greenish to purple.	" "	3·34% globe, rough.
Oval	Purple	" "	Uniform, fairly smooth.
"	Bronze	" "	22·83% globe, 2·17% flat, 6·52% green top, 3·26% purple top, fairly smooth.
"	"	" "	27·09% globe, 52% purple top, fairly smooth.
"	Purple	" "	29% globe, 5·55% bronze top, fairly smooth.
"	Bronze to purple	" "	39·14% globe, smooth, a good lot.
"	Purple	" "	46% globe, 3% flat, rough.
"	"	" "	40·71% globe, 2·32% flat 8·13% bronze top, fairly smooth.
"	"	" "	16·67% globe. 4·16% bronze top, fairly smooth.
Globe	"	" "	37·73% oval, fairly smooth.
Oval	"	" "	Uniform, little rough.
"	"	" "	31% globe, 2% flat 3% bronze top, rough.
"	"	" "	34·05% globe, 3·19% green top, rough.
"	Bronze greenish	Maize yellow	15·31% globe, 2·04% flat, rough and rooty.
"	Purple	Buff yellow	32·99% globe, 2·12% flat, rough.
"	Bronze greenish	" "	7·15% globe, smooth.
"	Purple	" "	18·37% globe, 2·04% flat, 2·04% bronze top, fairly smooth.
Globe	"	" "	34·09% oval, 2·27% flat, rough, 1·13% bronze top.
Oval	"	" "	5·82% globe, fairly smooth.
Globe	Bronze	" "	36·17% oval, 8·51% purple top, fairly smooth.
Oval	Purple	" "	31·12% globe, 2.22% flat, 3·33% bronze top.
"	"	" "	33·7% globe, 7·6% bronze top, rough.
Globe	"	" "	36% oval, 1% bronze top, fairly smooth.
Oval	"	" "	11·46% globe, 2·08% bronze top, smooth.
"	Bronze	" "	7·15% globe, 3·06% purple top, 1·02% green top, rough.
"	Purple	Maize yellow	26·37% globe, 3·29% flat, 4·39% bronze top, rough.
"	"	Buff "	41·32% globe, 1·08% flat rough, 4·34% bronze top.
"	"	" "	3·19% globe, 1·06% bronze top, little rough.
"	"	" "	17·35% globe, 3·06% bronze top, rough.
"	"	" "	39·37% globe, 1·06% flat, 3·19% bronze top, rough.
"	"	" "	Uniform in shape, 2·08% bronze top, little rough.
"	Bronze	" "	4·73% globe, 0·94% flat, 2·83% purple top, rough.
"	"	" "	12·5% globe, 12·5% green top, rooty.
"	Purple	" "	7% globe, 1% bronze top, fairly smooth.
"	"	" "	13·55% globe, 4·16% bronze top, 3·12% green top, rough.
"	"	" "	3·4% globe, rough.
"	"	" "	Uniform, fairly smooth.
"	"	" "	33% globe, 4% bronze top, 3% green top, fairly smooth.
"	"	" "	34·04% globe, 1·06% flat, 3·19% green top, rough.
"	"	" "	17·35% globe, 6·12% bronze top, 1·02% green top, rough.
"	"	" "	32·3% globe, 2·08% green tops, fairly smooth.
"	"	" "	3·92% globe, little rough.
"	"	" "	26·1% globe, 5·43% flat, smooth.
"	"	" "	3·12% bronze top, some rough roots in this lot.
Globe	Bronze	" "	12·79% oval, 1·16% purple top, fairly smooth.
Oval	Purple	" "	14·89% globe, 1·06% green top, rough.
"	Bronze	" "	21·43% globe, 6·12% green top, rough, rooty.
"	Purple	" "	6·66% bronze top, little rough.
"	Bronze	" "	25% globe, 1·04% purple top, rough.
"	"	" "	39·37% globe, 4·25% green top, rough.
"	Purple	" "	11·11% globe, 2·22% bronze top, fairly smooth.
"	"	" "	3·12% globe, fairly smooth.
"	Green	" "	24·31% globe, 2·8% flat, rough.
"	Bronze	" "	1·02% globe, a very few purple tops present, rough.
"	"	" "	34% globe, 4% purple top, smooth.
Globe	Mixtures of bronze and purple.	" "	29·03% oval, 2·15% flat, rough.
Oval	Purple	" "	1·06% flat, rough.
"	"	" "	2·08% globe, smooth.
Globe	Bronze	" "	48·93% oval, little rough.
Oval	Purple	" "	8·33% bronze top, 3·12% green top, very rough.
"	Bronze	" "	23·9% globe, 2·08% flat, rooty.
"	"	" "	20·76% globe, 2·83% purple top, smooth.
Globe	Purple	" "	19·23% oval, 2·56% flat, 3·84% bronze top, rough.
Oval	"	" "	14·81% globe, 3·76 flat, rough.
"	"	" "	14·59% globe, 4·16% flat, 4·16% bronze top, little rough.
"	Bronze greenish	" "	1·13% globe, rough.
Globe	Purple	" "	45·74% oval, 4·25% flat, 3·19% green top, rough.
Oval	"	" "	45·94% globe, 7·14% bronze top, rough.
"	"	" "	18·36% globe, 4·08% flat, 1·02 % long yellow, 4·08% green top, rough.
Globe	"	" "	20·40% oval, 1·02% flat, rough, 3·06% bronze top.

TABLE 12.—SWEDE TURNIP VARIETIES—*Concluded*

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield per acre dry matter
			tons lbs.			tons lbs.
Universal	Dupuy and Freguson, Montreal	94	19 694	0·51	11·20	2 334
Champion Purple Top	Graham Bros., Ottawa	68	18 259	0·51	11·95	2 333
Olsgaard Bangholm	Hjalmar Hartmann, Copenhagen	87	21 1,480	0·82	9·92	2 313
Bangholm 33/209	A. E. McKenzie, Brandon	82	18 1,484	0·20	11·49	2 307
Famous Kangaroo Green Top S/993-23	Steele Briggs, Toronto	83	20 1,895	0·82	10·21	2 277
Hardy Purple Top	Sutton's (England)	94	17 407	0·50	12·38	2 260
Bangholm	Dupuy and Ferguson, Montreal	63	17 1,913	0·51	11·74	2 216
Ditmars Swede	H. H. McNutt	92	20 457	0·91	10·32	2 175
Hartley's Bronze Top	Wm. Rennie, Toronto	55	18 1,533	0·91	11·10	2 166
Hall's Westbury	Wm. Rennie, Toronto	80	20 1,811	0·20	9·92	2 148
Kangaroo 2706	McKenzie, Brandon	98	18 687	0·41	11·28	2 138
Elephant	Suttons (England)	94	18 1,125	0·51	11·04	2 99
Bangholm Lyngby D.C. 318	Danske Landboforningers Froforsyning Roskilde, Denmark.	98	19 280	0·91	10·70	2 96
White Swede	J. A. Bruce, Hamilton	63	16 723	0·91	12·16	1 1,979
Bangholm Pajbjerg V 7022	Trifolium, Copenhagen	70	18 152	0·71	10·82	1 1,912
Laings Improved	Dupuy and Ferguson, Montreal	28	15 576	0·40	12·73	1 1,892
Monarch Swede	Experimental Farm, Nappan, N.S.	96	17 1,370	0·82	10·96	1 1,877
Purple Top Swede	Harris McFayden, Winnipeg	79	18 81	0·61	10·55	1 1,807
Sutton's Grsen Top	Suttons (England)	92	15 1,003	0·71	12·17	1 1,773
Hazard's Improved S 964-23	Steele Briggs, Toronto	44	17 1,832	1·02	10·52	1 1,770
Best of all	Graham Bros., Ottawa	87	17 1,923	0·41	10·43	1 1,747
Sslected Purple Top	Steele Briggs, Toronto	81	16 1,871	1·01	10·98	1 1,719
Bangholm Studsgaard Bl 768	Danske Landboforningers Froforsyning, Roskilde, Denmark.	78	14 923	0·61	12·82	1 1,708
Suttons Champion	Suttons (England)	89	16 1,295	0·20	10·97	1 1,652
Best of all	Suttons (England)	96	16 1,675	0·91	10·78	1 1,630
Universal	K. McDonald, Ottawa	79	16 1,824	0·71	10·62	1 1,592
Suttons Champion Purple Top	Dupuy and Ferguson, Montreal	74	16 1,993	0·99	10·47	1 1,559
Bruces Purple Top	J. A. Bruce, Hamilton	86	16 1,298	0·72	10·27	1 1,420
Bangholm	C. E. F., Charlottetown, P.E.I.	97	14 160	0·71	11·96	1 1,368
White Swede 234	A. E. McKenzie, Brandon	42	14 1,040	0·91	11·40	1 1,311
Bangholm Purple Top	Halifax Seed Co., Halifax	87	16 612	0·91	9·94	1 1,242
Selected Hazard's Improved	Wm. Rennie, Toronto	65	15 1,385	0·71	9·80	1 1,076
Mammoth Clyde Purple Top	Wm. Ewing, Montreal	93	13 1,631	0·71	10·59	1 926
Bangholm 8112	McDonald, College, Quebec	94	15 513	1·12	9·39	1 865
Kaalrabi fro Bangholm 702	Trifolium, Copenhagen	84	15 1,852	0·41	8·67	1 762
Laing's Purple Top	Wm. Ewing, Montreal	99	12 189	0·81	9·87	1 387
Westbury	Dupuy and Ferguson, Montreal	99	11 1,731	0·41	8·65	1 53

TABLE 12A—FALL TURNIP VARIETIES

Variety	Source	Germination per cent in 10 days	Yield per acre	Per cent sugar in juice	Per cent dry matter	Yield per acre dry matter
Greystons	Steele Briggs, Toronto	75	28 331	0·81	9·19	2 1,177
Early Sixweeks	Suttons (England)	95	22 1,523	1·23	11·19	2 1,094
Fynsk Bortfelder Parti 2660	Danske Landboforeningers Froforsyning, Roskilde.	98	17 95	0·81	9·98	1 1,403
White Globe	Wm. Ewing, Montreal	99	15 103	0·72	8·95	1 694
Green Top Aberdeen	Suttons (England)	87	12 383	0·51	9·04	1 204
Green Top Yellow Aberdeen	Wm. Ewing, Montreal	89	10 566	0·20	9·96	1 48
Purple Top Aberdeen	Suttons (England)	97	11 556	0·20	8·29	– 1,870
Purple Top Mammoth	Suttons (England)	94	35 847	.....	.....	.....
Purple Top Mammoth or Improved Greystone.	Steele Briggs, Toronto	67	33 902	.....	.....	.....
Red Paragon	Suttons (England)	97	32 1,181	.....	.....	.....
Yellow Tankard	Danske Landboforeningers Froforsyning, Roskilde.	94	26 452	.....	.....	.....
Fynen Bortfeld	Hjalmar Hartmann, Copenhagen	96	23 1,939	.....	.....	.....
Pomeranian White Globe	Steele Briggs, Toronto	99	15 437	.....	.....	.....
Dalis	Danske Landboforeningers Froforsyning, Roskilde.	98	11 1,887	.....	.....	.....
Aberdeen Purple Top	Steele Briggs, Toronto	8	11 519	.....	.....	.....

TABLE 12.—SWEDE TURNIP VARIETIES—*Concluded*

General Type	General Colour		Remarks
	Top	Flesh	
Oval	Purple	Buff yellow	30·62% globe, 1·02% flat, 3·06% bronze top. rough.
"	"	" "	11% globe, rough.
"	"	" "	7% globe, fairly smooth.
"	"	" "	30·86% globe, 1·06% flat, 3·19% green top, rough.
"	Bronze greenish	" "	2·08% globe, rough.
"	Purple	" "	85% globe, rough.
"	"	" "	20·22% globe, 2·12% bronze top, rough.
Globe	Green	" "	13% oval, 3% flat, 24% bronze top, rough.
"	Bronze	" "	27% oval, 2% flat, 3% green top, 2% purple top, rough.
"	Purple	" "	44% oval, 2% flat, 3% bronze top, 1% green top, rough.
Oval	Bronze	" "	13·33% globe, 17·77% purple top. rough.
"	Purple	" "	2·04% globe, fairly smooth.
"	"	" "	4% globe, 1% bronze top, fairly smooth.
"	Bronze greenish	White	1·66% globe, 3·48% flat, 1·16% purple top, rough.
Globe	Purple	Buff yellow	37·5% oval, 1·04% green top, rough.
Oval	"	" "	2·32% green top, 2·32% bronze top, rough and rooty.
"	"	Maize yellow	13·27% globe, fairly smooth.
"	"	Buff yellow	34·44% globe, 1·11% flat, 4·44% bronze top, 2·22% green top, rough.
"	Green	" "	39·37% globe, little rough.
"	Bronze	" "	4·77% globe, 1·19% flat, 17·85% green top, 2·38% purple top, rough and many "Multiple Necked".
"	Purple	" "	29·60% globe, 7·14% bronze top, rough.
Globe	"	" "	44% oval, 4% flat, rough.
Oval	"	" "	6·87% globe, 12·74% green top, 6·86 % bronze top, rough.
"	"	" "	31% globe, fairly smooth.
"	"	" "	35% globe, 4% bronze top, rough.
"	"	" "	48·87% globe, 2·27% flat, 34% bronze top, fairly smooth.
"	"	" "	38·55% globe, 4·16% bronze top, rough.
"	"	" "	39·14% globe, 5·43% flat, rather rough.
"	"	" "	15·91% globe, 26·23% green top, 5·68% bronze top, rough.
"	Green	" "	9·77% globe, 3·65% flat, rough.
"	Purple	" "	24·04% globe, 0·96% flat, 2·88% bronze top.
"	Bronze	" "	45·84% globe, 4·16% flat, 7·29% green top, rough.
"	Purple	" "	35·72% globe, rough 8·16% bronze top.
"	"	" "	3·48% globe, fairly smooth.
Globe	"	" "	35·10% oval, 10·63% bronze top, rough.
Oval	"	" "	33% globe, 2% bronze top, rough and rather rooty.
"	"	" "	6·76% globe, 4·05% green top, 1·35% bronze top, rough, a very bad lot.

TABLE 12A—FALL TURNIP VARIETIES—*Concluded*

General Type	General Colour		Remarks
	Top	Flesh	
Flat	Purple	White	40·01% globe, 8·88% oval, smooth.
"	White	"	17·4% globe, 13·04% oval, smooth.
Long	Martius yellow	Maize yellow	Uniform, smooth.
Oval	White	White	40·63% globe, 6 25% purple top, 6·25% green top, smooth.
"	Green	Maize yellow	45% globe, 2·5% flat, fairly smooth.
Globe	"	"	32·43% oval, 8·1% flat, fairly smooth.
"	Purple	Buff yellow	47·5% oval, fairly smooth.
Mixture of types.	"	White	41·87% globe, 39·53% flat, 18·60% oval, very smooth.
Globe	"	"	25·58% oval, 13·95% flat, smooth.
Oval	"	"	16·22% globe, very smooth.
Long	Light yellowish olive.	Maize yellow	Uniform, smooth.
"	Martius yellow	"	Uniform, smooth.
"	"	White	2·63% flat, a little rough.
Globe	Green	Maize yellow	24·48% oval, 6·12% flat. Rough.
Globe	Purple	"	22·22% oval, fairly smooth.

TABLE 13.—FIELD CARROT VARIETIES—*Continued*

Variety	Source	Germination per cent in 14 days	Yield per Acre	Per cent Sugar in Juice	Per cent Dry Matter	Yield Dry Matter per Acre	General Type
			Tons Lbs.			Tons Lbs.	
Large White Short Vosges	Graham Bros., Ottawa, Ontario	71	36 1,509	2·81	13·64	5 27	Short.
Large White Vosges	J. A. Bruce, Hamilton	34	34 1,655	2·91	13·52	4 1,417	Short.
Improved Interm. White	Wm. Ewing, Montreal	84	38 1,459	2·12	12·13	4 1,396	Interm.
Improved Short White	K. McDonald & Sons, Ottawa	85	39 1,173	1·67	11·74	4 1,295	Short.
Large White Belgian	Wm. Rennie, Toronto	61	38 938	2·12	11·94	4 1,186	Interm.
Ontario Champion White	Graham Bros., Ottawa	73	34 325	2·82	13·18	4 1,005	Interm.
White Interm. Carrot	McDonald College, Quebec	60	39 364	2·32	11·17	4 753	Interm.
Large White Belgian	Steele Briggs, Toronto	79	40 1,942	2·02	10·64	4 719	Interm.
Mammoth White Intermediate	Wm. Rennie, Toronto	50	37 924	2·52	11·36	4 511	Interm.
Giant Green Top White	Dupuy and Ferguson, Montreal	80	32 287	2·50	13·23	4 505	Long.
Orange Giant	Carters Ltd., Toronto	51	33 1,466	2·42	12·60	4 501	Short.
Danish Champion	C.E.F., Ottawa	73	36 1,105	1·91	11·42	4 349	Interm.
White Belgian	Hjalmar Hartmann, Copenhagen	45	28 705	2·30	14·38	4 154	Interm.
White Belgian French	Wm. Ewing, Montreal	80	27 1,365	3·19	14·71	4 144	Long.
Gulerodsfro Champion No. 7031	Trifolium, Copenhagen, Denmark	40	28 1,142	1·70	14·11	4 63	Interm.
Improved White Vosges	K. McDonald & Sons, Ottawa	86	35 1,218	1·81	11·30	4 48	Short.
White Belgian	Dupuy and Ferguson, Montreal	71	32 660	2·73	12·38	4 5	Long.
White Half Long	Harris McFayden, Winnipeg	62	38 1,327	1·62	10·35	4 3	Half Long
Champion	Harris McFayden, Winnipeg	84	24 462	3·72	16·24	3 1,870	Long.
Improved Short White	Steele Briggs, Toronto	83	34 293	1·82	11·32	3 1,731	Short.
Mammoth Short White	Wm. Rennie, Toronto	57	34 1,356	2·01	10·85	3 1,525	Short.
White Belgian No. 7016	Trifolium, Copenhagen, Denmark	55	27 1,176	2·11	13·61	3 1,509	Long.
Improved Intermediate White	Dupuy and Ferguson, Montreal	67	36 17	1·34	10·40	3 1,490	Interm.
Improved Half Long White	A. E. McKenzie, Brandon	71	30 1,693	3·02	12·12	3 1,477	Half Long
Danish Champion	K. McDonald & Sons, Ottawa	61	27 970	2·21	13·44	3 1,388	Interm.
Mammoth Intermediate (Smooth White).	J. A. Bruce, Hamilton	79	34 598	1·21	10·60	3 1,271	Interm.
Yellow Belgian	Wm. Ewing, Montreal	71	22 1,983	3·52	15·58	3 1,164	Long.
White Belgian	J. A. Bruce, Hamilton	62	29 1,491	2·02	12·00	3 1,139	Long.
White Belgian	Graham Bros., Ottawa	60	28 1,910	1·82	12·08	3 996	Long.
Long Orange Belgian	A. E. McKenzie, Brandon	69	21 359	3·31	15·76	3 676	Long.
Long Orange	J. A. Bruce, Hamilton	69	25 1,744	2·82	12·80	3 623	Long.
White Belgian	Halifax Seed Co., Halifax	76	29 106	1·61	11·31	3 572	Interm.
Long Red Surrey	Steele Briggs, Toronto	66	24 1,765	2·42	13·20	3 569	Long.
Guerande or Oxheart	Graham Bros., Ottawa	58	26 1,403	2·43	12·21	3 521	Short.
New Yellow Intermediate	Wm. Ewing, Montreal	67	17 1,995	3·98	18·10	3 515	Interm.
James	Danske Landboforeningers Frofosyning, Roskilde, Denmark.	54	20 1,123	2·81	15·47	3 362	Long.
Oxheart	Harris McFayden, Winnipeg	74	26 1,606	2·53	11·74	3 293	Short.
Champion	Hjalmar Hartmann, Copenhagen	44	26 665	2·62	11·60	3 109	Interm.
Improved Danvers	Graham Bros., Ottawa	68	24 893	2·72	12·49	3 107	Short.
Long Orange Belgian	J. A. Bruce, Hamilton	75	23 331	3·11	13·04	3 42	Long.
Improved Red Intermediate	Carters Ltd., Toronto	76	22 782	2·53	13·09	2 1,862	Interm.
Danvers Half Long Stump	Dupuy and Ferguson, Montreal	67	24 1,063	2·62	11·87	2 1,824	Short.
Long White Belgian.	A. E. McKenzie, Brandon	66	23 1,956	2·12	11·75	2 1,635	Long.
Large White Vosges	Dupuy and Ferguson, Montreal	46	21 1,213	2·62	12·44	2 1,376	Short.
Long Orange or Yellow Belgian	Wm. Rennie, Toronto	63	24 44	2·22	11·03	2 1,299	Short.
Improved White Belgian	Carters Ltd., Toronto	82	22 1,924	1·71	10·99	2 1,047	Long
James	Harris McFayden, Winnipeg	82	15 818	2·63	11·94	1 1,680	Long.

TABLE 13.—FIELD CARROT VARIETIES—*Concluded*

General Colour.			Other Types Present
Top	Skin	Flesh	
Light green olive	White	White	9·69% intermediate, 9·18% long, 4·08% yellow short, 8·16% prongy, 0·51% seed roots.
Light green olive	White	White	4·18% long, 1·39% intermediate, 0·46% stump, 0·04% prongy.
Light green olive with a little bronze	White	White	12·29% short, 7·63% long, 0·42% stump, 13·13% prongy, 0·85% seed roots.
Light green olive	White	White	1·34% long, 3·14% intermediate, 0·89% stump, 8·07% prongy.
Light green olive	White	White	19·68% short, 1·06% long, 15·42% prongy roots.
Light green olive	White	White	8·58% short, 2·52% yellow, 23·74% prongy, 0·5% seed roots.
Light green olive	White	White	10·77% short, 2·56% yellow, 47·69% prongy, 1·54% seed roots.
Light green olive with bronze in some roots.	White	White	16·89% short, 5·94% long, 0·46% short red, 3·20% yellow intermediate, 1·37% short yellow, 0·91% stump, 15·98% prongy, 0·46% seed roots.
Light green olive with bronze in some roots.	White	White	22·17% short, 9·05% long, 0·45% yellow intermediate, 15·38% prongy, 0·45% seed roots.
Olive green with bronze in some roots.	From very, very little yellow to white.	From very, very little yellow to white.	4·65% prongy, 1·86% seed roots.
Dark green olive	Apricot yellow.	Apricot yellow.	8·58% long, 6·06% intermediate, 12·12% prongy.
Dark green olive	Empire yellow.	Empire yellow.	13·53% short, 7·06% long, 0·59% stump, 18·82% prongy.
Light green olive	White	White	44·61% long, 0·51% long yellow, 3·08% yellow intermediate, 19·49% prongy.
Light to dark green olive with more or less bronze.	White	White	1·41% yellow long, 0·35% short red, 12·72% prongy.
Parrot green	Empire yellow.	Empire yellow.	12·55% long, 7·36% short, 22·08% prongy.
Light green olive	White	White	36·74% long, 4·81% intermediate, 3·21% prongy, 0·04% seed roots.
From light to dark green olive with heavy bronze in some.	White	White	11·69% prongy, 0·58% seed roots.
Light green olive	White	White	5·63% long, 0·86% yellow intermediate, 8·22% prongy.
Dark green olive	Orange	Orange	1·30% intermediate, 0·86% short, 13·42% prongy roots.
Light green olive	White	White	15·23% long, 10·93% intermediate, 6·64% prongy, 0·39% seed roots.
Light green olive	White	White	8·97% long, 7·26% intermediate, 9·04% prongy, 0·42% seed roots.
Green olive with bronze	White	White	1·32% long yellow, 5·73% prongy, 4·85% seed roots.
Dark green olive	White	White	14·22% short, 0·42% yellow, 28·03% prongy.
Light green olive	White	White	13·43% long, 0·79% yellow intermediate, 9·09% prongy.
Dark green olive	Empire yellow.	Empire yellow.	7·98% short, 2·52% long, 22·69% prongy, 0·42% seed roots.
Light greenish olive	White with a shade of bronze.	White	20·05% short, 2·93% long, 1·67% yellow, 50·63% prongy 1·25% seed roots.
Dark green olive	Empire yellow to orange.	Empire yellow to orange.	1·42% short, 13·12% prongy roots.
Light to dark green olive with more or less bronze.	White	White	6·64% short, 0·38% long yellow, 8·85% prongy.
Green olive with bronze in the long shaped.	White	White	5·83% short, 0·9% short yellow, 10·31% prongy, 3·14% seed roots.
Very dark green olive	Orange	Orange	1·66% long yellow, 12·03% prongy.
Dark green olive	Grenadine red.	Grenadine red.	33·33% short, 0·43% long white, 14·10% prongy.
Green olive with bronze in the long shaped.	White	White	36·57% long, 2·72% short, 0·39% yellow intermediate 9·34% prongy, 0·78% seed roots.
Very dark green olive with a shade of bronze.	Grenadine red.	Grenadine red.	7·11% short, 10·28% prongy.
Very dark green olive with a shade of bronze.	Grenadine red.	Grenadine red.	1·19% prongy roots.
Dark green olive	Very light orange.	Very light orange.	40% long, 5% short, 45·19% prongy, 0·84% seed roots.
Very heavy green olive with some bronze.	Grenadine red.	Grenadine red.	18·53% short, 20% prongy roots.
Very heavy green olive with some bronze.	Grenadine red.	Grenadine red.	1·57% prongy.
Parrot green	Empire yellow.	Empire yellow.	15·48% long, 2·51% short, 0·84% seed roots, 13·39% prongy.
Green with heavy bronze	Grenadine red.	Grenadine red.	14·62% prongy, 0·39% seed roots.
Very dark green olive	Orange	Orange	4·56% short white, 11·20% prongy roots.
Dark green olive	Grenadine red.	Light green red.	16·45% short, 11·39% long, 0·42% yellow, 27·85% prongy.
Very heavy green olive with some bronze.	Grenadine red.	Grenadine red.	20% prongy.
Light to dark green olive with more or less bronze.	White	White	2·51% long yellow, 4·6% prongy, 0·42% seed roots.
Light green olive	White	White	1·86% long, 1·49% stump, 4·10% prongy, 0·37% seed roots.
Dark green olive	Grenadine red.	Grenadine red.	7·86% long, 2·06% long yellow, 1·65% stump, 11·57% prongy.
Light to dark green olive with more or less bronze.	White	White	0·39% long yellow, 5·9% prongy.
Very dark green olive with a shade of bronze.	Grenadine red.	Grenadine red.	8·24% short, 0·37% long yellow, 10·86% prongy, 1·55% seed roots.

TABLE 13A.—SUGAR BEETS

Variety	Source	Germination per cent in 10 days	Average yield per acre	Per cent sugar in juice	Per cent solids in juice	Coefficient of purity
			tons lbs.			
Green Top White Sugar	Wm. Ewing, Montreal	44	26 649	13·48	17·56	80·78
Improved White Sugar	Carters, Toronto	69	23 1,895	12·15	15·06	80·70
Sugar Beet	Hjalmar Hartmann, Copenhagen	80	22 1,428	17·39	20·98	82·87
Danish Improved Sugar Beet	Dupuy & Ferguson, Montreal	81	22 918	17·58	21·00	83·71
Sugar Beet Vilmorin's Improved "B"	Vilmorin Andrieux, Paris	80	18 545	18·93	22·26	84·04
Sugar Beet, Chatham	Dom. Sugar Company, Chatham	78	18 527	16·63	20·58	80·78
Sugar Beet, Henning and Harving	" " "	71	17 1,424	17·22	20·66	85·35
Sugar Beet, Kitchener	" " "	87	17 541	16·90	26·78	81·28
Sugar Beet, Sluice Bros., Holland	" " "	40	15 1,639	15·48	19·78	78·25

RED CLOVER

Thirty lots of red clover from different sections of Canada and Europe were tested in trial plots. In clover, which produces the crop the year after seeding, hardiness is of greater importance than yielding capacity and for this reason, in addition to broadcast-sown plots, rows of individual plants of each lot under test were sown. By counting in the fall and spring comparative figures on the hardiness were obtained. In the broadcast-sown plots an area or areas was cut for yield records.

In connection with yield records it must be considered that when a lot killed out to any considerable extent weeds filled up these bare spaces and consequently greatly increased the yields. Summarizing from table 14 and from notes taken during the season, it would certainly appear that red clover from sources where winter conditions are not as severe as Canada should never be sown under our conditions as such material, owing to lack of winter hardiness, is not capable of producing a profitable crop.

TABLE 14.—RED CLOVERS

Name and Source of Seed	Individual plants per cent winter killed	Average total green yield per acre	Average total yield cured hay (15 per cent moisture)
		tons lbs.	tons lbs.
Red Clover, Wales	23·79	10 1,275	3 721
Red Clover, England	14·99	9 1,956	3 422
Medium Late Red Clover, Sweden	7·68	6 941	2 753
Red Clover, Kenora, Ontario	2·9	12 166	4 707
Red Clover, Ottawa, Ontario	3·15	10 1,988	3 885
Early Red Clover, Sweden	5·77	12 984	3 1,368
Red Clover, C. E. Farm	3·1	11 1,265	3 898
Toulouse Red Clover South Western France	50·87	7 721	2 1,280
Umbria Red Clover North Central Italy	100·0	6 459	2 285
Venezia Red Clover, South Italy	41·34	7 1,579	2 1,486
Red Clover, St. Casimir, Quebec	4·9	11 1,081	3 915
Red Clover, South Italy	66·95	12 907	3 1,773
Red Clover, South Eastern France	13·78	12 753	4 108
Red Clover, South Italy	55·39	9 93	3 573
Red Clover, South Italy	66·41	9 1,727	3 149
Red Clover, C. E. Farm	1·9	13 1,370	4 665
Dauphine Red Clover South Eastern France	61·8	11 1,915	3 1,831
Late Red Clover, Sweden	2·0	10 1,340	3 1,669
Red Clover C. E. F.	1·55	10 1,736	3 1,447
Altaswede, Alberta	8·66	11 1,119	3 786
Red Clover, South Eastern France	0·44	11 693	4 62
Marche Red Clover, North Central Italy	47·93	10 558	3 840
Red Clover, Central Italy	37·1	8 1,423	3 255
Red Clover, St. Clet, Quebec	0·9	12 649	4 1,046
Red Clover, South Italy	68·11	10 1,465	3 1,421
Red Clover, South Italy	66·58	8 410	3 69
Red Clover, Châteauguay, Quebec	2·25	10 1,948	3 1,803
Emilia Red Clover, North Central Italy	37·9	8 733	3 546
Red Clover, North Italy	29·0	11 1,637	3 1,264
Red Clover, Italy	51·8	12 515	3 1,114

WHITE CLOVER

Eight commercial lots of white clover were tested for hardiness, yield and general suitability.

Only one cutting was secured from them. After the first cutting, Scottish wild white and Kentish wild white made no further growth till the fall rains came. The English white and commercial white made very little growth while the other varieties particularly Ladino and Mammoth White made a second growth almost equal to that secured from them at the time of the first cutting.

All of the varieties came through the winter with practically a perfect stand.

TABLE 15.—WHITE CLOVERS

Variety	Source	Green yield per acre		Per cent dry matter	Yield dry matter per acre	
		tons	lbs.		tons	lbs.
Ladino	Idaho, U.S.A.	9	345	28·15	2	1,164
Morso	Danish	19	115	12·98	2	947
Mammoth White	Suttons (England)	7	1,162	29·18	2	424
White Dutch	Commercial	15	803	13·61	2	192
Stryno	Danish	16	1,154	11·61	1	1,849
Wild White	Scottish	9	886	17·52	1	1,309
Wild White	Kentish	11	618	14·35	1	1,246
English White Dutch	Suttons (England)	9	764	15·19	1	850

MIXTURES OF GRASSES AND CLOVERS

The following tables give the comparative yields of twenty-eight mixtures of grasses and clovers sown in varying combinations and proportions.

An average of the yields for the past two years, as well as the current year's figures is given.

Of the grasses sown with sweet clover, orchard grass is the only one that has persisted in competition with the sweet clover.

TABLE 16.—MIXTURES OF GRASSES AND CLOVERS

Seeding	Rate per acre	Total Yield 1922				Total Yield 1923				Average Total Yield for 1922 and 1923			
		Green		Dry		Green		Dry		Green		Dry	
	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Alfalfa	6												
Timothy	6												
Red clover	10	11	1,407	3	1,023	14	720	3	686	13	63	3	854
Alsike	2												
White Dutch clover	1												
Alfalfa	4												
Timothy	6												
Red clover	7½	10	807	3	69	15	1,290	3	1,185	13	48	3	627
Alsike	1½												
White Dutch clover	1												
Alfalfa	3	9	1,387	2	1,561	17	1,038	3	1,810	13	1,212	3	685
Timothy	6												
Red clover	5												
Alsike	1												
White Dutch clover	1												
Timothy	8												
Red clover	10	4	929	1	1,195	17	1,878	3	705	11	403	2	950
White Dutch clover	1												

TABLE 16—MIXTURES OF GRASSES AND CLOVERS—*Continued*

Seeding	Rate per acre	Total Yield 1922				Total Yield 1923				Average Total Yield for 1922 and 1923			
		Green		Dry		Green		Dry		Green		Dry	
	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Timothy	8												
Red clover	10												
Kentucky blue grass	2	5	932	1	1,701	17	1,601	3	489	11	1,266	2	1,095
Red Top	2												
White Dutch clover	1												
Timothy	8												
Red clover	8												
Alsike	2	6	863	1	1,555	17	1,082	2	1,660	11	1,972	2	607
White Dutch clover	1												
Timothy	8												
Red clover	8												
Alsike	2	4	805	1	1,026	17	1,205	2	1,787	11	5	2	406
Kentucky blue grass	2												
Red Top	2												
White Dutch clover	1												
Timothy	8												
Alsike	4	4	8	1	1,303	19	967	3	56	11	1,487	2	709
White Dutch clover	1												
Timothy	8												
Alsike	4												
Kentucky blue grass	2	3	1,387	1	925	18	1,988	2	1,774	11	687	2	349
Red top	2												
White Dutch clover	1												
Timothy	6												
Meadow Fescue	4												
Red clover	10	3	1,972	1	1,045	15	1,688	3	236	9	1,830	2	640
White Dutch clover	1												
Timothy	6												
Meadow Fescue	4												
Red clover	10	4	587	1	1,300	19	813	3	927	11	1,700	2	1,113
Kentucky blue grass	2												
Red top	2												
White Dutch clover	1												
Timothy	6												
Meadow Fescue	4												
Red clover	8	4	1,600	1	1,375	19	1,645	3	1,204	12	622	2	1,289
Alsike	2												
White Dutch clover	1												
Timothy	6												
Meadow Fescue	4												
Red clover	8												
Alsike	2	4	92	1	947	18	1,039	3	659	11	565	2	803
Kentucky blue grass	2												
Red top	2												
White Dutch clover	1												
Timothy	6												
Orchard grass	4	5	1,516	1	599	18	1,926	3	605	12	721	2	1,102
Red clover	10												
White Dutch clover	1												
Timothy	6												
Orchard grass	2												
Meadow Fescue	2												
Red clover	10	3	615	1	216	15	1,442	2	1,728	9	1,028	1	1,972
Kentucky blue grass	2												
Red top	2												
White Dutch clover	1												
Timothy	6												
Orchard grass	4												
Red clover	10	5	938	1	1,337	16	544	3	467	10	1,741	1	902
Kentucky blue grass	2												
Red top	2												
White Dutch clover	1												

TABLE 16—MIXTURES OF GRASSES AND CLOVERS—*Concluded*

Seeding	Rate per acre	Total Yield 1922				Total Yield 1923				Average Total Yield for 1922 and 1923			
		Green		Dry		Green		Dry		Green		Dry	
	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Timothy	6												
Orchard grass	4												
Red clover	8	4	610	1	880	14	629	2	1,336	9	619	2	108
Alsike	2												
White Dutch clover	1												
Timothy	6												
Orchard grass	4												
Red clover	8												
Alsike	2	3	1,477	1	598	17	1,938	3	303	10	1,707	2	450
Kentucky blue	2												
Red top	2												
White Dutch clover	1												
Timothy	6												
Orchard grass	2												
Meadow Fescue	2	3	1,076	1	587	18	..	3	616	10	1,538	2	601
Red clover	10												
White Dutch clover	1												
Timothy	6												
Orchard grass	2												
Meadow Fescue	2	4	317	1	714	18	857	2	1,690	11	587	2	202
Red clover	8												
Alsike	2												
White Dutch clover	1												
Timothy	6												
Orchard grass	2												
Meadow Fescue	2												
Red clover	8	4	1,862	1	752	18	1,835	2	1,886	11	1,848	2	319
Alsike	2												
Kentucky blue	2												
Red top	2												
White Dutch clover	1												
Timothy	8												
White Bloss. S. clover	10	9	751	2	571	12	163	1	1,927	10	1,457	2	249
White Dutch clover	1												
Timothy	6												
Orchard grass	4												
White sweet clover	10	10	361	2	743	14	598	2	228	12	479	2	485
White Dutch clover	1												
Timothy	6												
Meadow Fescue	4	7	1,525	2	451	14	996	2	316	11	260	2	383
White sweet clover	10												
White Dutch clover	1												
Timothy	6												
Meadow fescue	2												
Orchard grass	2	8	1,946	2	770	14	567	2	405	11	1,256	2	587
White sweet clover	10												
White Dutch clover	1												
Alfalfa	20	.....		.....		11	1,979	1	1,595				
White Dutch	1												
Field Brome	8												
White sweet clover	10	10	1,450	2	1,250	13	1,864	1	1,768	12	657	2	509
White Dutch	1												

ANNUAL HAY CROPS

Twenty-nine lots of annual hays, consisting of millets, clovers and cereals, planted alone and in various combinations, were tested for fodder production.

In the following table will be found the comparative yields secured from these crops. As in previous tests the sweet clovers in combination with the millets produced the highest yield of fodder. The fodder secured was also of excellent quality.

Crimson clover has continually failed to make any appreciable growth when sown in mixtures, either in the hay crop secured or in the subsequent aftermath.

TABLE 17—ANNUAL HAY CROP

Seeding	Rate	Green yield per acre		Dry yield per acre	
		tons	lbs.	tons	lbs.
Hubam Clover	15				
Banner Oats	80	5	1,464	2	1,063
Hubam Clover	15				
Spring Rye	80	5	1,430	2	883
Hubam Clover	15				
Japanese Millet	20	16	1,019	5	152
Hubam Clover	15				
Golden Millet	20	12	1,989	4	1,113
White Sweet Clover	15				
Banner Oats	80	4	1,694	2	207
White Sweet Clover	15				
Spring Rye	80	5	42	2	817
White Sweet clover	15				
Japanese Millet	20	15	475	5	1,358
White Sweet Clover	15				
Golden Millet	20	9	226	3	376
White Sweet Clover	15				
Yellow Sweet Clover	15				
Spring Rye	80	3	1,719	1	887
Banner Oats	80				
Yellow Sweet Clover	15				
Spring Rye	80	5	676	2	908
Yellow Sweet Clover	15				
Japanese Millet	20	18	910	6	1,344
Yellow Sweet Clover	15				
Golden Millet	20	12	40	4	706
Crimson Clover	15				
Banner Oats	80	3	1,672	1	1,182
Crimson Clover	15				
Spring Rye	80	10	750	5	412
Crimson Clover	15				
Japanese Millet	20	14	60	5	102
Crimson Clover	15				
Golden Millet	20	7	1,801	2	1,658
Barley	100	4	1,167	1	1,173
Hubam Clover	20	9	1,050	1	153
White Sweet Clover	20	5	1,358	1	910
Yellow Sweet Clover	20	4	339	..	1,951
Banner Oats	100	4	724	1	1,564
Banner Oats	78				
Arthur Peas	45	4	1,925	2	494
Common Vetch	15				
Golden Millet	30	11	488	4	157
Common Millet	30	7	946	2	1,408
Japanese Millet	30	18	1,211	.....	.....
Hungarian Millet	30	4	1,735	1,	1,516
Siberian Millet	30	7	1,603	3	676
Hog Millet	30	7	965	2	1,457

SUNFLOWERS

Eight commercial lots of sunflowers were tested for yield and general suitability. Table 18 records the data secured.

TABLE 18—SUNFLOWER VARIETIES

Variety	Source	Date cut	Type of growth	Corrected average yield		Average yield per acre dry matter	
				tons	lbs.	tons	lbs.
Giant Russian	C. P. Railway	Aug. 29	Single stalk	16	605	2	297
Disco Russian Giant	Dakota Impr. Seed Co.	Sept. 24	Single stalk	20	541	3	753
Manchurian	A. E. McKenzie	Aug. 29	Single stalk	13	1,669	2	61
Manteca	C.P.R.	" 29	Single stalk	12	1,604	1	1,394
Mixed sunflowers	C.P.R.	" 29	Single stalk	15	555	1	1,864
Black	C.P.R.	" 29	Single stalk 2% branching	13	1,024	1	1,368
Early Ottawa 76	C. E. Farm	" 31	Single stalk 2% branching	13	1,957	2	254
Mixed Mennonite	Rosthern, District	" 29	Single stalk 2% branching	10	1,861	1	867

BREEDING

ROOTS

Land not being available, no seed for stecklings was sown. A selection from stecklings grown the previous year was made and roots set out for seed production. The mangel and carrot seed crops were good, the former yielding at the rate of 1,800 pounds to the acre, the latter 830 pounds. Swede turnips although protected from cabbage maggot by corrosive sublimate did not yield well, due possibly to insect attack the previous year. Only 450 pounds of seed to the acre was obtained.

SUNFLOWERS

Summarizing results in breeding work with sunflowers the following may be stated.

First. That sunflowers are not totally self sterile.

Second. That heads must be isolated in material which will prevent wind pollination.

Third. That working on the above basis it is possible to breed uniform pure line strains of many different types.

When work was first started here the question naturally arose as to the possibility of selfing this crop. Authorities consulted gave information that sunflowers were self sterile. However selfing was tried by enclosing the heads in paper bags and sufficient germinable seed obtained to carry on the selected types. This method of selfing was continued until the Division has to-day over ninety lots of many types which are breeding pure to type. Cotton and mosquito net covers were tried out for isolation but the resulting crop clearly proved that with this method natural crossing was occurring. In the test of paper versus cotton bags branching types were selected and heads on the same plant were isolated with the different materials. Progeny from heads isolated in paper bags was pure and uniform, that from the cotton isolations

showed clear evidence of having been crossed. Isolation will be continued in 1924 and it is expected that in 1925 crosses will be made between similar types to regain vigour and obtain material for commercial distributions.

GRASSES, CLOVER AND ALFALFA

Isolations were made from the grass breeding material on an extensive scale. Bulk isolations were carried out on two selected pure lines of Kentucky Blue with the idea of obtaining sufficient seed for large multiplication plots. Ten pure strains of Timothy were also isolated in bulk and one selection "Boon" was supplied the Canadian Seed Growers Association for multiplication.

One hundred and thirty Western Ryes were under test for hay and seed yield, and 59 selected for multiplication on the western Experimental Farms in 1924, 1925.

Further selection and inbreeding was carried on with Orchard Grass, Meadow Fescue, Red Top and Awnless Brome Grass.

Ninety lots of seed, each from an isolated alfalfa plant, were set out in plots of individual plants.

GENERAL NOTES

New seedings were put in of hay and pasture plots and a great amount of data secured in connection with methods of experimentation which will be published as a separate bulletin when data from a number of years is available.

Exhibits were prepared and supervised for a number of exhibitions, and an officer from the Division was in attendance at the Canadian National Exhibition, the Central Canada Exhibition, and the Winter Fairs at Toronto, Guelph and Ottawa to discuss and advise interested parties concerning the Forage Crop work on the Experimental Farm System.

EXPERIMENTAL PROJECTS UNDER WAY IN THE DIVISION OF FORAGE CROPS, CENTRAL EXPERIMENTAL FARM

INDIAN CORN

Project No.	Title
Ag. 1.	Indian Corn, variety tests for ensilage purposes.

FIELD ROOTS

Ag. 16.	Mangels, variety tests for yield and purity.
Ag. 17.	Mangels, breeding of pure strains.
Ag. 23.	Mangels, seed growing as a commercial venture.
Ag. 24.	Mangels, stecklings vs. mature roots for seed.
Ag. 25.	Mangels, methods of planting seed roots.
Ag. 36.	Carrots, variety tests for yield and purity.
Ag. 37.	Carrots, breeding of desirable types.
Ag. 38.	Carrots, early vs. late seeding for fodder.
Ag. 41.	Carrots, seed production as a commercial venture.
Ag. 46.	Turnips, variety tests for yield and purity.
Ag. 51.	Swedes, variety tests for yield and purity.
Ag. 52.	Swedes, breeding of pure strains.
Ag. 53.	Swedes, early vs. late seeding.
Ag. 54.	Swedes, early vs. late harvesting.
Ag. 57.	Swedes, methods of planting seed.
Ag. 58.	Swedes, seed production as a commercial venture.
Ag. 66.	Sugar Beets, variety tests for yield and purity.
Ag. 71.	Winter storage of roots.

SUNFLOWERS

Ag. 76.	Sunflowers, variety tests for yield and purity.
Ag. 77.	Sunflowers, breeding of pure strains.

BREEDING AND TESTING OF GRASSES AND CLOVERS

Project No.	Title
Ag. 86.	Breeding improved strains of Timothy.
Ag. 87.	" " " Orchard Grass.
Ag. 88.	" " " Western Rye.
Ag. 89.	" " " Brome Grass.
Ag. 90.	" " " Kentucky Blue.
Ag. 91.	" " " Red Top.
Ag. 92.	" " " Tall Oat Grass.
Ag. 93.	" " " Meadow Fescue.
Ag. 94.	" " " Red Fescue.
Ag. 95.	" " " Agropyron spicatum.
Ag. 111.	" " " Alfalfa.
Ag. 112.	" " " Sweet clovers (w).
Ag. 113.	" " " Sweet clover (y).
Ag. 114.	" " " Red clover.
Ag. 115.	" " " Alsike clover.
Ag. 116.	" " " White Dutch.
Ag. 117.	" " " Soybeans.
Ag. 126.	Alfalfa, variety tests, hardiness, yield and suitability.
Ag. 130.	Alfalfa, broadcast vs. rows for seed production.
Ag. 146.	Red clover, variety tests for yield and general suitability.
Ag. 148.	Red clover, rows vs. broadcast for seed production.
Ag. 161.	Sweet clover, variety tests.
Ag. 178.	Alsike clover, variety tests.
Ag. 201.	Timothy, variety tests for yield and purity.
Ag. 202.	Timothy, seed production.
Ag. 231.	White Dutch clover, variety tests for yield and suitability.
Ag. 255.	Miscellaneous grasses, variety tests.
Ag. 256.	Miscellaneous legumes, variety tests.

MISCELLANEOUS FORAGE PLANTS

Ag. 181.	Soybeans, variety tests for forage.
Ag. 182.	Soybeans, methods of planting.
Ag. 186.	Horse beans, methods of planting.
Ag. 187.	Horse beans vs. soybeans.
Ag. 191.	Sorghums, variety tests.
Ag. 257.	Forage crops other than legumes and grasses, variety tests.

ANNUAL HAY CROPS

Ag. 241.	Annual hay crops, variety tests for yield and suitability.
Ag. 241 (A).	Grain varieties, variety tests for yield and suitability.
Ag. 241 (B).	Legume varieties, variety tests for yield and suitability.
Ag. 241 (D).	Mixtures, variety tests for yield and suitability.
Ag. 245.	Annual hay crops, time of harvesting.

MILLETS

Ag. 251.	Millets, variety tests.
Ag. 252.	Millets, rates of seeding.
Ag. 253.	Millets, methods of seeding for hay production.

HAY AND PASTURE MIXTURES

Ag. 258 (B).	Hay and pasture mixtures experiments, Alfalfa as a base.
Ag. 258 (C).	Hay and pasture mixtures experiments, Sweet clover as a base.
Ag. 258 (D).	Hay and pasture mixtures experiments, Red clover as a base.
Ag. 258 (E).	Hay and pasture mixtures experiments, Mixed clover as a base.
Ag. 258 (H).	Hay and pasture mixtures experiments, Alsike clover as a base.

GENERAL PROJECTS

Ag. 259.	Experimental methods.
Ag. 260.	Herbarium. Collection of grasses and other forage plants from all parts of the Dominion of Canada.
Ag. 261.	Exhibits. Collection and preparation of forage crop specimens for exhibit.
Ag. 262.	Botanical Surveys. Botanical survey of the salt marshes of Nova Scotia at Kentville and Nappan.

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