

CANADIAN FARM
**YEAR
BOOK**

1915



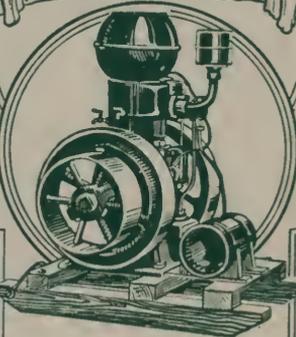
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CANADIAN FARM YEAR BOOK

1916

A Complete Reference Library and Handy Book
for the Farmer and Stockman

Compiled Under Direction of
Editorial Staff of
CANADIAN FARM

THE FARM PRESS, LIMITED

181 Simcoe St.

Toronto, Ont., Canada

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Toronto, Ont.

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INTRODUCTORY

THIS is the third edition of Canadian Farm Year Book. The first one was issued in 1913, and the second in 1914. Conditions arising out of the war in its earlier stages made it impracticable to publish an edition in 1915. This is the 1916 edition, and is presented with the hope that it will fill as important a place in the agricultural field as have the previous editions. The demand for a work of this kind grows, and our endeavor has been to make it meet the real needs of the farmer.

While retaining many of the old features of former editions, the 1916 Year Book contains sufficient new matter to make it a distinctly new book. Many changes have taken place in agriculture since the 1914 edition was published. These have all been tabulated and noted. One of the new features is "Who's Who in Agriculture," a chapter that cannot but be of very great value to the country. The list of "Who's Who" is not as large as we hope to make it in future editions. It is, however, a good beginning, and its appearance will be of great help in securing information about other prominent agriculturists who should occupy a place in "Who's Who," but who were backward about sending in the information necessary to compile such a list.

This third edition will, we believe, fill a place in the agricultural field not filled by the other editions, valuable as they were. It retains all the good features of the old, with much added information of great value to agriculture. Much of the old is recast in more up-to-date form, and the new, gathered from many sources, is in keeping with the needs of the times. It is not practicable to give in detail the sources of information. Suffice it to say that the information is authoritative and has only found a place in the 1916 edition because it was felt to be of value.

The new edition is presented herewith, and we trust it will serve the purpose intended of providing a handy reference book and encyclopaedia of information specially useful to farmers.

THE EDITORS.

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Canadian Farm Year Book

1916

THE DOMINION.

The Parliament of the Dominion of Canada consists of the Senate, with 87 members, and of the House of Commons, with 221 members, senators being appointed for life by the Governor-General, and members of the House of Commons being elected by the people. The limit of duration for each Parliament is five years. A Redistribution Act passed after each census readjusts the number of representatives in the House of Commons in accordance with rules laid down in Section 51 of the British North America Act, 1867, of the Imperial Parliament (30-31 Vict., c. 3). These rules provide that the Province of Quebec shall always have the fixed number of 65 members and that there shall be assigned to each of the other provinces such a number of members as will bear the same proportion to the number of its population (ascertained by the census) as the number 65 bears to the population of Quebec.

The four original provinces of the Dominion were Ontario, Quebec, Nova Scotia and New Brunswick, which were given parliamentary representation according to Section 37 of the British North America Act, 1867. By Imperial Orders in Council the provinces of British Columbia and Prince Edward Island were admitted into the Dominion—the former on July 1, 1873, by Order dated May 16, 1871, and the latter on July 1, 1873, by Order dated June 26, 1873. An Act of the Dominion Parliament of May 12, 1870 (33 Vict., c. 3), provided for the formation of the province of Manitoba out of Rupert's Land and the Northwest Territory, so soon as these should be admitted into the Dominion of Canada, which admission was effected by Imperial Order in Council, dated June 23, 1870, and taking effect on July 15, 1870. In consequence of doubts as to the legal validity of the Dominion Act of 1870 (33 Vict., c. 3) the Imperial Parliament passed an Act in 1871 (34-35 Vict., c. 28) making the Canadian Act valid and effectual.

Area and Population.

The Dominion of Canada, extending westward from the Atlantic Ocean to the Pacific Ocean, and northward from the United States boundary into the Arctic Circle, embraces a total area computed at 3,729,665 square miles. This area is divided into nine provinces and the Yukon and Northwest Territories. By the Boundary Extension Acts, passed by the Dominion Parliament in 1912 (2 Geo. V. cc. 32, 40 and 45) the provinces of Manitoba, Ontario and Quebec were enlarged by the addition of areas that were previously part of the Northwest Territories. The boundaries of Manitoba were thus extended northwards to the 60th parallel of north latitude between the eastern boundary of Saskatchewan and the western shore of Hudson Bay; and from the point where the northern boundaries of Manitoba and Ontario formerly coincided the boundary of Manitoba was extended due north to a point defined and thence north-easterly to the point where the 89th meridian of west longitude intersects the southern shore of Hudson Bay. The northern boundaries of Ontario were extended to the southern shores of Hudson Bay, the new western boundary of Ontario coinciding with the new eastern boundary of Manitoba. To the province of Quebec were added the whole of the territory of Ungava and that part of Labrador which is within the Dominion of Canada.

Additional Territory.

By the revision of the boundaries Manitoba received about 178,100, Ontario 146,400 and Quebec 354,961 square miles of additional territory.

Quebec, instead of British Columbia, is now the largest province of the Dominion, Ontario being second, and British Columbia third in point of size. The map of Canada which forms part of this volume shows clearly the present boundaries of the provinces.

New District.

The new district of Ontario has been named Patricia. It is bounded on the west and northwest by Manitoba, on the south and southeast by the English and Albany rivers and on the east and north by James and Hudson Bays. Pursuant to an Order-in-Council, dated February 20, 1912, and subject to the future enactment by the Dominion Parliament of the necessary legislation, Ontario will also possess a strip of territory five miles wide lying between the district of Patricia and the Nelson River and to be located within 50 miles of the Hudson Bay Coast, as well as an area half a mile wide and five miles in length to be located along the south shore of the Nelson River. The latter area is to be contiguous to the five mile strip, and together these areas will afford ten miles of water front for harbour facilities and railway terminals. The land is to be selected and designated by the Ontario Government within five years from the date of the Order-in-Council.

Population of Canada.

According to the corrected returns of the fifth census, the total population on June 1, 1911, was 7,206,643, representing an increase of 1,835,328 since the previous census of April 1, 1901. For the period covered, the rate of increase, viz., 34.17 per cent., is the largest in the world, and is due to the heavy tide of immigration which set in with the beginning of the present century. The countries next in order, in respect to the percentage rates of increase during the same decade are: New Zealand, 30.5; the United States, 21; Germany, 15.2; Holland, 14.8; Switzerland, 13.2; Denmark, 12.6; Belgium, 10.9; Austria, 9.3; United Kingdom, 9.1; Hungary, 8.5; Sweden, 7.5; Italy and Norway, 6.8; and France, 1.6. Ontario and Quebec continue to be the most largely populated of the nine provinces, the former having 2,523,274 and the latter 2,003,232 inhabitants. None of the other provinces has yet reached half a million; but Saskatchewan has the third largest population with 492,432. All the provinces show an increase since 1901, excepting Prince Edward Island, where the population has decreased by 9,531, or 9.23 per cent. The Yukon and Northwest Territories, with relatively sparse populations, show decreases as compared with 1901. The greatest relative increase is in the western provinces, especially in Saskatchewan and Alberta. The population of Saskatchewan, 492,432, as compared with 91,279 in 1901, shows an increase of 401,153, or over 439 per cent. Alberta has grown from 73,022 in 1901 to 374,663 in 1911, an increase of 301,641, or 413 per cent. Manitoba, 455,614, shows an increase of 200,403 from 255,211, or 78.5 per cent., and British Columbia, one of 213,823, or over 119 per cent., the population having grown from 178,657 in 1901 to 392,480 in 1911.

The average density of the population works out to 1.93 per square mile, calculated upon the total of 3,729,665 square miles, the area of Canada. This figure may be compared with the density per square mile of other new countries, as, for instance, the United States, 30.69; the Argentine Republic, 5.99; the Commonwealth of Australia, 1.53; the Dominion of New Zealand, 9.63; and Newfoundland, 1.47. Prince Edward Island has a density of 42.91, Nova Scotia of 22.98, New Brunswick of 2.61, Ontario of 9.67, Manitoba of 6.18, and Quebec of 5.69. The other three provinces, Saskatchewan, Alberta and British Columbia are each below 2 per square mile.

Extension of Boundaries.

The boundaries of the provinces of Manitoba, Ontario and Quebec were extended by chapters 32 (Manitoba), 40 (Ontario), and 45 (Quebec). Particulars of the extensions thus effected are given in the Canadian Year Book of 1913. The Manitoba Act (chapter 32) contains new financial provisions (sections 4 and 5), governing the annual payments to be made by the Government of Canada to the Government of Manitoba in respect of interest,

public lands, swamp lands, public buildings, etc. The Quebec Act (chapter 45) provides by section 2 (a) and (b) that the population of the territory added by the Act shall be excluded in ascertaining the population of the province for the purposes of any readjustment of representation of the other provinces consequent upon any census, that in any future census the population of the new territory shall be distinguished from the province as heretofore constituted and that the representation of the new territory in the House of Commons shall be determined according to the rules enacted by section 51 of the British North America Act, 1867, regulating the representation of provinces other than Québec. All three Acts came into force on May 15, 1912, by proclamations of the Governor-in-Council, dated May 10, 1912.

Aid to Agriculture.

Chapter 3 provides for the granting of subsidies to the provincial governments for the encouragement of agriculture, and empowers the Minister of Agriculture, with the authority of the Governor-in-Council, to enter into agreements with the provincial governments setting forth the terms upon which the subsidies are granted and prescribing the conditions under which and the purposes for which they shall be expended. For the financial year ended March 31, 1913, a total sum of \$500,000 was appropriated for the purposes of this Act (see also page 453).

The Agricultural Instruction Act, assented to on June 6, 1913, repeals chapter 3 of the Statutes of 1912 and provides for the appropriation of a sum of \$10,000,000 during the next ten years for the purpose of aiding and advancing the farming industry by instruction in agriculture, including the work carried on by the Veterinary Colleges. The sum available under this Act for the fiscal year ending March 31, 1914, is \$700,000; for 1915, \$800,000; for 1916, \$900,000; for 1917, \$1,000,000, and for 1918 to 1923, \$1,100,000 annually.

DOMINION CABINET.

Seat of Government—Ottawa.

Governor-General—Field Marshal His Royal Highness The Duke of Connaught and Strathearn, K.G., K.T., K.P., G.M.B., G.C.S.I., G.C.M.G., G.C.V.O., P.C.

The Cabinet.

Ministry formed 10th October, 1911.

Prime Minister and President of Privy Council—Rt. Hon. Robert Laird Borden, LL.D., K.C.

Minister of Trade and Commerce—Sir Geo. E. Foster, B.A., D.C.L., LL.D.

Minister of the Interior—Hon. Dr. Wm. Jas. Roche, M.D.

Minister of Public Works—Hon. Robert Rogers.

Minister of Railways and Canals—Hon. Frank Cochrane.

Minister of Finance—Sir Wm. Thomas White.

Postmaster-General—Hon. T. C. Casgrain.

Minister of Marine and Fisheries and Minister of the Naval Service—Hon. John D. Hazen, B.A., B.C.L.

Minister of Justice—Hon. Chas. J. Doherty, K.C., D.C.L., LL.D.

Minister of Militia and Defense—Sir Sam Hughes.

Secretary of State—Hon. P. E. Blondin.

Minister of Labor—Hon. Thomas W. Crothers, B.A., K.C.

Minister of Inland Revenue—Hon. G. L. Patenaud.

Minister of Customs—Hon. Dr. John D. Reed, M.D.

Minister of Agriculture—Hon. Martin Burrell.

Solicitor General—Hon. A. Meighen.

AGRICULTURAL DEPARTMENT.

Dominion.

Unless otherwise stated, the post-office address of the officials mentioned is Ottawa, Ontario.

Minister of Agriculture—Hon. Martin Burrell.

Deputy Minister of Agriculture—Geo. F. O'Halloran, B.A., B.C.L.
 Assistant Deputy Minister of Agriculture—Lt.-Col. A. L. Jarvis, I.S.O.
 Chief Officer Census and Statistics Branch—R. H. Coats.
 Director-General Public Health—F. Montizambert, I.S.O., M.D., F.R.S.C.
 Veterinary Director-General—Dr. Fred. Torrance.
 Agricultural Commissioner—C. C. James, C. M. G.
 Live Stock Commissioner—John Bright.
 Dairy Commissioner—J. A. Ruddick.
 Seed Commissioner—George H. Clark.
 Chief Veterinary Inspector—G. Hilton, V.S.
 Pathologist—C. H. Higgins, D.V.S., B.Sc.
 Hon'y. Veterinary Adviser—Prof. D. McEachran, F.R.C.V.S., Montreal.
 Veterinary Inspector-in-charge Manitoba—D. C. McGilvray, M.D.C.,

Winnipeg.

Veterinary Inspector-in-charge Saskatchewan—D. Tamblin, V.S.

Veterinary Inspector-in-charge Alberta—J. C. Hargrave, V.S., Medicine Hat.

Veterinary Inspector-in-charge and Representative Live Stock Branch British Columbia—S. F. Tolmie, V.S., Victoria.

Chief Meat Inspector—R. Barnes, V.S.

The Canadian area of the five Great Lakes of 100,000 miles, forms only one-fifth of the total area of the larger fresh water lakes of Canada.

Distance from Halifax to Vancouver is greater than from London to Halifax.

Provincial Governments.

Each province has a Lieutenant-Governor appointed for five years by the Governor-General of Canada, and is aided by an executive council whose members have seats in the legislature and are responsible to the popular house for their actions in council. The provinces of Quebec and Nova Scotia have a legislative council composed of 21 and 24 members respectively, appointed by the lieutenant-governor in council of each province. In the other provinces there is only one house, an elected assembly. The duration of parliament is four years in all provinces excepting Nova Scotia and Quebec, where it is five years, although it may be dissolved at any time within that period. Sessions are held annually, the speaker is elected by the House, members are paid for their services and require no property qualifications. The powers of the legislatures are so defined in the British North America Act of 1867.

Province of Ontario.

Population, 2,523,297.

Entered Confederation 1st July, 1867.

Seat of Government, Toronto.

Lieutenant-Governor, His Honor Sir John Hendrie.

Executive Council.

President of Council and Premier—Hon. W. H. Hearst.

Attorney-General—Hon. I. B. Lucas.

Treasurer of the Province—Hon. T. W. McGarry.

Secretary and Registrar of Province—Hon. W. J. Hanna.

Minister of Education—Hon. R. A. Pyne.

Minister of Agriculture—Hon. J. S. Duff.

Minister of Public Works—Hon. F. G. McDiarmid.

Minister of Lands and Mines—Hon. G. H. Ferguson.

Without Portfolio—Hon. J. J. Foy, Dr. Preston.

Department of Agriculture.

Minister—Hon. J. S. Duff.

Deputy Minister—W. B. Roadhouse.

Assistant Deputy—C. F. Bailey.

Chief Clerk and Statistician—W. O. Galloway.

Supt. of Farmers' Institutes and Dairying—G. A. Putnam.

Supt. of Agricultural Societies—J. Lockie Wilson.

Director of Live Stock Branch—R. Wade, B.S.A.

Director of Fruit Branch and Secretary Fruit Growers' Association—
P. W. Hodgetts.

Ontario Veterinary College—Principal E. A. Grange, V.S., M.S.

Eastern Dairymen's Association—G. G. Publow, Kingston, Instr.

Western Dairymen's Association—F. Hems, London, Instr.

Province of Quebec.

Population, 2,002,726.

Entered Confederation 1st July, 1867.

Seat of Government, Quebec.

Lieutenant-Governor—His Hon. Sir Francis Langelier, Knt.

Executive Council.

Hon. Sir Lomer Gouin—Premier and Attorney-General.

Hon. Jules Allard—Minister of Lands and Forests.

Hon. John C. Kaine—Minister without Portfolio.

Hon. Charles Devlin—Minister of Colonization, Mines and Fisheries.

Hon. L. A. Taschereau—Minister of Public Works and Labor.

Hon. J. L. Decarie—Provincial Secretary.

Hon. J. E. Caron—Minister of Agriculture.

Hon. P. S. G. MacKenzie—Provincial Treasurer.

Hon. J. E. Tessier—Minister of Roads.

Hon. N. Perodeau—Minister without Portfolio.

Department of Agriculture.

Minister—Hon. Jos. Ed. Caron.

Deputy Minister—J. A. Grenier.

Secretary of Council of Agriculture—Oscar Lessard.

Provincial Secretary of Rural Roads—J. A. Camirand.

Province of New Brunswick

Population, 351,899.

Entered Confederation July 1st, 1867.

Seat of Government, Fredericton.

Lieutenant-Governor—J. Wood, D. C. L., LL.D.

Executive Council.

Premier and Surveyor-General—Hon. J. K. Flemming.

Provincial Secretary and Receiver-General—Hon. D. V. Landry.

Chief Commissioner of Public Works—Hon. John Morrissy.

Attorney-General—Hon. W. C. Hazen Grimmer, K.C.

Commissioner of Agriculture—Hon. J. A. Murray.

Solicitor-General—Hon. Harry F. McLeod.

President of the Council, without Portfolio—Hon. Robert Maxwell.

Department of Agriculture.

Commissioner—Hon. J. A. Landry.

Deputy Commissioner—J. E. Daggett.

Provincial Horticulturist—A. G. Turney.

Dairy Superintendent—C. W. McDougall.

Dairy Superintendent—L. C. Daigle.

Clerk and Supt. of Women's Institutes—Mrs. A. E. Dunbrack.

Province of Manitoba.

Population, 455,869.

Entered Confederation July 15th, 1870.

Seat of Government—Winnipeg.

Lieutenant-Governor—Sir Douglas Colin Cameron.

Provincial Executive.

Premier and Prov. Secretary—Hon. T. C. Norris.

Minister of Agriculture, Immigration Comm., and Comm. of Public
Land—Hon. Valentine Winkler.

Provincial Treasurer—Hon. E. Brown.

Minister of Public Works—Hon. T. H. Johnson.

Chief Game Guardian—C. Barber.

Deputy Minister of Agriculture—Archibald J. McMillan.

Livestock Commissioner—F. W. Jacobs.

Editor of Publications—George Batho.

Province of British Columbia.

Population, 390,229.

Entered Confederation July 20th, 1871.

Seat of Government, Victoria, V.I.

Lieutenant-Governor, His Hon. Frank Barnard, Esq.
Executive Council.

Premier and Minister of Mines—Hon. W. J. Bowser.

Provincial Secretary and Minister of Education—Hon. H. E. Young,
M.D., LL.D.

Minister of Finance and Agriculture—Hon. W. J. Bowser (acting).

Chief Comm. of Lands—Hon. W. R. Ross.

Minister of Works—Hon. Thomas Taylor.

Deputy Minister of Agriculture—W. E. Scott.

Live Stock Comm.—W. T. McDonald.

Provincial Horticulturist—R. W. Winslow.

Province of Nova Scotia.

Population, 492,338.

Entered Confederation July 1st, 1867.

Seat of Government, Halifax.

Lieutenant-Governor, His Hon. David MacKeen.
Executive Council.

Premier and Provincial Secretary—Hon. G. H. Murray.

Commissioner of Works and Mines—E. H. Armstrong.

Secretary for Agriculture—M. Cumming, Truro.

Supt. of Agriculture Societies—F. L. Fuller.

Province of Prince Edward Island.

Population, 93,722.

Entered Confederation July 1st, 1873.

Seat of Government, Charlottetown.

Lieutenant-Governor, His Hon. Augustine Colin Macdonald.
Executive Council.

President, Premier and Attorney-General—Hon. J. A. Matheson.

Prov. Secretary-Treasurer and Comm. of Agriculture—M. McKinnon.

Comm. of Public Works—Jas. A. McNeill.

Secretary for Agriculture—Theo. Ross.

Director of Agricultural Instruction—W. R. Reek, B.S.A.

Province of Saskatchewan.

Population, 492,344.

Was established on Sept. 1st, 1905.

Seat of Government, Regina.

Lieutenant-Governor—His Hon. Geo. Wm. Brown.
Executive Council.

Premier, Pres. of Council and Minister of Public Works—Hon. Walter
Scott.

Provincial Secretary and Minister of Agriculture—Hon. W. R. Mother-
well.

Deputy Minister of Agriculture—A. F. Mantle.

Live Stock Comm.—L. C. Smith. P. Bredt, Jr. (acting).

Dairy Supt.—W. C. Wilson.

Province of Alberta.

Population, 375,434.

Was established on Sept. 1st, 1905.

Seat of Government, Edmonton.

Lieutenant-Governor, His Hon. Robt. Geo. Brett, M.D.
Executive Council.

Premier, Minister of Public Works and Prov. Treasurer—Hon. A. L.
Sifton.

Attorney-General and Minister of Education—Hon. C. W. Ross.

Minister of Agriculture—Hon. Duncan Marshall.

Provincial Secretary—Hon. A. J. MacLean.

Director of Demonstration Farms—Sidney Carlyle.

Deputy Minister of Agriculture—H. A. Craig.
 Live Stock Comm.—W. F. Stevens.
 Dairy Comm.—C. Marker.

Yukon Territory.

Population, 8,512.
 Organized June 13th, 1898.
 Seat of Government, Dawson City.
 Commissioner—George Black.

Territorial Officials.

Treasurer—A. F. Englehart.
 Assayer Mines Department—W. Sime.
 Supt. Education Department—T. G. Bragg.
 Superintendent Public Works—Isaac Lusk.

Northwest Territories.

Population, 15,762.
 Organized Sept. 1st, 1905.
 Seat of Government, Ottawa.
 Comprising all British territories and possessions in North America and all islands adjacent thereto, not included within any Province, or the Yukon Territory and the colony of Newfoundland and its dependences.
 Commissioner—Lt.-Col. F. White, C.M.G., Ottawa.

PUBLIC STATUTORY HOLIDAYS OF CANADA.

Dominion of Canada.

Sundays, New Year's Day, The Epiphany, Good Friday, The Ascension, All Saints' Day, Conception Day, Easter Monday, Ash Wednesday, Christmas Day, the birthday (June 3rd, or day fixed by proclamation for celebration of birthday) of reigning Sovereign, Victoria Day, Dominion Day, the first Monday of September (to be designated "Labor Day"), and any day appointed by proclamation for a general fast, or Thanksgiving Day.

Ontario.

Sundays, New Year's Day, Good Friday, Easter Monday, Christmas Day, Dominion Day, birthday of her late Majesty and her Royal successors, Labor Day, and any day appointed by proclamation of Governor-General or Lieutenant-Governor as a public holiday or for a general fast or thanksgiving, and any Dominion holiday not included in this list.

Quebec.

Sundays, New Year's Day, the festival of the Epiphany, Ash Wednesday, Good Friday, Easter Monday, The Ascension, All Saints' Day, Conception, Christmas Day, the anniversary of the birthday of the Sovereign (or the day fixed by proclamation for its celebration), 1st July (the anniversary of the day on which the Union Act came into force) or 2nd July (if 1st is a Sunday), any other day fixed by Royal proclamation or by proclamation of Governor-General or of the Lieutenant-Governor as a public holiday, or as a day of general fast or thanksgiving, or as Labor Day.

Nova Scotia.

Sundays, Good Friday, Dominion Day, Christmas Day, day appointed for celebration of the birthday of her late Majesty or any of her Royal successors, Labor Day, and any day appointed by proclamation of the Governor-General or Lieutenant-Governor as a general holiday, or for general fast or thanksgiving, and any Dominion holiday not included in this list.

New Brunswick.

Sundays, New Year's Day, Good Friday, Christmas Day, Dominion Day, Victoria Day, the day appointed for the celebration of the birthday of His Majesty, Labor Day, and any day appointed by proclamation of the Governor-General or Lieutenant-Governor as a public holiday, or for a general fast or thanksgiving within the Province, or which by any Act of the New Bruns-

wick Legislature, or of the Parliament of Canada is, or shall be, declared to be a public holiday within the Province.

Manitoba.

Sundays, New Year's Day, Good Friday, Christmas Day, Dominion Day, Labor Day, Victoria Day, the birthday of the reigning Sovereign, or the day set apart by proclamation of the Governor-General for the celebration thereof, and the day following such birthday, or following New Year's Day or Christmas Day when such day is Sunday, and any day appointed by proclamation for a general thanksgiving or general holiday, or as Arbor Day, and any Dominion holiday not included in this list.

British Columbia.

Sundays, New Year's Day, Good Friday, Easter Monday, Dominion Day, Christmas Day, the day appointed for the celebration of the birthday of her late Majesty and of her Royal successors, and any day appointed by proclamation for a general fast or thanksgiving, and any day appointed by proclamation or order of the Lieutenant-Governor-in-Council as a holiday, and any Dominion holiday not included in this list.

Prince Edward Island.

Sundays, Christmas Day, Good Friday, and any day appointed by proclamation for a general thanksgiving or fast, and any Dominion holiday not included in this list.

Alberta.

Sundays, New Year's Day, Ash Wednesday, Good Friday, Easter Monday, 2nd Friday in May (known as Arbor Day), Christmas Day, birthday of the reigning Sovereign, Dominion Day, Labor Day, and such day as may in each year be proclaimed a public holiday for the planting of forest and other trees, and any other day appointed by proclamation for a general fast or thanksgiving, and any Dominion holiday not included in this list.

Saskatchewan.

Same as Alberta.

Yukon Territory.

Same as Alberta and Saskatchewan.

Land and Water Area of Canada by Provinces and Territories.

Provinces	Land Sq. Miles	Water Sq. Miles	Total Land and Water Sq. Miles
P. E. Island	2,184	.....	2,184
Nova Scotia	21,068	360	21,428
New Brunswick	27,911	74	27,985
Quebec	690,865	15,969	706,834
Ontario	365,880	41,382	407,262
Manitoba	231,926	19,906	251,832
Saskatchewan	243,382	8,318	251,700
Alberta	252,925	2,360	255,285
British Columbia	353,416	2,439	355,855
Yukon	206,427	649	207,076
N. W. Territories	1,207,926	34,298	1,242,224
	3,603,910	125,755	3,729,665

ONTARIO GAME LAWS

LICENSES

46. **Regulations.**—The Lieutenant-Governor in Council may make regulations.—

(a) **Terms of license.**—Governing the issue of licenses and permits, prescribing the terms and conditions thereof, the period for which the same shall be in force, and the fees payable in respect thereof.

(b) **Special license to guest of resident.**—For granting without fee a special license to enable a guest of a resident of Ontario to hunt and shoot therein for a term not exceeding one week.

(c) **Reduced fee to residents of other provinces.**—For reducing the fee for non-resident hunting license to a resident of any other Province of Canada by providing that such license may be issued upon the same terms and conditions upon which a similar license is issued under the law of such other Province to a resident of Ontario. 3-4 Geo. V. c. 69, s. 46.

47.—(1) **Not to be issued to convicted persons or their employers.**—No license shall be issued or permit granted to any person convicted of any offence against this Act within two years next preceding the date of application for such license or to any person employing a person so convicted.

(2) **Illegal transfer.**—A license shall not be transferable, and every person who buys, sells, exchanges or in any way becomes a party to the transfer of any license or shipping coupon, or in any way uses or attempts to use a license or coupon issued to any other person shall be guilty of an offence against this Act.

(3) **Cancellation.**—A license may be cancelled by the Superintendent, subject to appeal to the Minister, for a contravention by the licensee, or by any person with his connivance, of this Act or of the Regulations, or of any of the terms and conditions of the license, notwithstanding that no prosecution has been instituted or conviction had in respect of such contravention.

(4) **Effect of conviction as cancellation.**—A conviction for an offence against this Act shall operate as a cancellation of every license held by the person convicted.

(5) **License discretionary.**—The issue of a license shall be in the discretion of the Superintendent subject to appeal to the Minister. 3-4 Geo. V. c. 69, s. 47.

48.—(1) **Hunting Licenses.**—A license may be issued to—

(a) **To non-residents.**—A person not resident in Ontario to carry guns, rifles and firearms and to hunt and shoot, and the fee for such license shall not exceed \$50.

(b) **To residents, deer.**—A resident of Ontario to hunt deer, and the fee for such license shall be \$2.

(c) **To residents for moose, reindeer or caribou.**—A resident of Ontario to hunt moose, reindeer or caribou, and the fee for such license shall be \$5.

(d) **To non-residents, for fur-bearing animals.**—A person not resident in Ontario to hunt and trap fur-bearing animals, and the fee for each license shall be \$50.

(2) **Production of licenses on demand.**—Every person who has obtained a license under this section shall at all times when hunting carry such license on his person, and shall at all reasonable times and as often as reasonably requested produce and show the same to the Superintendent or any inspector, warden or overseer or person acting under the authority of any of them who requests him so to do, and on failure or refusal shall forfeit such license, and if found hunting or taking any deer or other animals for hunting which a license is required shall, on proof of failure or refusal to comply with such request, be deemed to have been guilty of an offence against this Act.

(3) **Coupons, to be attached to license.**—

There shall be attached to every license or one more shipping coupons plainly marked with the description of the game for hunting which the license is issued, and there shall be printed or stamped upon the coupon the date when it will expire which shall not be later than ten days after the last day of the open season for which the license is issued.

(4) **Detachment and cancellation of.**—Where any deer, moose, reindeer or caribou, or any part thereof, or any game for export under section 45 is presented for shipment at a railway station, steamboat landing or other point of shipment a coupon shall be detached from the license and signed by the person to whom the license is issued, in the presence of the shipping agent or clerk in charge of the office at such point of shipment, and attached to each deer or other animal, or part thereof, or to the receptacle in which it or any ducks are contained, and thereupon such shipping agent or clerk shall write across the face of the coupon the word "cancelled."

(5) **Contravention.**—Any person, shipping agent or clerk who contravenes any provision of this section, or uses a coupon after the expiry thereof, or ships or assists in the shipment of anything to which a coupon is required to be attached without complying with the provisions of this section shall be guilty of an offence against this Act. 3-4 Geo. V. c. 69, s. 48.

49. **What licenses may be issued.**—A license may be issued upon such terms and conditions as may be imposed by the Regulations authorizing.

(a) **Cold storage.**—Any person engaged in the business of cold storage of perishable articles to keep any game during the open season, and during the period in the close season from the end of the open season in any year to the 16th day of January of the following year, and the fee for such license shall be \$25.

(b) **Game dealers. Sale in open season.**—Any person during the open season and during the period in the close season from the end of the open season in any year to the 1st day of January of the following year to buy and sell, and, within the limits of the municipality for which such license is issued, to expose for sale game, other than fur-bearing animals or the skins or pelts of protected animals lawfully killed and procured, and during such period and upon the conditions prescribed by the Regulations game other than fur-bearing animals or the skins or pelts of protected animals imported into Ontario, specified and described in the Regulations, and lawfully hunted, killed or procured according to the law of the province, state or country in which the same were killed or procured, and the fee for such license shall be in cities having a population of not less than 100,000, \$25; in other cities having a population of not less than 50,000, \$10; in cities having a population of less than 50,000 and not less than 25,000, \$5; in cities having a population under 25,000 and in towns, \$2; and in villages and townships, \$1.

(c) **Supply of game by hotels, etc.**—A hotel, restaurant or club to supply for or as part of a meal served upon its premises any game lawfully obtained during the period in which the same may be lawfully kept in cold storage; and the fee for such license shall be in cities having a population of not less than 100,000, \$10; in other cities having a population of not less than 50,000, \$5; and in all other municipalities, \$1. 2-4 Geo. V. c. 69, s. 49.

(d) **Fur-dealer's license.**—Any person to buy and sell protected fur-bearing animals or the skins or pelts of protected animals, and the fee for such license shall be \$2. 4. Geo. V. c. 46.

30. **Conditions of licenses for the Nepigon waters.**—Licenses may be issued authorizing fishing in the Nepigon River, Nepigon Lake and adjacent waters subject to the following in addition

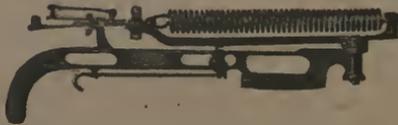
The most fascinating of all sports

Trap-shooting! The "sport alluring"! The *one great* out door game that appeals to everyone—men and women— young and old.

It's full of interest and excitement and with a little practice transforms the "couldn't-hit-a-balloon" amateur into a "crack shot."

For the farmer, trapshooting is the ideal form of amusement. And the old-time drawback of a stationary trap is done away with, for you can now do your trap shooting anywhere, and at any time if you have

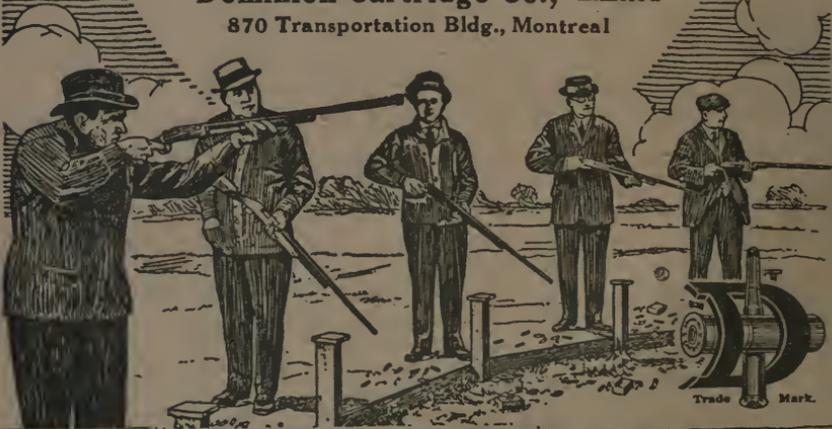
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It is light, portable and thoroughly reliable. It can be carried and used as easily as a gun. We will supply you direct if you send us the name of your dealer and \$4.50, which is the delivered price. As for targets, you can procure them cheaply and conveniently. When we receive your name and address, we'll tell you where to get them. Write for full particulars.

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to any other conditions imposed by the Regulations.

(a) Not transferable and to be produced upon request.—The license shall not be transferable and the holder shall produce and exhibit it whenever called upon so to do by the Superintendent or an inspector, warden or overseer.

(b) Subject to supervision.—All fishing camps and fishing parties visiting such waters shall be subject to the supervision of the Superintendent or an inspector, warden or overseer who may direct what arrangements shall be made with regard to sanitary matters the disposal of refuse and the extinction of fires.

(c) Cutting of live timber prohibited.—A licensee, his servant or agent shall not cut live timber except where necessary for the purpose of camping and shelter, such as for tent poles, tent pins, and the like. 3-4 Geo. V. c. 69, s. 50.

51. Fishing licenses.—Licenses may be issued authorizing fishing in any waters subject to any terms, conditions or limitations, and for any district or fishery, and within any boundaries therein or 'in the Regulations set forth. 3-4 Geo. V. c. 69, s. 51.

52. Guides.—Licenses or permits may be issued on such terms and conditions as may be prescribed by the Regulations giving authority to act as guides for hunting, shooting or fishing in any part of Ontario specified in any license or permit to such persons applying therefor as are certified by any inspector or warden to be fit and proper persons and qualified so to act; and the fee for any such license or permit shall not exceed \$2. 3-4 Geo. V. c. 69, s. 52.

53. Refunding fee.—The Minister may direct the refund of the fee paid for any commercial fishing license, or any part of such fee, where, owing to the license not having been used, or having been used for part only of the period for which it was issued he deems it just so to do, and the Treasurer of Ontario, upon the written request of the Minister, shall cause a cheque to be issued for the amount of such refund. 3-4 Geo. V. c. 69, s. 53. 4 Geo. V. c. 46.

OPEN SEASONS

10.—1) Open Season.—No person shall hunt, take, kill or destroy.

(a) Deer.—Any deer, except from the 1st day of November to the 15th day of November, both days inclusive.

(b) Moose, reindeer, and caribou south of C.P.R.—Any moose, reindeer, or caribou in that part of Ontario lying south of the main line of the Canadian Pacific Railway in the Town of Mattawa in the City of Port Arthur, except from the 1st day of November to the 15th day of November, both days inclusive.

(c) Moose, reindeer, and caribou north of C.P.R.—Any moose, reindeer, or caribou throughout that part of Ontario lying north of the main line of the Canadian Pacific Railway from Mattawa to the Manitoba boundary and that part of Ontario lying south of the Canadian Pacific Railway from the City of Port Arthur to the Manitoba boundary except from the 16th day of October to the 15th day of November, both days inclusive.

(d) Grouse, etc.—Any grouse pheasants prairie fowl or partridge except from the 15th day of October to the 15th day of November, both days inclusive; but no persons shall take or kill more than ten partridges in any one day.

(e) Woodcock.—Any woodcock, except from the 1st day of October to the 15th day of November, both days inclusive.

(f) Quail and Wild Turkeys, black and grey squirrels.—Any quail or wild turkey, black or grey squirrel, except from the 15th day of November to the 1st day of December in any year, both days inclusive.

(g) Swans and geese.—Any swan or goose, except from the 15th day of September to the 15th day of April in the following year, both days inclusive.

(h) Ducks and other water-fowl. Northern District.—Duck of any kind or any other water-fowl, snipe, rail, plover or any other bird known as a shore bird or wader in the Northern District, except from the 1st day of September to the 15th day of December in any year, both days inclusive.

(i) Ducks and other waterfowl. Southern District.—Duck of any kind or any other water-fowl, snipe, rail, plover or any other bird known as a shore bird or wader in the Southern District, except from the 15th day of September to the 15th day of December in any year, both days inclusive.

(j) Capercaillie.—Capercaillie before the 15th day of September, 1915, nor thereafter except from the 15th day of September to the 15th day of December, both days inclusive.

(k) Hares.—Hares, except from the 1st day of October to the 15th day of December, both days inclusive, and except that between the 15th day of December and the 31st day of December in any year, both days inclusive, the wood-hare or cotton-tail rabbit may be taken, killed or destroyed by means of snares, ferrets or any other means than shooting.

(2) Cotton-tail rabbits.—Notwithstanding anything in this Act a wood-hare or cotton tail rabbit may be taken, killed or destroyed in any manner by the owner, occupant or lessee of any land upon which it causes actual damage to trees or shrubs, or by any member of the family of such owner, occupant or lessee, or by any person holding a written license or permit from such owner, occupant or lessee; and any of these animals killed under this subsection shall be handed over to the nearest officer of the Game and Fisheries Branch for distribution to charitable institutions.

(3) Special provision as to shooting deer put or bred by any person on his lands.—Notwithstanding anything in this Act a person who puts or breeds or imports deer upon his own land for the purpose of breeding and preserving the same and his licensee, may hunt, take or kill any such deer from the 1st day of October to the 15th day of November, both days inclusive; but the onus of proof that the deer were so put or bred shall rest on the person hunting or killing the same. 3-4 Geo. V. c. 69, s. 10.

BEAVER, OTTER, MUSKRATS, ETC.

11.—(1) Beaver and otter.—No beaver or otter shall be hunted, taken or killed or had in possession by any person before the 1st day of November, 1916, and after such date the hunting taking or killing of beaver and otter shall only be permitted during such periods and on such terms and conditions as may be prescribed by the Lieutenant-Governor in Council, 5 Geo. V. chap. 20.

(2) Muskrat.—No Muskrat shall be hunted, taken or killed or had in possession of any person between the 1st day of May and the 1st day of December, except as provided by the next succeeding subsection, nor shall any trap, snare, gin or other contrivance be set for it during such period; and any such trap, snare, gin or other contrivance so set may be destroyed by any person without his thereby incurring any liability therefor, and this subsection shall apply to Indians in respect of private or leased land.

(3) Close season for muskrat in certain districts.—The close seasons with respect to muskrat in the electoral districts of Port Arthur, Fort William, Rainy River and Kenora shall be from the 1st day of May to the 1st day of March in the year following.

(4) Muskrat houses, etc.—No Muskrat shall be shot during the month of April, or speared at any time; nor shall any muskrat house be cut, speared, broken or destroyed at any time.

(5) When destruction of muskrats lawful.—Nothing in this section shall apply to any person destroying any of the animals in defence or preservation of his property, or prevent the destruction of muskrats by any means, at any time, in the vicinity of dams or drainage embankments where

there is a probability of injury being caused by them to such dams or drainage embankments.

(6) **Onus of proof.**—The onus of proving the justification under the next preceding subsection shall be on the person destroying any such animals.

(7) **Mink.**—No mink shall be hunted, taken or killed or had in possession of any person between the 1st day of May and the 1st day of November following.

(8) **Beaver doing damage.**—The Superintendent may at any time by order in writing direct the taking or killing of beaver by an overseer or other officer named in the order in any designated locality in Ontario in which, in the opinion of the Superintendent, beaver are causing damage to a highway or to private property, but all beaver so taken or killed shall be duly accounted for and handed over to the Superintendent. 3-4 Geo. V. c. 69, s. 11.

SUNDAY

12. **Hunting on Lord's Day.**—No person shall on the Lord's Day hunt, take, kill or destroy any game, or use any gun or other engine for that purpose. 3-4 Geo. V. c. 69, s. 12.

DEER

13.—(1) **License necessary for hunting deer.**—No person shall hunt, take, kill, wound or destroy any deer, moose, reindeer or caribou except under the authority of a license.

(2) **Cow moose, fawns, etc., not to be killed.** No person shall at any time hunt, kill or take any cow moose, or any other moose, reindeer or caribou under the age of one year.

(3) **Number of deer, etc., which may be killed.**—No person shall during any one year or season kill or take more than one deer, one bull moose, or one bull reindeer or caribou; but this shall not apply to deer which are the private property of any person and which have been killed or taken by him or by his direction or with his consent in or upon his own land.

(4) **Aggregate kill.**—Two or more persons hunting together and holding licenses may kill an aggregate of not more than one deer for each member of the party.

(5) **Restraint of dogs.**—No owner of any dog, known by the owner to be accustomed to pursue deer, shall permit such dog to run at large during the close season for deer in any locality where deer are usually found.

(6) **Idem.**—Any person harbouring or claiming to be the owner of such hound or dog shall be deemed to be the owner thereof; and any dog found running deer during the close season shall be deemed to be at large with the permission of the owner and may be killed on sight by any person, and he shall not be liable to any penalty or damage therefor. 3-4 Geo. V. c. 69, s. 13.

WATER FOWL

14.—(1) **Hunting ducks, etc., from sailboats.**—No wild duck, goose or other waterfowl shall be hunted, taken or killed from a sail boat, yacht or launch propelled by steam or other power.

(2) **Illegal contrivances.**—No swivel gun, or gun of any kind of a larger bore or gauge than 8, and no contrivance for taking or killing wild swans, geese or ducks, known as sunken punts or batteries, shall be used at any time.

(3) **Blinds or decoys.**—No blinds or decoys for use in hunting duck or other water fowl shall be placed at a greater distance than two hundred yards from the shore or a natural rush bed thick enough to conceal a boat, or from a water line bounding private property, and all decoys shall be removed from the water during the hours in which shooting is prohibited. 3-4 Geo. V. c. 69, s. 14.

(4) **Limit of number of duck.**—No person shall take or kill more than two hundred wild ducks in any one year. 4 Geo. V. c. 46.

POISONS, TRAPS AND CONTRIVANCES

15.—(1) **Poisons, use of prohibited.**—No person shall kill or take any game by the use of poison, or a poisonous substance, or expose poison, poisoned bait or other poisoned substance in any place or locality to which any game or any dog or cattle usually has access.

(2) **Trapping, snaring, etc.**—None of the game animals and game birds, except those mentioned in section 11, shall be trapped or taken by means of traps, nets, snares, gins, baited lines or other similar contrivances, nor shall such traps, nets, snares, gins, baited lines or contrivances be set for them or any of them at any time; and if so set they may be destroyed by any person without incurring any liability for so doing. 3-4 Geo. V. c. 69, s. 15.

16. **Shooting at night.**—No person shall discharge any gun or other fire-arm at any game between sunset and sunrise. 3-4 Geo. V. c. 69, s. 16.

17. **Hired hunters.**—No person shall for hire, gain or reward or hope thereof hunt, kill or shoot any game, or employ, hire or for valuable consideration induce any other person so to do; but this shall not apply to the bona fide employment of any person as guide to accompany a person lawfully hunting or shooting. 3-4 Geo. V. c. 69, s. 17.

EGGS

18. **Eggs not to be taken.**—No eggs of any game bird shall be taken, destroyed or had in possession by any person at any time. 3-4 Geo. V. c. 69, s. 18.

MASKS AND DISGUISES

19. **Masked or armed persons in neighborhood of preserves.**—Any person being masked or disguised and carrying or having in his possession any gun or other fire-arm near any preserve or shooting ground or, in close season, near any place where game is usually found shall be guilty of an offence against this Act. 3-4 Geo. V. c. 69, s. 19.

20. **Automatic Guns prohibited.**—Subject to the Regulations, no gun of the description known as "automatic" in which the recoil is utilized to reload the gun shall be used in the killing of game. 3-4 Geo. V. c. 69, s. 20.

21.—(1) **Certain employees not to carry fire arms.**—No person employed in connection with the construction of any railway or public work shall carry or have in possession in the vicinity of such railway or public work, any gun or other fire-arm except as may be authorized by special license.

MUNICIPAL BONDS FOR FARMERS

Frequently farmers who have money to invest are at a loss to know how best to invest it. A common plan is to invest it in mortgages on farm property. But the large majority allow their surplus cash to remain in the savings bank at three per cent. interest, which is a poor investment.

One of the best investments for the farmer is municipal bonds. They are as safe as the bank and when bought at satisfactory prices bring in nearly double bank interest. Here is no safer investment than Ontario municipal bonds. Municipal bonds in the

West pay higher rates. They are considered perfectly safe too when vouched for by the officers of the provincial governments. In the Maritime Provinces, more particularly in Saskatchewan, there is a special department of government that supervises municipal bond issue. While no government guarantee goes with this, the government undertakes to protect the investor to the extent of preventing municipalities from issuing bonds for a greater amount than they are able to take care of. For this reason western municipal bonds are considered safe investments when they have government endorsement as to the ability of the municipality to pay. In Alberta somewhat similar control of municipal bond issue is in force.

Established that a municipal bond is a safe investment, what are their advantages to the investor? They provide a safe and profitable investment; extending over long terms there is no bother about renewal as in the case of mortgages; municipal bonds are accepted by banks as security for temporary loans; they are always saleable and if need be can be realized on at any time; interest is usually payable twice a year and can be easily collected through any bank for a normal charge. A bank may break, a manufacturing concern may become insolvent, but there has rarely been a case in Canada where a municipality has failed to pay bonds when due. A municipality is always good for its bond issue.

INVESTMENTS FOR FARMERS.

Many merchants whose skill in buying and selling has enabled them to make large profits, lose their surplus profits, steadily and consistently, by rash ventures in real estate. Many skilled farmers, careful husbandmen, shrewd judges of the immediate things affecting the production of crops, lose their savings by buying stock in ill-founded enterprises. Merchant, housewife, farmer,—practically every class in the community, may master the ordinary problems of their particular business; but of money, the most obedient and the most powerful of servants, many are but poor masters. The hundred dollars, or ten thousand dollars which might well be "hired out," that is to say invested at a good "wage," or rate of interest, is either risked foolishly, or because its owner has had losses or has seen other men's fortunes wiped out, is buried "in an old iron kettle in a hole in the ground, underneath the wood-pile." Storekeeping, housekeeping, farming or any other thing of skill, is considered easier than investing.

The great centres of investment are the cities, and because the farmer is inconvenient to the city, or not well acquainted with its methods, he is at a disadvantage which only thought, study, and general quickness of observation can overcome. Very often, because of this the farmer-investor makes his investments locally. He lends money to his neighbors on their notes. He takes a mortgage on a farm. He goes to the nearby county town and there entrusts his funds to a private banker, to be let out in such investments as the banker thinks are

sound. It may be that all his savings are placed in the savings bank. Such are the chief local places of "Investment." The farmer may, it is true, be able to estimate the honesty and earning capacity of the neighbor he lends to; or sufficiently skilled in judging the worth of farm land to know just how much is wise to invest in any one mortgage. He may have means of assuring himself that the banker's methods of operating are safe. He may be content, for the sake of safety, to leave his funds earning three per cent. in the local branch savings bank—at about three-fifths of the fair rate of interest on a sound investment.

But it is the great outer world of investment that must ultimately be faced and understood by the great majority of men with savings for which to find employment, and to this realm of business, men continue to turn for opportunities to invest their funds. It is essential then, that the farmer secures an absolutely safe investment, yielding a fair rate of interest—5 per cent.—without trouble and inconvenience. The mortgage corporations of Ontario provide such an investment in the form of Mortgage Corporation Debentures, which are secured by mortgages on improved properties, and also, the total assets of the Corporation. According to Government statistics, not a dollar has ever been lost in Canadian Mortgage Corporation Debentures. The interest is paid every six months through your own bank, so there cannot possibly be any trouble in collecting. Thousands of farmers have thousands of dollars invested in debentures.

For **BIG Crops**
 Sow with a
COCKSHUTT DRILL



The **COCKSHUTT DRILL** makes every seed count in the harvest. It sows 7 rows with the same seed others need for 6.

It yields 2 to 5 more bushels per acre.

It seeds acre after acre with absolute uniformity.

It encourages early, vigorous crop-growth that means good grain.

Trash won't clog it.

Rough ground won't alter depth nor feed.

Frame will never sag.

It is light in draft.

It is low—for easy filling.

It is economical of grain. (The feed is shut off at turns.)

It is staunchly built for **SERVICE**.

Finely adjusted for **BEST RESULTS**.

In every detail you will find it just the **DRILL** to insure **YOU** bumper crops.

See it at our nearest Agency. Or write for interesting pamphlet—"More Bushels Per Acre." It may throw new light on your particular planting problem.

COCKSHUTT PLOW COMPANY, Limited

BRANTFORD, ONTARIO

Sold in Eastern Ontario, Quebec and Maritime Provinces by

THE FROST & WOOD COMPANY, Limited

SMITHS FALLS

MONTREAL

ST. JOHN

SOILS, CROPS AND FERTILIZERS

Importance of Soil Condition or Fitness

The most important soil fact—first, last and always—is condition, or fitness.

The best wheat soil in the world seeded with the finest wheat obtainable, will grow but an indifferent crop if the soil is not "fit."

The wise farmer recognizes this "condition" or "fitness" when the soil has an elastic feel to the foot, is swollen like well raised dough, and is of a darker color than the natural soil.

These outward and easily recognized signs mean that the soil is mellow, penetrated to its innermost recesses with air; that the natural manures have been intimately mixed with the earthy particles and the weeds destroyed.

To secure "fit" in soil, deep working with harrow and roller, etc., at the time when the soil is neither dry nor wet is essential; rotating crops to secure a change, and to get intensive working of the soil; dressings of long fresh straw manure on heavy soils and of well rotted manure on light soils; dressings of lime to correct both heavy and light soils.

Objects of Tillage.

To destroy and prevent growth of weeds.

To place under surface, manure stubble and other organic matter to be converted into food for plants.

To develop various degrees of openness of texture and uniformity of soil conditions suitable to planting.

To modify movement of soil moisture and soil air.

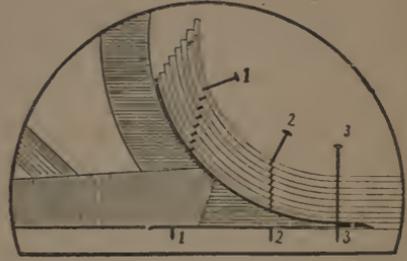
To regulate the temperature of the soil.

Tips on Tillage.

If you will open a book, place the fingers upon the fly leaf in front and the thumbs under the fly leaf in the back, and abruptly bend up the corner, it will be seen that every leaf is slipped over its neighbor. What takes place is represented in the accompanying illustration. Had pins been put through the book before attempting to bend the leaves, the bending would have tended to cut the pins into as many pieces as there were leaves as in figure.

The plow has exactly this effect

upon the furrow slice; it tends to divide it into thin layers which slide over one another just as the leaves



Showing the principle of pulverizing action of plow.

of the book did, and it is because of this kind of action that a plow pulverizes a soil as no other tool can.

How Plows Correct Tilth.

If a soil is out of tilth, has become cloddy, or partly puddled, there is a shape of mould-board, a stage of soil moisture and a depth of furrow slice which will help to restore tilth the best and quickest.

Work of Plow.

The deep furrow pulverizes better and puddles worse than the thin slice or shallow furrow. A low mould-board plow disturbs tilth the least and leaves the texture the coarsest. The steep mould-board gives the greatest danger of puddling if the soil is too wet, and the greatest opportunity to pulverize the soil and improve the tilth if the moisture is right.

Forms of Plows, Etc.

To cut a clean furrow, slice and turn it over so as to completely cover whatever is on the surface, a long, low mould-board plow is used. (See fig. A.)

Type of Sod Plow Which Pulverizes Little.

If the primary objects are to thoroughly pulverize the soil, making it deep and mellow, a plow like Fig. B must be used. Shapes of plow intermediate between these two can be used according to the need.

Type of Plow With Steep Mould-board.

A heavy and soggy soil calls for a

good slope of mould-board. A soil which is rather dry needs a fairly steep mould-board. A soil too open and porous like the sandy soils, should be plowed with a steep mould-board. If plowing must be done when soil is a little too wet, use the less steep mould-board and plow as shallow as other conditions will allow.

If soil has become too dry, use the steeper mould-board and plow deep, as this will split it into thinner layers, make the soil finer and the tilth better.

The Line of Draft.

It is important that the line of draft be right and that such a line connecting the centre of draft A (see illustration, page 28) in the mouldboard with the place of attachment to the plow bridle shall also be in the plane of the traces as shown by A, B, D. If the line of draft becomes broken, as A, C, D, or 1, 3, 5, instead of 1, 2, 5, the draft of the plow is made heavier.

Time of Plowing.

Early fall plowing in a dry season where the soil is light and the amount of levelling small is advisable. Plow as soon as crop is removed from ground, to save soil moisture and to

enable the nitrates and other soluble salts to develop for next season.

Plowing Sod.

Skim plow in fall and cross plow in spring, or plow and disc to give de-



Fig. A. Low Mouldboard Plow sired seed bed in spring. In this case roll with heavy roller before discing.

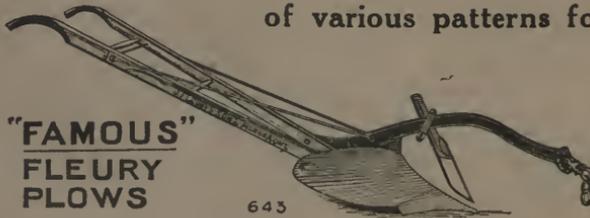
Plowing Under Manure.

Coarse manure on light soil, plow deep furrow, as it needs more moisture to rot it, and in heavy soils will let air penetrate to greater depth. Plow in fall or very early spring.

If ground be dry and seeding time is at hand, thoroughly harrow and firm, using heavy roller to establish capillary action with deeper soil. When manure is well rotted it may be left nearer the surface except in sandy soils.

FAMOUS FLEURY PLOWS

of various patterns for all soils



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FLEURY
PLOWS**

643

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RUNS SO
SMOOTHLY,
has such EASE
for HORSES
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for the PLOW-
MAN, as Fa-

amous Fleury Plows. Nearly 100,000 of these Plows—from first to last—have turned the BEST FURROWS Ontario has known.

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Farm Climate.

The first practical item of the homeing of the seasons. On the days available for work in spring and fall depend the crops and their yields.

The following useful suggestions in table form show the days available for farm work in the mild climate and the raw climate:

Mild Climate.

Spring	53-65	working days.
Summer	73-85	" "
Fall	76-88	" "

Raw Climate.

Spring	19-21	working days.
Summer	99-114	" "
Fall	32-42	" "

A delay of 7 days in seeding wheat reduces the yield 30%; 14 days reduces 40%; 21 days reduces 50%. A week late in seeding cuts the oat yield 15%, the barley yield 23%, the pea yield 4%.

Growing crops require rainfall, heat and sunlight in definite quantities.

Balanced Supply.

A plant must have each and every one of the different plant foods. Each is essential to aid in some particular function, and no one can be substituted for another. Nature has supplied an abundance or most of the essential foods, but sometimes some of them are lacking or are in an unavailable condition. Of all the elements of plant foods which are essential, only a few are often in this condition. These are nitrogen, phosphoric acid, potash and lime. The term, plant food, as ordinarily used by farmers, includes nitrogen, phosphoric acid and potash only, not that these are any more essential to plant growth than are the other substances, but because of the deficiency of them in many soils, and their corresponding commercial importance.

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S. J. SMITH, Manager.

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Tons of Plant Food in Soils.

	Potash. Tons.	Lime. Tons.	Phosphoric Acid. Tons.	Sulphuric Acid. Tons.
Sandy Soil	2.42	1.70	1.74	1.10
Clay Soil	6.38	12.3	2.82	1.50
Loam	8.70	16.0	4.0	1.8
Humus	6.39	37.8	1.5	1.4

Moisture Requirement of Common Crops.

	Water used per ton dry matter. Tons.	Depth of dry water used. Inches.	Dry matter per acre. Tons.	Acres inches of water in ton of dry matter.
Barley	464.1	20.69	5.05	4.096
Oats	503.9	39.53	8.89	4.447
Corn	270.9	15.76	6.59	2.391
Clover	576.6	22.34	4.39	5.089
Peas	477.2	16.89	4.009	4.212
Potatoes	385.1	23.78	6.995	3.399
Average	446.3	23.165	5,987	3.939

Approximate Amounts of Water Retained in Plowed and Unplowed Lands.

	1st foot lbs. water.	2nd foot lbs. water.	3rd foot lbs. water.	4th foot lbs. water.
Land plowed	13.87	20.66	18.32	16.05
Land not plowed	10.53	17.98	17.28	13.94
Loss on unplowed	3.29	2.68	1.04	2.11

Mulches of Soil.

The following table shows the relative effectiveness of soil mulches at different depths and different numbers of cultivation:—

	Not cul- tivated per acre.	Once in 2 weeks per acre.	Once per week per acre.	Twice per week per acre.
Cultivated 1 inch deep.				
Loss in tons per 100 days...	724.1	551.2	545.0	527.3
Loss in inches per 100 days..	6.394	4.867	4.812	4.662
The % water saved .....	.....	23.88	24.73	27.10
Cultivated 2 inches deep.				
Loss in tons per 100 days ..	724.1	609.2	552.1	515.4
Loss in inches per 100 days..	6.394	5.380	4.875	4.552
% water saved .....	.....	15.88	23.76	28.81
Cultivated 3 inches deep.				
Loss in tons per 100 days ..	724.1	612.0	531.5	495.0
Loss in inches per 100 days..	6.394	5.402	4.694	4.371
% water saved .....	.....	15.49	26.60	31.64

The twelve primary constituents found in plants and thus needed in the soil are:—

Nitrogen,	Iron Oxides,
Potash,	Magnesia,
Phosphoric Acid,	Sulphuric Acid,
Lime,	Silica,
Water (Hydrogen and Oxygen),	Soda,
Carbon,	Chlorine.

Nitrogen, phosphoric acid, potash and lime are the constituents generally lacking in soils when they fail to respond to the needs of crops. Either one of these four is likely to be deficient.

Classification of Soils.

- Sandy, under 10% of clay.
- Sandy Loam, 10% to 20% of clay.
- Loam, 20% to 30% of clay.
- Clay Loam, 30% to 50% of clay.
- Strong clay, over 50%.
- Marly, 5% to 50% calc carbonate.
- Humus, over 5% vegetable matter.

The permanent fertility of a soil is closely connected with its power of retaining plant food. In clay soils only traces of phosphoric acid are found in the drainage water.

Sandy soils being more open and thus freer drained are of less natural fertility and more dependent on immediate supplies of manure.

Humus or decayed vegetable matter, i.e., ploughed in clover, etc., greatly increases a soil's capacity for holding water.

Water Capacity.

Crops will not grow in soils permanently saturated with water and from which air is excluded. Best growth obtained in soils one-half to two-thirds saturated. The quantity of water a soil will hold when fully drained de-

termines its capacity for supplying a crop with water.

The finer the particles of the soil, or the more porous, the greater the amount of water held. When drained, coarse sand and coarse gravel soils hold the least water.

Loss of nitrogen is far less when a soil is under crop than in the case of a bare fallow.

Depth of Plowing.

Deep plowing of heavy land allows rain to penetrate it, establishes drainage in the surface soil and increases its temperature. Shallow surface cultivation preserves the soil water in time of drought. Rolling increases the moisture at the surface and the depth to which the soil is warmed by the sun.

A crop can only use up a certain amount of ready available plant food. Therefore, the waste as the soils become richer is greater, and this point should be borne in mind. To farm highly with profits demands more scientific knowledge and more practical skill than when a lower standard is aimed at. The last ton of roots in a big crop and the last few pounds of weight on a very fat animal cost the most to produce.

Nature of Soils.

Soils are made up of either very fine or very coarse particles and are classified accordingly.

Soils may differ in degree of firmness with which particles are held together.

Sand is composed of simple separate grains of large size.

Clay is composed of extremely fine granules.

A soil is in good tilth when its granules are neither too fine nor too coarse and when not too firmly cemented together.

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Three, Four and Five Year Crop Rotations¹

Systematic Rotation Recommended by the Dominion Experimental Farm, Ottawa, to Meet the General Conditions of Canadian Agriculture.

Wise selection and rotation of crops, prevent exhaustion of plant food, supplies nitrogen, cleans the lands of noxious weeds, promotes good physical condition of soil, conserves soil moisture and plant food, reduces loss in bad seasons, increases crop yield and crop quality.

Length of Rotation.	First Year.	Second Year.	Third Year.	Fourth Year.
Three Years' Duration.	Corn, roots, potatoes for corn, summer plow for roots, manure in either case.	Cereals seeded down to 6 lbs. red clover, 2 lbs. alfalfa, 6 corn, etc., the next year.	Hay or part hay and pasture followed by corn, etc., the next year.	
Four Years' Duration.	Corn roots, potatoes or peas. Land plowed for roots, peas, potatoes or peas early the preceding fall, corn plowed in spring, corn, root and potato land, manured.	Grain mixture: Peas, 1 bushel; barley, 1 bushel; oats, 2 bushels sown at the rate of 3 bushels per acre. Seeded down with red clover, 6 lbs.; alsike, 2 lbs.; alfalfa, 7 to 8 lbs.; timothy, 6 lbs.	Part pasture, part hay or hay cut early and pasture part of after-math. Cut hay twice off part of area.	Hay and pasture part intended for roots, potatoes or peas to be plowed early in August, rolled and disced and cultivated, corn area plowed next spring, manure applied as convenient during summer, winter and spring, preparatory to hoed crop.
Five Year Rotation.	Grain seeded down to clover.	Clover hay or pasture.	Corn, potatoes, and peas.	Grain followed by clover hay the following year.

CROPS RECOMMENDED FOR ONTARIO.

Experiments.	Varieties.	Com- para- tive Value	Yield per Acre		
			Straw (tcns)	Grain (bus.)	Grain (lbs.)
Oats (87 tests).....	O. A. C. No. 72.....	100	1.25	39.81	1,354
	Siberian.....	88	1.33	38.73	1,317
	Regenerated Abundance....	95	1.13	38.20	1,299
	Lincoln.....	74	1.13	34.82	1,134
Six-rowed Barley (33 tests)..	Emmer.....	80	1.08	.....	1,331
	O. A. C. No. 21.....	100	1.06	27.67	1,329
Hulless Barley (9 tests).....	Guy Mayle.....	100	1.88	23.37	1,402
	Black Hulless.....	82	1.53	21.21	1,273
Spring Wheat (14 tests)....	Wild Goose.....	100	1.19	19.60	1,176
	Hungarian.....	79	1.07	16.73	1,004
Emmer and Spelt (3 tests)..	Common Emmer.....	100	.62	34.34	1,374
	Alstrom Spelt.....	53	.48	21.00	840
Buckwheat (2 tests).....	Rye.....	100	1.36	15.30	734
	Silver Hull.....	95	1.71	10.98	527
Winter Wheat (24 tests)....	American Banner.....	96	1.21	23.80	1,428
	Imperial Amber.....	100	1.20	23.34	1,400
	Tasmania Red.....	91	1.20	23.00	1,380
	No. 5 Red.....	65	1.20	20.73	1,244
	Crimean Red.....	57	.96	19.18	1,151
Winter Rye (2 tests).....	Mammoth White.....	100	2.91	24.83	1,390
	Common White.....	67	3.00	21.43	1,200
Spring Rye (7 tests).....	O. A. C. No. 61.....	100	1.04	17.91	1,003
	Common.....	67	1.06	16.33	914
Field Peas (27 tests).....	New Canadian Beauty....	100	1.35	17.89	1,074
	Early Britain.....	82	1.05	17.84	1,076
Field Beans (19 tests).....	Marrowfat.....	95	1.22	18.59	1,115
	New Prize Winner.....	92	1.07	18.25	1,095
	White Wonder.....	100	1.10	17.91	1,074
Corn for Grain (16 tests)...	Early California Flint....	100	5.98	47.63	2,667
	Genesee Valley.....	58	6.18	42.90	2,402
	Wisconsin Little Dent....	82	4.91	41.94	2,349
Sorghum for Grain (3 tests)	Early Minnesota Sugar Cane.....	100	10.04	36.12	1,734
	Early Amber Sugar Cane	90	5.93	34.45	1,654

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Root Crops, Etc., for General Conditions.

Experiments	Varieties	Comp. value	Tons per acre
Mangels (6 tests).....	{ Ideal (Ontario Seed Co.).....	83	25.34
	{ Yellow Leviathan.....	100	24.24
	{ Sutton's Mammoth Long Red.....	75	23.83
Sugar Beets (4 tests).....	{ Rennie's Tankard Cream.....	100	24.38
	{ Bruce's Giant White Feeding.....	91	23.01
Swede Turnips (2 tests)..	{ Carter's Invicta.....	100	17.26
	{ Bruce's New Century.....	92	16.50
	{ Rennie's Empress.....	88	15.96
Carrots (5 tests).....	{ Steele-Briggs Improved Short White....	100	13.79
	{ Simmer's Giant Short White.....	96	13.50
Fodder Corn (4 tests)....	{ Sterling White Dent.....	100	11.09
	{ Hoopengardner's Very Early Yellow Dent	94	10.90
	{ White Cap Yellow Dent.....	91	10.28
Grass, Peas and Vetches.. (4 tests).....	{ Hairy Vetches.....	100	7.18
	{ Common Vetches.....	79	5.80
	{ Grass Peas.....	100	5.56
Millet (4 tests).....	{ Japanese Barnyard.....	78	6.00
	{ Hungarian Grass.....	100	5.47
	{ Golden Wonder.....	100	5.00



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TYPES OF SOIL AND FERTILIZER REQUIREMENTS

CROP	Pounds of Fertilizer Per Acre	SANDY SOIL			LOAM SOIL			CLAY SOIL			HUMUSOR MUCK SOIL				
		Ammonia	Phos. Acid	Potash	Ammonia	Phos. Acid	Potash	Ammonia	Phos. Acid	Potash	Ammonia	Phos. Acid	Potash		
		Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.	Per Ct.		
Corn (Grain).....	200- 400	3- 4	8-10	4- 5	1- 2	10-12	3- 4	8-12	2- 3	2- 3	2- 3	1	10-12	8-10	8-10
Corn (Silage).....	300- 500	3- 5	6- 8	3- 4	2- 3	6- 8	3- 4	6- 8	3- 4	2- 3	2- 3	1	10-12	8-10	8-10
Wheat & other Sm. Grains..	200- 400	3- 4	8-10	3- 4	1- 2	8-12	3- 4	8-12	2- 3	2- 3	2- 3	1	10-12	7-10	7-10
Hay Mixtures and Fodder Crops.....	200- 300	3- 5	6- 8	4- 5	2- 3	6- 8	3- 4	6- 8	3- 4	3- 4	2- 3	....	10-12	7-10	7-10
Potatoes and Roots.....	600-1,000	4- 5	6- 8	7-10	2- 4	6- 8	7-10	6- 8	4- 5	4- 5	6- 8	1	8-10	10-12	10-12
Tomatoes, Cabbage, Cucumbers and Melons.....	500- 700	4- 5	6- 8	7-10	2- 3	6- 8	7-10	6- 8	3- 4	3- 4	5- 7	1	8-10	10-12	10-12
Onions.....	800-1,000	4- 5	6- 8	7-10	3- 4	8-10	5- 7	8-10	4- 5	4- 5	5- 7	1	8-10	10-12	10-12
Orchards.....	800-1,000	3- 5	8-10	4- 6	2- 3	8-10	4- 6	8-10	3- 5	3- 5	3- 5	....	10-12	8-10..	8-10..
Beans, Peas.....	300- 500	3- 5	8-10	4- 6	1- 2	8-10	3- 5	8-10	2- 3	2- 3	2- 4	....	8-10	8-10	8-10
Raspberries, Blackberries, Currants, etc.....	300- 600	3- 5	10-12	8-10	1- 2	8-10	6- 8	8-10	2- 3	2- 3	4- 6	....	10-12	8-10	8-10
Rape.....	200- 400	3- 5	7- 8	4- 6	2- 3	6- 8	3- 5	6- 8	3- 5	3- 5	2- 4	1-2	6- 8	8-10	8-10
Top-Dressing Grain.....	200- 300	4- 5	8-10	3- 4	2- 4	8-10	2- 3	8-10	3- 4	3- 4	2- 3	1-2	8-10	4- 5	4- 5
Tobacco.....	400-1,000	4- 5	6- 8	4- 5	2- 4	6- 8	3- 4	6- 8	3- 4	3- 4	3- 4	....	....	....	....
Strawberries.....	600-1,500	2- 4	10-12	6- 8	2- 3	8-10	4- 6	8-10	3- 4	3- 4	4- 6	1	8-10	8-10	8-10
Top-Dressing Meadows and Pastures.....	200- 500	4- 5	6- 8	3- 5	2- 4	6- 8	3- 4	6- 8	3- 4	3- 4	2- 4	....	8-10	5- 7	5- 7
Celery, Lettuce, Table Beets, Parsnips, Asparagus, etc.	1,000-2,000	4- 5	8-10	6- 8	2- 4	8-10	5- 7	8-10	4- 5	4- 5	5- 6	1-2	8-10	10-12	10-12

NOTE—See pages 32 to 38.

Facts on Crop Peculiarities.

Alfalfa: Alfalfa grows after all crops so long as the soil is stirred deeply, is well manured and is free from weeds. The best fore-crop is a manured hoed crop.

Alfalfa continues on a field usually four to ten years, but sometimes fifteen to twenty-five years.

It is a great error to say that alfalfa must be off a field as long as it has been on the field. The longer a good stand of alfalfa has been down, the shorter the time before it can be put down again in alfalfa.

A good stand of alfalfa leaves the soil in splendid shape for following crops, while a poor stand with its spots of crusted soil and weeds makes a very poor fore-crop.

A soil in which the water level is near the surface is not in good condition for alfalfa growing.

Barley: Barley is the child of the best agriculture. It delights in soil prepared to the point of a flower-garden. Barley is grown on all soils, from sand to clay—to be injured by drought on sand and by lodging on the clay. Brewing barley must have a deep sandy loam, carrying lime, or the fairly dense marl, and both supplied with humus.

Through some perversion of thought, barley now is chosen to be put in only when everything else has had attention, and usually on fields overrun with weeds.

Barley must not come on new breaking. Barley does not do well following itself. It does best after manured hoed crops—sugar beets, corn (maize), potatoes—especially sugar beets. After potatoes the quality is good but the yield is not high. Barley does not do well after turnips. As sugar beet soil is the "barley soil," these crops alone furnish a very profitable rotation.

Clover: The real clover soil is the deep, medium moist loam and clay containing humus and lime and underlaid with a porous loamy subsoil. Heavy sticky clay soil is made to carry clover by heavy liming. Loamy sand, poor dry lime or marl soils and soils in which the water level comes close to the surface are not good clover soils.

Clover grows after all crops so

long as the soil is stirred deeply, is well manured and is free from weeds. The poor growth of clover when grown with grasses and afterwards pastured, is due to shallow cultivation and to the weeds coming from the years of cereal growing.

The best fore-crop is a manured hoed crop. Always clover should have a good place in the rotation, for its failure seriously affects the live stock.

In Europe it is a well known fact that clover should not follow clover. On good clover soil clover may follow once in six years, and on poorer soils not oftener than from nine to twelve years. Clover grass mixtures may come on the same piece of ground oftener without danger. While clover sickness is not common in Canada, it does exist and poor success in growing the crop is possibly due to this sickness.

Like alfalfa, a good stand of clover leaves the soil in splendid shape for following crops, while a poor stand, with its spots of crusted soil and weeds, makes a very poor fore-crop.

Corn: Corn cannot stand wet land. Excepting loose dry sand and sticky wet clay, corn grows on all soils. Corn does best on loam richly supplied with humus.

Corn and oats are the lusty brothers among farm crops, due to the vigorous root systems they possess. The deep-going, wide-spreading roots of corn, coupled with a disregard for physical soil conditions, are the reasons why corn will grow anywhere in a rotation.

Corn is not averse to following itself and does well when coming on heavily manured grass and clover sod. It can be used for the first two or three crops on cleared woodland. It follows the winter grains (wheat or rye) to be followed in turn by summer grains. Where the crop-changing system is practised, corn is to be treated as a manured hoed crop. Corn is like a baby, it must be nursed while young.

Oats: The oat turns up its nose at no soil, if we except dry sand and soil rich in lime. The oat particularly likes a loam rich in humus, and is well adapted for reclaimed swamp lands.

The oat is given the place in the

rotation farthest removed from the manures. When a meadow is broken up, a wood lot cleared off, a low lying field brought into cultivation, the oat stands ready to come on the land. Yet, in spite of it being given the poor place, no crop responds to genial soil conditions better than oats, no crop rewards with greater yields.

The best place for oats is following manured hoed crops. Oats do splendidly after clover, though on rich land there is danger of lodging. Flax may be sowed in between the clover and oats.

When the price of oats is not reduced proportionately with the price of wheat, they should be given a better place in the rotation.

Potatoes: The best soils for potatoes are mild loam and sandy loam and loamy sand soils. Potatoes do well on sandy soils when the soil is well supplied with moisture, but they are not a sure crop on the very light sand soils. They love well aired soil, which means that all moist, fine textured and poorly ventilated soils are unsuitable.

While the potato can be grown for cattle feed on sandy soil, this does not mean that potatoes can be grown often on these soils.

The potato stands in the rotation between two cereal crops. The potato, like corn, can follow itself, hence can be grown repeatedly on the same soil, though this is only possible by handling the field like a garden. The potato also does well on new breaking.

Rye: The rye soil is the dry, sandy loam and the loamy sand. Rye can be grown to advantage on pure sand. Reclaimed swamp lands and sanded alluvial soil lands grow fine crops of rye.

Rye cannot stand backwater. Heavy sticky clay soil heavily manured with stable manure and lime and well worked, can be made suitable for rye.

Rye, on light land dressed well with manure, can follow itself year in and year out. It does well after black fallow. Next to fallow the best fore-crop is a good stand of legumes, cut early to give the necessary time to prepare the soil. Rye and wheat

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WEST TORONTO, CANADA

like the firm seedbed and the hoed crops leave the soil too late for its preparation and settling.

An all-clover stand is a good fore-crop; a clover-grass stand is not as good on account of weeds. Flax is a poor fore-crop. Manured peas and beans are good fore-crops.

Wheat (Winter): The heavy loam and clay soils, rich in humus, are wheat soils. In cold and wet localities the dense soil, well supplied with lime; in warm localities, the deep soil well supplied with water. Very dry or very wet soils are not adapted to wheat.

Wheat should not follow wheat. Wheat should not come on new land until the second or third year.

The legumes, by mellowing the soil and keeping the weeds down, are good fore-crops. Winter-swede—like rape, heavily manured, shades and mellows the soil, keeps down the weeds, and by being harvested early, permits of a partial black fallow.

On heavy clay soils the horse bean (*Faba vulgaris*) has proved a splendid fore-crop. Red clover and alfalfa are highly prized fore-crops.

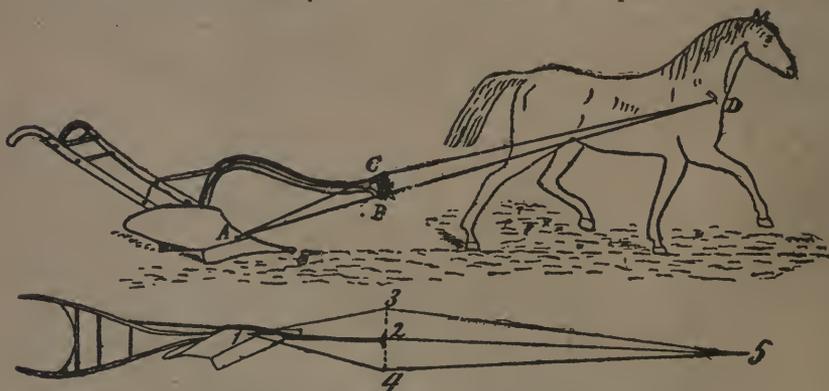
Winter wheat can follow manured hoed crops (potatoes, beets) to advantage, provided these crops are off the field in sufficient time for its pre-fore-crop.

Wheat loves the settled soil, hence after hoed crops is not the ideal preparation and settling. Wheat, sugar beets, to be followed with alfalfa is a profitable succession under certain conditions. On strong land, heavily manured, flax may be used as a good for wheat unless the soil is prepared for it in time to settle closely.

Selection of Seed Potatoes.

Of all the factors in potato growing selection of seed is by far the most important. Had we bred our Short-horn cattle as many of us have been in the habit of selecting and breeding our seed potatoes, we would now have no breed of Shorthorns. If we used only the culls and scrubs to breed from, our breeds of stock would soon run out. It has been careful selection and the application of scientific principles of breeding that has brought our pure-bred live stock up to the present high standard. One reason why potatoes on many farms in this country have degenerated is that culls, screenings and small potatoes have been planted.

If no method of selection has hitherto been followed, the seed for this year's crop will have to be taken from the bin. Potatoes which are of medium size, smooth, free from disease and true to the type of the variety being shown, should be selected. During the late summer or early autumn, when the vines are beginning to die down, the best and most vigorous hills should be marked by putting down a small stake or twigg. When the crop is harvested, any poor hills among those marked should be discarded and the rest saved for next year's planting. One farmer doing illustration work for the Commission of Conservation planted potatoes thus selected and ordinary potatoes side by side. When harvested, four rows from the selected seed yielded ten bushels per row, while the four rows on either side of the ordinary seed yielded seven and one-half bushels per row.



Direction of the line of draft for plows.

CROPS

Quantity of Seed to Sow Per Acre.

Alfalfa (broadcast)	20 to 25 lbs.
Alfalfa (drilled)	15 to 20 lbs.
Barley	8-10 pecks.
Beans, field (small)	2-3 pecks.
Beans, field (large)	5-6 pecks.
Beets	4-6 lbs.
Blue grass	25 lbs.
Brome grass	15-20 lbs.
Brome grass (in mixture)	2-5 lbs.
Buckwheat	3-5 pecks.
Carrots (field)	4-6 lbs.
Clover, alsike	8-15 lbs.
Alsike (on wheat)	4-6 lbs.
Clover, mammoth	12-15 lbs.
Clover, red	8-14 lbs.
Clover, sweet	2 pecks.
Corn	6 quarts to 1 bushel.
Corn (silage)	9-11 quarts.
Cow pea	1-1½ bushels.
Crimson clover	12-15 lbs.
Field peas	2½-3½ bushels.
Flax (for seed)	2-3 pecks.
Flax (for fibre)	1½-2 bushels.
Hungarian grass	2 pecks.
Kaffir corn (fodder)	10-12 lbs.
Mangolds	5-8 lbs.
Millet, barnyard (drills)	1-2 pecks.
Millet, foxtails (drills)	2-3 pecks.
Millet, German (seed)	1 peck.
Oat Grass, tall	30 lbs.
Oats	2-3 bushels.
Oats and peas	Oats 2 bushels. Peas 1½ bushels.
Orchard grass	12-15 lbs.
Parsnips	4-8 lbs.
Popcorn	3 lbs.
Potatoes	10-14 bushels.
Potatoes (cut to 1 or 2 eyes)	6-9 bushels.
Potatoes, for best yield	14-20 bushels.
Rape (in drills)	2-4 lbs.
Rape (broadcast)	4-8 lbs.
Red Top	12-15 lbs.
Rye	3-4 pecks.
Rye (forage)	3-4 bushels.
Sorghum (for syrup)	2-5 lbs.
Sorghum (for silage)	6 lbs—½ bushel.
Sorghum and peas	3-4 pecks each.
Soy beans (drills)	2-3 pecks.
Soy beans (broadcast)	1-1½ bushels.
Sugar beets	15-20 lbs.
Sunflower	10-15 lbs.
Sweet clover	2-4 pecks.
Timothy	15-25 lbs.
Timothy and clover	Timothy 10 lbs. Clover 4 lbs.
Turnip (broadcast)	2-4 lbs.
Turnip (drills)	1 lb.
Vetch (drilled)	1 bushel.
Vetch (broadcast)	1½ bushels.
Wheat	6 to 9 pecks.

DYNAMITE AND WASTE LAND

Dynamite is a solution, in part, of the problem of getting our unworkable lands into crop-producing condition. Dynamite is a dangerous thing, but handled with care, it is no worse than a cross bull or a kicking horse. All things, whether gentle or otherwise, are apt to become dangerous if abused, but intelligently handled are a power for good.

Science is solving problems for the farmer every day. Twenty years ago, theories that are now in practical use upon the majority of the farms, would have been considered the wildest fancy of the impractical dreamer. Men are constantly learning facts of which they little dreamed in earlier days. They are constantly finding the necessity of modifying their systems of farming and reaching out for those things that will make the soil more prolific and make their efforts yield a larger profit. Dynamite, as a factor in farming, is one of these things that were undreamed of years ago. Those who were considered the more fool-hardy at that time, used gun powder for blasting rock or for blowing stumps, but in the latter case they were decidedly the exception. To-day dynamite has proven its wonderful influence in putting before the farmer land that was then considered hopelessly unsuitable for any kind of farm work. Brush land, land covered with stumps and undergrowth that seemed almost impassable, is now made to blossom like the rose and to yield its quota of food for man and beast. And it does all this in an incredibly short time. At least, it seems that way when one compares the field before and after the application of the explosive. Dynamite has also proved a blessing to the farmer who finds his field littered with stones, especially in the hard head and boulder that is so common in many sections of the country. With its use these are thrown from the earth and broken so that they can easily be handled, either for building purposes or simply to remove them from the land. Both of these services, which are rendered by the explosive, are more or less apparent and easily understood. But there remains another way in which dynamite is of great service to the farmer. It is a way that is not so perfectly apparent nor yet so easily understood. In certain sections of the country, where fruit is grown extensively, it has been found that the tree planted in soil that has been broken by a blast of dynamite will be much more hearty and much more sure to make a profitable growth and a much safer investment. The tree whose roots spread out more extensively because the sub-soil has been broken by the explosive, is able to reach out for a greater supply of plant food, its little rootlets are able to permeate the soil at a greater distance in every direction so that the tree gets a stronger foothold and is less liable to be blown over and is more substantially nourished. The other tree whose roots are limited to the hole that is dug with the spade, is naturally more circumscribed in its growth, and while the rootlets will ultimately spread out and pierce the hard soil that encases them, this will be done only at a greater sacrifice to plant life and after much time has been wasted that might have been used for growth. The same thing is true of smaller crops. Repeated plowing at approximately the same depth, forms a sort of crust at the bottom of a furrow through which it is difficult for the plant root to get down to the lower surface. This crust leaves practically the same amount of soil to feed succeeding crops. The vast store house that is down two or three feet lower is not drawn upon. In practical terms this crust is a sort of hard pan. It forms a sort of division between the sub-soil and the upper surface. It makes the upper surface more susceptible to the influences of nature; that is blowing of the soil and evaporation. The plant life is left to be nourished on that proportion of the soil that is most invaded by succeeding cropping. Now the dynamite comes in as the solution. In some sections farmers have gone through their fields and broken up this hard pan by blasting the soil. In Kansas the holes are made about 15 feet apart each way, and from 50 to 60 pounds of dynamite are used to the acre. Charges are fired simultaneously by means of electricity. In some places the charges are put into the ground about four feet apart each way. The details are not of so much importance, the theory is what actually counts. Dynamite as a means of breaking up the hard pan is going to help develop a soil that is more thoroughly drought resistant, it is going to make it possible to feed the crops on plant life that has long been buried and inaccessible. Finally, it must be borne in mind that dynamite is not necessarily so awe inspiring as many people think. It is a dangerous instrument, but so are many of the things that are in every day use. If abused it is sure to produce wreckage; but why abuse it? The explosive that is made for uses of this kind can be easily and safely handled.

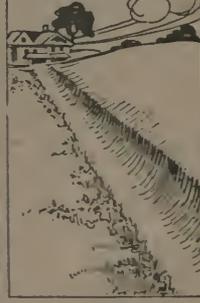
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Fertilizers—Need and Application

Most soils when analyzed show enough potential or latent fertility—enough potash, enough phosphorus, and oftentimes enough nitrogen, for long years of cropping and yet many of them are practically barren. Why? All crops require that their food shall be available, that is, soluble in water, liquid, and if not liquid or capable of soon becoming so, crops fail and the soil is said to be barren.

The liquid assets of business are those forms of property which are available—which can be turned into cash at once. The liquid assets of the soil are those elements of fertility which can be taken up and absorbed as fast as needed by growing crops,

What Fertilizers can be Mixed



which do their principal feeding in sixty days in northern latitudes. Therefore it would seem wise for the farmer to keep a good balance of available fertility to his credit in the soil; not alone to feed the crop in order to increase yield but to improve quality and to hasten maturity.

That is just what Europeans do, and is one of the reasons why they are so successful as farmers. They are the best farmers in the world because they never reach the limit of available fertility—the limit of their liquid assets. as it were. They believe in making a fertile soil still more fertile. That is why some are able to produce 88% of their food requirements in the shape of staple crops, such as potatoes, rye, barley, oats, wheat, etc.

A reserve of ready money in the bank is the very best form of "liquid assets" in business. A reserve of soluble plant food in the soil is the best form of crop insurance. Usually they are present in some degree and the farmer has to supply only a small balance to produce maximum crops.

Those who have applied from season to season this little balance of liquid or available plant food which the crop must have during its growing season of sixty to one hundred and twenty days have insured the crop as far as fertility will insure it. The crop says: "Feed me when I need food and I will feed you when you need food." Commercial fertilizers supplement the latent fertility in the soil, in stable manure and in ploughed in green crops, with some quickly available plant food when the crop needs it.

Fertilizers—What They Are—How to Apply Them.

Fertilizers are carriers of plant food in an available and concentrated form. They contain the three elements of plant food most needed in crop production—nitrogen, usually referred to as ammonia, phosphorus, known to the buyer as available phosphoric acid, and potassium, known as potash. Each of these elements performs definite functions in plant growth.

There is no mystery about the action of fertilizers in plant growth. Nitrogen, or ammonia, causes quick and vigorous growth of stalk or stem.

Available phosphoric acid helps fill the grain or fruit and hastens ripening. Potash strengthens the straw or stalk and helps to plump and fill the grain and fruit.

Hay is grown for the stalk or stem, hence needs a larger proportion of ammonia than grain crops. Wheat is grown for the grain, therefore needs larger amounts of available phosphoric acid and potash than does hay. On the other hand, potatoes and other root crops require a larger proportion of potash.

Speaking generally, it has been proven that the use of a fertilizer con-

(Continued on page 35.)

Swift's Red Steer Brand Fertilizers

MADE IN CANADA

"It Pays To Use Them"



Red Steer Brand

BONE AND BLOOD

Pure Animal Matter Ammoniates

Crop Producers

Soil Builders

Always Reliable. Adapted to all Soils and all Crops

Crop rotation should be practiced, but that alone will not maintain fertility of the soil.

You cannot maintain the fertility of your soil without fertilizers.

You cannot obtain largest yields and best quality crops without fertilizers.

You can greatly increase your profits without increasing the number of acres planted by using Swift's Fertilizers.

A good catch of clover is almost assured when Swift's Fertilizers are used.

Profit by experience of others. Use Swift's Fertilizers on every acre you plant.

Do not lose the extra profit from this year's crop by waiting to experiment on only a few acres.

Place your order for Swift's Fertilizers now.

Insist upon getting fertilizers with the Red Steer on Bag, for it is your guarantee of best quality.

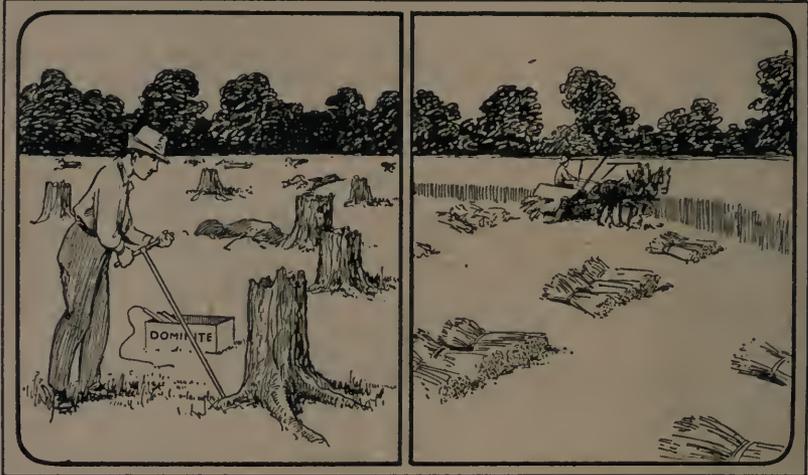
If you do not know the agent for Swift's Fertilizers, write us and we will see that your requirements are supplied.

ADDRESS

SWIFT CANADIAN CO., Limited

UNION STOCK YARDS,

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The Easiest, Quickest and Cheapest way to clear your land of Stumps and Boulders is with

DOMINITE

DOMINITE can be used by anyone, safely and successfully without previous experience as a blaster, and without special training. While having the same power as ordinary dynamite, Dominite is far safer to handle and use, being practically insensible to shocks, and will not explode if set afire by sparks or flames. To explode it, it is necessary to use a blasting cap or electric exploder of not less than No. 7 strength, while No. 8 insures even better results.



Right way to insert Caps and Exploders, to avoid miss-fires.

By using Dominite, stumps and boulders that render the best of land useless can be blown out and broken up for convenient handling, very quickly and at trifling cost.

Dominite does not freeze in the coldest weather, hence can be used at any time without the danger and inconvenience met with in using ordinary dynamite.

Caps, Fuse, etc., of best brands, at right prices.

Write us for full information, references to users, prices, etc.

DOMINION EXPLOSIVES,

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General Offices, OTTAWA, ONT.

Farmers: Write for our local agencies proposition.

taining all three of the essential elements of plant food gives best all-around results under average conditions. The proportions of the plant food ingredients should be varied to suit soils, previous treatment of the soil and what the previous crop indicated—whether straw was weak or strong, whether the crop matured fast or slow.

How and When to Apply Lime.

Lime should usually be applied before those crops in rotation which are most likely to be benefited by it. In rotations where the land is seeded to winter wheat, clover, and timothy, it is a good plan to apply the lime just before sowing the wheat. In rotations where alfalfa is grown it is desirable to lime prior to sowing the alfalfa seed. The crops which are less in need of lime, which follow in the rotation, will then secure all that they require, and the soil will remain sufficiently sweet to be well adapted to them.

Lime should be applied with a broadcast lime spreader or with a fertilizer distributor which is so constructed as to insure an even distribution of the material. It should be applied after the land has been plowed, and preferably, after it has been harrowed once. It is highly important, particularly if hydrated or burnt lime is used, that it be harrowed into the soil as soon as possible. It should never be left on the surface over night or during a storm.

Lime and fertilizer should not be mixed together before their application. Each should be applied separately and be thoroughly harrowed into the soil, except in cases where the fertilizer is applied with the fertilizer attachment of a grain drill, a corn or potato planter. If large amounts of lime are mixed with a fertilizer containing soluble phosphoric acid, it causes considerable of the phosphoric acid to change back to an insoluble state. It is always well to apply the lime, if possible, at least a week or two previous to the application of the fertilizer and to the time of planting.

How to Apply Fertilizer for Various Crops.

When fertilizer is applied with any broadcaster, do not fail to make application just previous to the last harrowing.

When fertilizer attachment of grain drill is recommended (except where small grains are drilled in rows) always remove the conductor tube or hose pipe from the foot of the furrow opener. Hang a board below the open tubes or hose pipes allowing the fertilizer to drop on this board. The constant shaking of the drill distributes the fertilizer evenly. The hoes or disks on the grain drill will help fit the seed bed and work the fertilizer into the soil.

Corn—200 to 400 Pounds Per Acre.

1. Apply two-thirds through the fertilizer attachment of the grain drill or through the fertilizer attachment of the corn planter, distributing it in a continuous stream along the row since the continuous stream along the row is preferable to checking.

2. Two-thirds through a broadcast lime and fertilizer distributor or sower and the remainder through the corn planter fertilizer attachment.

3. All through the fertilizer attachment on the grain drill or all through a broadcast lime and fertilizer distributor.

4. If 125 pounds or less per acre are used, apply all through the fertilizer attachment on the corn planter.

Silage Corn—300 to 500 pounds per acre. (Apply the same as for field corn.)

Sweet Corn—600 to 1,000 pounds per acre. (Applications same as for field corn.)

Pop Corn—(Amounts and applications same as for field corn.)

Potatoes—600 to 1,000 pounds per acre.

1. Apply all but 300 pounds through the fertilizer attachment of the grain drill and the remainder through the fertilizer attachment on the potato planter.

2. Apply 300 to 700 pounds through a broadcast fertilizer distributor and 300 pounds through the fertilizer attachment on the potato planter.

3. All through the grain drill fertilizer attachment.

4. All through the broadcast lime and fertilizer distributor.

5. If under 300 pounds per acre, apply all through the fertilizer attachment of the potato planter.

Wheat, Oats, Barley and Rye—200 to 400 pounds per acre.

1. Apply all through the fertilizer attachment of the grain drill at time of seeding.

2. Apply all through broadcast lime and fertilizer distributor previous to drilling.

Flax—150 to 200 pounds per acre—(Applications same as for wheat.)

Spring Top-dressing of Winter Wheat and Rye—200 to 300 pounds per acre. (This should be done as early in spring as possible.)

1. Apply all through a broadcast lime and fertilizer distributor.

2. Apply all through the fertilizer attachment of the wheat drill, running disks about one inch deep which will cultivate the crop and work the fertilizer into the soil.

Tomatoes, Cabbage and Similar Transplanted Truck Crops—500 to 700 Pounds Per Acre.

If setting by hand there is no tool so useful as the potato planter with a fertilizer attachment. It will open the furrow, mark the rows and scatter the fertilizer evenly.

1. Apply all but 200 pounds per acre through the grain drill fertilizer attachment and scatter a handful (totaling 200 pounds per acre) around each plant after it is set, thoroughly mixing fertilizer with the soil.

2. Apply all but 200 pounds with the broadcast distributor applying re-



Putting on a Nice Crown.

N.B.—Do not fail to harrow with a disk grass seeder (with which clover or grass seed can be sown at same operation) weeder or adjustable harrow, throwing teeth back at an angle of 45 degrees. The harrowing mixes the fertilizer with the soil and breaks the crust, thereby conserving soil moisture. On light soils, follow the application with a roller.

Soy Beans, Cow Peas and Other Forage Crops—300 to 500 Pounds Per Acre.

1. Apply through fertilizer attachment of the grain drill or whatever other seeding machine or planter you use.

2. If your seeding machine or planter has no fertilizer attachment, drill in the fertilizer through the fertilizer attachment of the grain drill.

3. Apply with a lime and fertilizer distributor.

mainder by hand as above.

3. Apply all with grain drill.

4. Apply all with lime and fertilizer distributor.

5. If applying less than 600 pounds per acre, partition off the hopper of the grain drill fertilizer attachment so that three feeds can be used which will scatter fertilizer evenly on sides and bottom of trench or row.

6. When very light applications are to be made and rows are of standard width, the fertilizer attachment on the corn and similar planters can be utilized in marking out the field and in distributing the fertilizer in the rows at the same time.

7. On gardens and small areas or where especially early maturity or excellent quality are desired, hand applications in rows or about hills may be made.

8. When grown in the field and no other distributor is available, the fer-

tilizer may be scattered by hand and worked very thoroughly into the soil.

Onions (seeded)—800 to 1,000 Pounds Per Acre.

1. Apply two-thirds through the fertilizer attachment of the grain drill and the remainder through the fertilizer attachment on the onion seeder at the time of drilling.

2. Apply two-thirds through broadcast fertilizer distributor and the remainder through the onion seeder attachment.

3. Apply all through the fertilizer attachment of the grain drill.

4. Apply all through lime and fertilizer distributor.

5. If not more than 600 pounds per

Top-Dressing Clover, Timothy, Alfalfa, Millet and Grass Stands—200 to 500 Pounds Per Acre.

1. Apply through a broadcast lime and fertilizer distributor.

2. Apply through the fertilizer attachment of the disk grain drill. Set disks shallow.

N.B.—Roll and harrow lightly or harrow alone with disk grass seeder, spike tooth harrow or weeder. On alfalfa, you may use a spring tooth or special alfalfa harrow.

Seeding Clover, Timothy, Alfalfa and Other Grasses—200 to 300 Pounds Per Acre.

1. Apply with broadcast distributor followed by a disk grass seeder.



Cleaning up the Furrow.

acre, apply all through onion seeder attachment.

6. If but a small area and you have none of the above machinery, you may scatter by hand, working well in the soil before planting.

7. Scatter between rows when onions are up, working in well by cultivation.

Orchards—800 to 1,000 Pounds Per Acre.

1. Apply through fertilizer attachment of one-horse five-hoe or five-disk grain drill or drill made for orchard work.

2. Apply all through a broadcast distributor.

Special fertilizer orchard drills are made in various sizes for this purpose.

2. Apply through fertilizer attachment of grain drill at time of seeding Rape—200 to 400 Pounds Per Acre.—Application had best be made same as for wheat.

If the rape is drilled in rows and cultivated, part of the fertilizer may be applied to the rows by using fertilizer attachment on corn or any small seed planter or by stopping up part of the holes in fertilizer attachment on the grain drill.

Beans and Peas—300 to 500 Pounds Per Acre.

1. Drill beans and apply the fertilizer at the same time using an 11-hoe grain drill, drilling the beans through the 2nd, 6th and 10th hoes only, but stopping up the fertilizer tubes correspond-

ing to these hoes. Allow the fertilizer to be distributed through the 1st, 3rd, 5th, 7th, 9th and 11th hoes only, stopping up both grain and fertilizer feeds on the 4th and 8th hoes. This distributes the fertilizer only through the hoes on either side of the ones carrying the beans and not directly with the beans.

2. If you do not have a grain drill with a fertilizer attachment or if you plant with a corn or other planter, apply the fertilizer broadcast at least a week before planting beans.

Sugar Beets—300 to 600 Pounds Per Acre. (Same analysis as potatoes.)

1. Apply all the fertilizer through the fertilizer attachment of the beet drill at time of planting.

2. Apply all the fertilizer with the fertilizer attachment of the grain drill or a broadcast lime and fertilizer distributor.

Tobacco—400 to 1,000 Pounds Per Acre.

1. Best put 200 pounds under plant in row or hill with the fertilizer attachment of the potato planter and apply the remainder with the fertilizer attachment on the grain drill previous to planting.

2. Put 200 pounds in rows or hills and apply the remainder with a broadcast fertilizer distributor.

3. Apply all through fertilizer attachment of the grain drill.

4. Apply all with broadcast lime and fertilizer sower.

5. Apply by hand.

A very light application scattered within a one foot radius of each plant will result in a quicker start.

Fertilizing Tobacco Beds.—Beds should be fertilized at the rate of 1,000 pounds per acre or 6 pounds per square rod. Apply by hand scattering as evenly as possible and make certain to work it thoroughly into the soil.

Lettuce, Table Beets, Parsnips, etc.—1,000 to 2,000 Pounds Per Acre.

1. Apply all but 250 pounds per acre through the fertilizer attachment of the grain drill, a broadcast distributor or by any other method, applying the rest through the fertilizer attachment of the hand planter at time of seeding.

2. Apply all through the fertilizer attachment of the grain drill, the broadcast distributor or by any other method.

3. If applying under 300 pounds per acre, apply all through the fertilizer attachment of the planter.

4. If a small garden area, you may scatter by hand.

Strawberries.—600 to 1,500 Pounds Per Acre.—Before setting plants, if a fair-sized area. -

1. Apply 300 pounds with fertilizer attachment of grain drill, and balance in frequent hand applications.

2. Apply 300 pounds through lime and fertilizer distributor and balance in frequent hand applications.

N.B.—Never top-dress strawberries in spring.

Cucumbers, Melons, Etc.—500 to 700 Pounds Per Acre.

1. Apply all but 300 pounds through the fertilizer attachment of the grain drill or through broadcast distributor, then work 150 pounds thoroughly into the hill before planting and apply remainder in one or two applications within one month after planting.

Grapes—600 to 1,200 Pounds Per Acre. Blackberries, Raspberries, Currants, Gooseberries—300 to 600 Pounds Per Acre.—Before setting—

1. Apply with fertilizer attachment of grain drill.

2. Apply with broadcast lime and fertilizer distributor.

3. Apply scattering by hand.

Calculating Manure Production.

Question: How much manure can I produce on my farm? I want to know, because I want to supplement what I lack, either by producing more or else by using commercial fertilizers.

Answer: About half of the fodder eaten by cattle is digested, and the other half is excreted in the form of manure. Fresh dung is made up of one-quarter dry matter and three-quarters water, and this means that to calculate the manure a cattle will make one-half the dry substance in the fodder fed must be multiplied by four. Therefore, divide the dry substance in the fodder by 2, add to this the weight of the litter and multiply this by 4.

Example: How much fresh manure is produced by feeding 10 tons of meadow hay and 4 tons of oat straw, while using 4 tons extra straw for litter.

$$10 \text{ tons meadow hay} \\ = 4 \times 85\% = 8\frac{1}{2} \text{ tons dry substance}$$

4 tons straw
 $= 4 \times 85\% = 3.4$ tons dry substance

11.9

4 tons litter
 $= 4 \times 85\% = 3.4$ tons dry substance

11.9 divided by 2, then multiply result by 4. This equals 37.4 tons of fresh manure.

To Apply Solubles

Soluble manures, such as nitrate, guano, etc., should be applied to the land in spring; undissolved manures, such as phosphates, slag, etc., in autumn. Soluble manures, again, suit heavy land; while undissolved varieties, whole bone, and the like, give best results on light soils. Dung may be plowed in in autumn on heavy land, but kept over till Spring on the lighter lands; on grass should be applied as a top-dressing in autumn on all varieties of land. The soil has great retentive power for phosphates and potash, but nitrogenous material easily decomposes, and the resultant nitrates wash out. Little at a time and more frequent dressings is therefore a good rule to follow in all manures, but especially with the nitrogenous—nitrate of soda, for instance, giving better results if put twice on a crop.

Fertilizer Act.

The law of the Fertilizer Act is stated as follows: All material excepting farmyard manure must be sold according to guarantee. The form of guarantee is as follows:

1. Name of brand.
2. Registration number.
3. Name and address of manufacturer.
4. Analysis as guaranteed by the manufacturer which shall show the percentage protein, fat and fibre. percentage nitrogen, phosp. and potash.

Any purchaser may have an analysis made by the Department of Inland Revenue at a fee of \$1.00. Samples must be taken in conformity with the regulations. For information write the Deputy Minister of Inland Revenue, Ottawa.

Determination of Fertilizer Needs.

A chemical analysis is of little value in determining just what element of growth your soil may be lack-

ing in. A practical experiment is a sure method to find the need of a particular crop or a particular soil.

Mark out five $\frac{1}{8}$ acre plots and proceed as follows:

Plot 1. No fertilizer.

Plot 2. Complete fertilizer (phosphoric acid, potash, nitrogen).

Plot 3. Phosphoric acid and nitrogen.

Plot 4. Phosphoric acid and potash.

Plot 5. Nitrogen and potash.

Then plant your crop under same conditions in each of these plots and watch results.

Rules to be Observed in Purchasing Artificial Fertilizers

The purchaser ought always to demand a guarantee of the percentage contents of the various fertilizing ingredients in the fertilizer, as well as of the materials used as a source of the same. In nitrate of soda and sulphate of ammonia, the nitrogen content will have to be guaranteed. In basic slag, of the total phosphoric acid, 80 per cent. ought to be soluble in citrate solution. The potash salts, both muriate and sulphate, contain 50 per cent. actual potash, and when purchased in the original sacks (225 lbs.), with lead seal attached, the purchaser may be confident that the goods are genuine.



Type of Subsoil Plow.

Never Mix

- Farmyard manure and lime.
- Guano and lime.
- Guano and basic slag.
- Nitrate and superphosphate.
- Sulphates and slag.
- Superphosphate and slag.
- Lime with sulphate of ammonia.

Artificial Fertilizer Losses.

Where a farmer's system of management does not provide sufficient stable manure to meet the requirements of the soil, or there are fields where barnyard manure cannot be applied, the use of animal and chemical fertilizers is to be recommended. Such materials as dried blood, tankage and finely ground bone meal and potassium fertilizers will benefit a variety of soils and make valuable fields that would be otherwise useless. When bone meal is of a reliable character there is no cheaper source of nitrogen and phosphoric acid.

Indirect Fertilizers.

Indirect fertilizers are those which do not in themselves supply plant food, but whose chief value depends upon the ability they possess of changing the insoluble and unavailable potash and phosphoric acid into available forms.

Gypsum lime, common salt, are of this nature. These should be used in moderation. One to one-half tons per acre at intervals of five to six years would be a safe application of lime.

Direct Fertilizers.

There are those which contribute directly to the growth of plants. They may contain either nitrogen, phosphoric acid or potash, or all or any two of these.

Nitrogen fertilizers, nitrate of soda, sulphate of ammonia, dried

blood and calcium cyanamide, are the most important and pure.

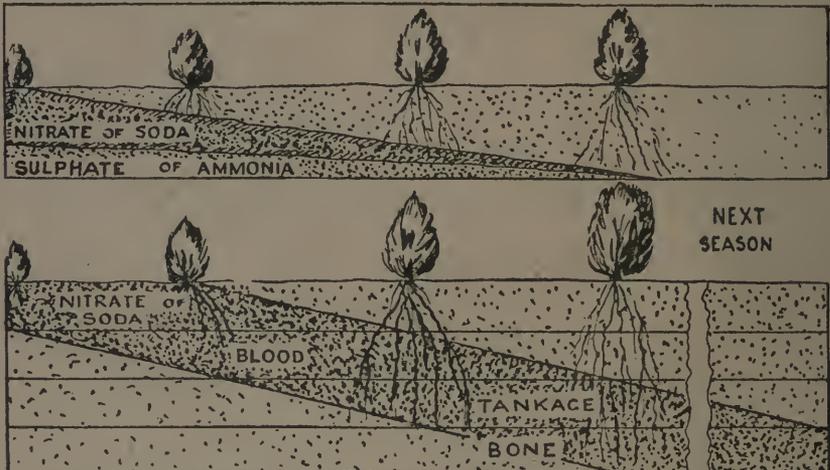
Potash, muriate of potash and sulphate of potash. Former contains 50% and latter 35% potash. Both are soluble and immediately available.

Phosphatic, ground rock and superphosphate are those most readily available.

Thomas phosphate, bone meal, bone ash, bone black, meat scrap, tankage, are materials containing more than one nutrient and their value, whilst not immediate, will spread over a fairly large period of time when made available by the action of the soil acids. Therefore it is reasonable to believe that an application of fertilizers, giving different sources of the same needed element, and thus becoming available at a different period of growth, will have a good and valuable effect on the growing crop.

To obtain this result, the fertilizers made up of the by-products of slaughter houses, etc., in Canada will produce favorable results. Purchased from reliable firms, animal fertilizers living up to the professed analysis have good value for the purchaser, and where their presence is needed are to be recommended.

Mineral fertilizers such as potash, nitrate of soda, acid phosphate, etc., are all beneficial and reliable.



This illustrates the value of using different sources of same element needed in fertility, thus giving plant food throughout growing season.

Practice of Farm Drainage.

Many of the farm lands in Canada are well drained naturally, but others are low lying and must be partly or entirely artificially underdrained, or else remain wet and otherwise incapable of full production. The practice of underdraining is now receiving better attention than heretofore, but many farmers are not availing themselves of its benefits for two chief reasons: (1) Lack of sufficient knowledge of drainage operations; (2) insufficient knowledge of the cost.

Again, there are lands that are so constituted physically as not to need artificial draining. The following are the chief costs for underdrainage:

Cost of Drainage (Ontario.)

The cost of drainage varies with the conditions. With convenient outlet, clean soil, in the early summer while the earth is still soft, drains can be put in at from 30 to 40 cents a rod, tile included, but later in the summer or in digging that is difficult from the nature of the soil, they may cost anywhere from 50 to 75 cents. Practical ditchers sometimes charge even more than this, but these estimates are based on operations of which we have actual knowledge. We know of one ten-acre field being drained four rods apart at a total cost of \$14.50 an acre. Previous to this it was the wettest field on the farm, was never sown earlier than June, never gave more than a half crop, and often not that, and would grow only timothy and oats. Since being drained it is the second driest field on the farm, has never but once been sowed later than April, always gives a full crop, and will grow successfully anything that can be grown on the high land of the farm. It is a pleasure to work the field now. If the reader will just figure out the difference in value between a half crop of oats or timothy and a full crop of wheat or other grain, he will find that those drains were not long in paying for themselves. This drainage was done twelve or fifteen years ago when labor was cheaper than now, but on the other hand the drains were put closer together than most soils demand. Perhaps \$17 to \$20 per acre would fairly represent the cost per acre, in average conditions at the present time.—Drainage Department, Guelph, Ont.

Depth and Distance Apart.

A mistake that some often make is that of putting their drains too shallow. This arises from not understanding fully the action and function of the drain. To begin with, why is it necessary to drain? Because the roots of plants cannot live and thrive in soil containing excessive water. This being so, we must next ask how deep do the roots naturally go in the soil where the conditions as to drainage are perfect? If they go six inches only, then it is sufficient to drain our soil on the surface alone. If they go three feet deep, then for best results we must drain three feet deep. But, again, how deep do they go? This varies somewhat with the crop, but the roots of corn, winter wheat, oats, barley and clover, some of our staple crops, penetrate at least from three to four feet in average field conditions. Then how deep should we drain? From three to four feet in order that the roots of these crops may have full opportunity to penetrate the soil. It may be suggested that two feet would be sufficient for the early needs of the crop, and that as the season advanced the water would naturally recede farther below, thus giving the roots plenty of space. This argument would have some weight but for one fact: the "water-table" in drained land is not level, but curved. If, in a field that is underdrained, one were to dig a series of holes four feet deep every ten feet between two drains, and if after a heavy rain he were to observe the water in the holes for a day or two, he would find that in a very short time no water remained in the hole at either drain, but the one situated midway between the drains would stand full for a long time, and the others would have less and less in them as he approached the drains, thus showing that the water-table is a curved surface, beginning at either drain and rising between. How fast does it rise? That varies with the soil and with the time since rain. In a clay in fairly good condition, when flow in drains begins to lessen, it will be found that the water rises 1 foot in about 25; in loam, 1 foot in 33; in lighter soils the rise will be slower still. The closer the drains are together the less the height of the crest

of the water-table above the drains; the farther apart, the higher the crest; hence the closer the drains are together the shallower they may be; the farther they are apart, the deeper they must be. The depth and distance apart must be so chosen that midway between the drains the soil will be drained a foot and a half or two feet within forty-eight hours after rain, for if the roots are submerged longer than this, they begin to suffer. Applying the gradients of 1 foot in 25 for clay and 1-foot in 33 for loam, we arrive at the general conclusion that if drains are from 3 to 3½ feet deep, they should be placed from 50 to 66 feet apart in clay or clay loam, and from 75 to 100 feet apart in lighter soils. But this is only a general conclusion, and judgment must be used in each individual case.

Course of Procedure Under the Ditches and Watercourses Act.

Before any recourse is had to legal procedure, the parties concerned in a drain affecting two or more owners should get together informally and endeavor to agree on some apportionment of the labor and expense of construction and maintenance. When such meeting and agreement are not possible, then legal proceedings become necessary. The first legal step in the adjustment of a dispute about drainage matters is the formal calling of a meeting of all parties interested. This meeting is to be called by him who requires the construction of the drain. He must serve notices in writing upon all concerned, appointing a day, hour and place convenient to the site of the ditch, at which all the owners are to meet and estimate the cost of the ditch, and agree if possible upon the apportionment of the work, and supply of material for construction among the several owners according to their respective interests therein, and settle the proportions in which the ditch shall be maintained; the notices shall be served not less than twelve clear days before the time named therein for meeting (R.S.O., 1897, c 285, s. 8.)

Blank forms for the notices are given in the Act, a copy of which may be had from the clerk of the municipality. Notices may be served personally or by leaving them at the place of the owner or occupant, with a grown-up person residing thereat, and

in case of non-residents then upon the agent of the owner, or by registered letter to the owner at the post office nearest to his last known place of residence. (R.S.O. 1897, c. 285, s. 15.)

In case an agreement is arrived at, it shall be reduced to writing, signed by all the owners, and within six days be filed with the clerk of the municipality, when it becomes as binding as the award of an engineer, and may be enforced in like manner (R.S.O. c. 285, s. 13 (1)). But such amicable settlement at this stage will seldom need enforcement, as the parties thereto will, of their own accord, fulfil their parts, and no further proceedings will be necessary.

In case an agreement is not arrived at, either at the meeting or within five days thereafter, then the owner requiring the ditch may file with the clerk of the municipality a declaration of ownership of his land and also a requisition naming all the parcels of land to be affected by the ditch and the respective owners thereof, and requesting that the engineer appointed by the municipality be asked to appoint a time and place in the locality of the proposed ditch at which he will attend (R.S.O. 1897, c. 285, s. 14), and examine the locality; and if he deems it proper, or if requested by any of the owners, he may examine the owners and their witnesses present, and may administer an oath or affirmation to any witness examined by him (R.S.O. 1897, c 285, s. 16 (1)). Within thirty days after his attendance the engineer will make his award in writing, apportioning the work and the furnishing of the material among the lands affected and the owners thereof, according to his estimate of their respective interests in the ditch, fixing the time for the performance by the respective owners, and apportioning the maintaining of the ditch, so that as far as practicable each owner shall maintain the portion on his own land. (R.S.O. 1897, c. 285, s. 16 (1)). In case the work apportioned to any owner is not completed in the allotted time, the engineer may let the contract for its performance to the lowest bidder, the expense chargeable to the land of the defaulting owner. (R.S.O. 1897, c. 285, s. 28.)

Thus we see that a man is bound to give outlet for the natural drainage water from his neighbor's farm, and, not only so, he is liable for cost of

construction and maintenance in proportion to the benefit he may be adjudged by the engineer to derive from the drain. The man who requires the

outlet must not forget, however, that he, too, is liable for outlet expense in proportion to his interest in said outlet.

Table of Size of Tile Pipe of Main Drain (McConnell).

Fall.	Acres Drained.						
	3-inch tile.	4-inch tile.	6-inch tile.	8-inch tile.	10-inch tile.	12-inch tile.	
1 foot in	20	18.6	26.8	74.4	150.0	270.0	426.0
1 "	30	15.1	21.8	60.4	128.0	220.8	346.0
1 "	40	12.9	18.6	51.6	108.8	189.6	298.4
1 "	50	11.9	17.0	47.7	98.0	170.4	269.0
1 "	60	10.9	15.6	43.4	90.0	156.0	246.0
1 "	70	10.0	14.5	39.9	83.0	144.4	228.1
1 "	80	9.3	13.4	37.2	77.0	135.0	213.0
1 "	90	8.1	12.6	35.0	72.5	127.0	200.5
1 "	100	7.3	11.9	33.1	69.2	120.6	190.5
1 "	150	6.7	9.5	26.6	56.0	97.3	154.4
1 "	200	5.7	8.2	22.8	48.0	83.9	132.5
1 "	250	5.1	7.5	20.4	42.4	74.4	117.0
1 "	300	4.6	6.9	18.4	38.2	65.5	107.0
1 "	400	4.1	5.9	16.5	32.6	60.3	90.7
1 "	500	3.7	5.2	14.8	30.1	54.0	81.6
1 "	600	3.3	4.7	13.3	28.0	48.6	74.0
1 "	800	2.9	4.1	11.4	24.0	41.9	65.0
1 "	1000	2.6	3.7	10.2	21.2	37.2	56.0
1 "	1500	2.1	3.0	8.5	16.8	30.8	47.0
1 "	2000	1.9	2.8	7.4	15.0	25.0	40.8

Suppose a man has 12 acres to drain and the slope of his main is 1 foot in 600, then we look down the list of falls till we find 1 foot in 600 and follow this line to the right. A 3-inch tile would not do; it drains only 3.3 acres. A 4-inch tile drains only 4.7 acres. A 5-inch tile, not given, but probably drains about 7 to 9 acres. A 6-inch tile fills the bill, as it is capable of draining 13.3 acres. The size to use for any other slope is determined in the same way. This rule applies to the submains and laterals as well as to mains. Owing to the great amount of friction in small tile compared with the volume of water they can carry, they are much more likely to clog with sediment than are the larger ones, so much so indeed that a 2-inch tile should never be used except on a steep grade. They are almost sure to clog in time on a slow grade.

Machine Ditching.

Machine ditching in farm under-drainage work has come to stay, but unfortunately not enough attention has been paid to the possibilities of increased agricultural profits in these valuable assistants and labor-savers in reclaiming and improving farm property. There are several good reasons why more machines are not in operation, and to mention a few of these will not be out of place. First, a traction ditcher is a very expensive machine; second, it is a very complicated piece of machinery; and third, to operate one successfully a good mechanic is required; one who is gifted with a

saving sense of humor, much patience, and who is constantly on the alert to avoid trouble. Experience is practically the only teacher in this business.

The modern gasoline traction ditcher of reliable make is a wonder of efficiency, power and mechanism, built to stand almost anything, yet requiring delicate handling to avoid trouble. Owing to the number of operations performed at one time a large number of bearings, pulleys and sprocket wheels are necessary, and these require constant attention to keep bolts tight and bearings and chains well oiled. A book would be

required to enumerate the various snags a beginner will encounter, so it is not possible to go into details here. The machine, though weighing several tons, will travel over the softest ground, and the writer has ditched and made a good job in absolutely new land, between stumps and over hills and hummocks of varying size. Tree roots cause no trouble, neither do old logs, no matter how large or tough, and even buried pine stumps, the toughest of all, can be torn out without the least trouble. However, lest readers might imagine that nothing causes a stop, it is well to mention a very bad enemy to these machines—boulders and large stones. Throughout Wellington, Bruce and Grey counties there are few places where stones are not encountered, and even if they cannot be seen quite often a big fellow is unearthed three feet below the surface. Stones increase the cost of ditching by fully 25 per cent., and for this reason prices in stony districts are often rather high. However, stones do not prevent work, and good work being done at that, but very materially increase the difficulties of the operator. Wherever stones are likely to be encountered only the heaviest type of machine can be used with success; others will prove a heart-break. The writer has operated a 20 horsepower $5\frac{1}{2}' \times 8'$ machine for several seasons in stones quite successfully.

The gross cost of operating one of these machines is very hard to give accurately to suit all conditions. However, the writer will give his experience in hard, dry, and sometimes stoney ground for the season of 1914. The total, per rod, allowing for gasoline, repairs, oil, wages, depreciation of machine, and interest on money, etc., was 25c for an average depth of three feet. This, of course, allows for no profit for the owner. Experience, larger jobs and better digging, reduce this cost very considerably, but the owner must not calculate too closely on his estimates, for if there is not one thing there is another. Mother Earth is full of surprises a few feet below the ground surface. Machines equipped with caterpillar traction wheels are very slow movers, and consequently small jobs far apart are not profitable, owing to the cost of moving. Until farmers realize that the cost of machine work is very largely increased by much moving, there will not be

much reduction in prices, which are now 35c. per rod for a 3-foot ditch. With government aid at their hand there is no excuse for farmers not making their jobs a good size, when they have it to do, and thereby saving money for themselves and increasing the profit to the machine ditcher. Hand labor does not figure much in underdrainage work, except in some localities. When the excellence of machine work becomes thoroughly recognized the professional ditcher will lose his job. Particularly at this crisis in national affairs is machine work so necessary. Every available man from the country districts has been called to the colors, and if it wasn't for the machines very little underdrainage would be done until the war is over. Laying aside the labor consideration the great value of the traction ditcher lies in the fact that with it a large tract can be underdrained in a very short time which otherwise would take months or even years of hard labor. The farmer is thus enabled to reap the benefit of this reclaimed land the next season and thereafter, whereas if he depended on hand labor it might never be done or would take years to realize the same profit if waiting to have it done by hand. In the writer's experience work done by hand is often poorly graded and much too shallow to be really efficient.

In the future practically all ditching operations in Ontario will be done by machinery, and as farmers become more educated to the value of underdraining these machines will fill a very large place in agricultural work. Therefore, it behooves those who have a large amount of such work to do to investigate for themselves, and if they have the necessary capital and can handle the machine to invest in one, feeling confident that it will do the work and do it right.—A. Hutchinson.



Steep Mouldboard Plow.

ORCHARD AND GARDEN

THAT REMINDS ME!

January.

Get the idea of a better garden this year. Don't plant more than you can care for.

Make a careful study of fertilizers, sprays and varieties.

Seeds to sow in the greenhouse or house are: Lobelia, pansy, verbenas, marguerite, carnation, snap dragon, petunia, forget-me-nots, daisy, salvia, canna.

Harvest the ice crop this month.

Top dress the bare lawn with short manure.

Don't let the indoor work be neglected.

Cut your scions for spring grafting, and cut always from bearing wood. Pack in moist sand in the cellar.

Plan your garden on paper and draw to a scale.

February.

Sow now in flat boxes in the window. For the autumn, scarlet sage or salvia. To fill gaps in the perennial border, single dahlias. For hanging baskets, the cigar plant. For May bloom indoors, Ten weeks stock. To cover the permanent bulb beds after the spring flowers have gone, verbenas. For edging the walks, tufted pansies.

For a trailing vine for window boxes, variegated periwinkle.

For an annual porch vine to fill in early, coboea seeders.

For big color mass in September, plant now cosmos.

For summer bed on north side, tuberous begonias. For fresh vegetables in May, sow in hot-bed: Cauliflower,

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khol rabi, lettuce, radish, leeks and onions.

Start early celery about the 15th in hot-beds.

March.

Haul out and spread manure in the garden whilst the ground is still frozen.

Order your seeds, trees, tools, etc., now and avoid the late rush.

Dig out perennial weeds in the lawn and sow fresh seed in the bare spots.

Graft apple and pear trees, cut off strawberry runners, and for the winter mulch of manure.

Manure rhubarb and asparagus.

Trim out old berry canes, cut out all wood except last year's new growth.

Overhaul your implements.

Consult spray calendar.

Plant late celery in hot-beds not later than the 15th.

April.

Plant deciduous trees and shrubs.

Plant hardy roses about the 25th, pruning rather severely.

As soon as ground can be worked plant sweet and garden peas. Use sifted ashes to make the garden workable.

Uncover and rake the bulb beds.

Sow seeds of hardy vegetables, all except beans, corns, vines and the tomato family.

Plant onion sets and early potatoes.

Transplant hardy vegetables from cold frame to garden, especially cabbage and cauliflower.

Divide and rearrange perennials and share with your neighbor.

Take particular care of the hot beds and cold frames, on account of sudden showers, hail, frost, heat and cold. It takes careful watching to prevent spindly plants, drying and burning.

Start cannas out of doors by April 1st, and the early crop of gladiolas and dahlias.

Spray roses with whale oil soap the last of April.

May.

Look out for frost! Don't plant tender vegetables or bedding plants until after the latest frost date. The tender vegetables are: corn, beans, eggplant, cucumbers, melons, peppers, okra, pumpkin, squash, sweet potato and tomatoes.

Perhaps try a few hills of corn the

beginning of the month for the extra early crop, and if frost threatens cover up with newspapers.

Trust to the cold frame for early vegetables.

Take a look to the spray calendar in this chapter. The apples and pears need attention.

June.

Make an outdoor seed bed and sow vegetables and flowers for fall use. Put brush on the beds, to keep off the chickens, etc. Lay newspapers over the top and sprinkle every day until the plants are up.

Pot strawberry runners before July 1st, to get plants for fall sets.

Keep the hoes and cultivators busy.

Thin, weed and cultivate vegetables and flowers.

Get after the cut worms with poisoned bran mash. Keep out the chickens. Make a second sowing of annuals, marigolds, phlox, calliopsis, California poppy, zinnias, pansies, nasturtiums, candytuft, mignonette. Trim the hedges. Plant dahlias and gladioli. Prune all shrubs that are done flowering by thinning out old wood. Look to the bad spots and weeds in the lawn.

July.

Get after the weeds in the heat of the day.

Pinch the ends of the squash and melon vines, and dig in some unleached wood ashes. Potash is the most needy fruit making element.

Destroy strawberry plants after they have borne two crops. Pot runners before July 1st.

Don't pick the cherries when they are dewy or rainy.

Remove the suckers from the fruit trees as fast as they form.

To obtain a record crop of roses cut back the hybrid perpetuals after the June bloom is over. Cultivate and manure, cut back about six inches.

Pinch chrysanthemums, cosmos and dahlias, make them compact, and full of flowers.

Get busy looking up your bulbs.

August.

Buy your potted strawberry plants. Your seedsman should be able to supply a midsummer sales list.

Start perennials from seed. Sow in cold frame.

Plant evergreens to avoid the spring rush. See that they have a perfect



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"Perfect"
Granaries



Pedlar's
"Perfects"
Silo Top

ball of roots. Plant bulbs out of doors for next spring and in pots for Christmas blooms.

'Sow early variety of beans twice this month.

Salsify now sown and left untouched until next spring will be large and delicious.



Apple Bud Ready for Main Spraying.

September.

Clean up, burn all litter infested with disease or insects. Get straw, etc., ready to cover half tender plants on approach of frost. Clean out the store rooms and cellars.

Take cuttings of tender bedding plants that will give stock for propagating in early spring.

Watch for early frosts.

Clean up vines from melon beds as soon as they are frosted.

Watch the field corn for harvesting; also root crops, except parsnips and salsify.

Save 20 days on next season's onions by sowing the seed now.

Put out your peonies and plant your daffodils.

Sow in cover crop on all vacant land as soon as possible. Plow heavy soil and rich up. Manure all level land.

October.

Good time to plant deciduous plants and shrubs, except those with thin barks and fleshy roots, such as the birch, magnolia.

Clean up and burn all diseased plants. Keep on plowing and manuring.

Plant every kind of bulb root and tuber now.

Burn the asparagus tops and manure the bed. Set out new asparagus bed and plant sets of extra onions for use in the spring.

Put some frozen rhubarb roots in a tub of earth in your cellar, and pro-

duce rhubarb for pies in the winter months.

Blanch endive by tying lightly at the tips.

Pull up cabbage; leave roots on and stand upside down on cellar shelf.

Rake up leaves and use as mulch for flowers and shrubs.

November.

Clean up all diseased and insect infested rubbish; put away your tools; get everything covered up for winter.

Start the mushroom bed. Make your compost heap. Procure sods about three inches thick, pile in layers of grass side down. Between layers of sod put a layer of cow manure, one part manure to three of sod. Turn over twice during winter. Best soil for potting plants. Get the leaves ready to cover over the bulb beds, but don't cover until there are about two inches of frost in the ground. Cover strawberries two to three inches deep with hay or straw.

December.

Protect your new fruit trees from mice and rabbits by the use of tar paper around the butts.

Store onions in dry place—not in the cellar. Spread on barn floor, let freeze solid and then cover.

Winter pruning and cleaning may be done now.

Paint gypsy moth nests with creosote. Cut and burn the nest of brown tail moths and the black knot on cherry.



Bordeaux Injury on Apple.

Cover cold frames for flowers with straw mats and shutters at night time.

Hydrangeas in the green-house for Easter flowering should have a night temperature gradually increased from 45 to 65 degrees.

Farmer's Best Vegetables.

Class of Vegetable.	For Commercial Purposes.	For Home Gardens.
Asparagus	Palmetto, Colossal.	Palmetto, Argenteuil, Columbian.
Bean	Dwarf Brittle Wax, Wardwell's Kidney Wax, Stringless Green Pod, Valentine, Refugee, Large White Marrowfat.	Early Golden Wax, Wardwell's Kidney Wax, Valentine, bush kinds; Caseknife, Kentucky Wonder, pole beans; Henderson's Bush Lima.
Beet	Egyptian, Crosby, Eclipse, Long Blood.	Egyptian, Crimson Globe, Detroit Dark Red.
Brussels Sprouts.	Dalkeith.	Dalkeith. Holborn.
Cabbage	Early Jersey Wakefield, Early Summer, Winningstadt, Late Flat Dutch, Danish Ball Head, Red Rock, Vertus Savoy.	Jersey Wakefield, Glory of Enkhuizen, Winningstadt, Succession, Late Flat Dutch, Chester Savoy.
Carrot	Chantenay, Danvers, Nantes Scarlet Intermediate.	Oxheart, Danvers, Chantenay.
Cauliflower	Snowball, Erfurt.	Snowball, Dry Weather.
Celery	White Plume, Paris Golden Yellow, Pascal.	Same, For a pink, Rose Ribbed Paris.
Corn, sweet	Early White Cory, Early Giant, Perry's Hybrid, Countryman Gentleman, Stowell's Evergreen.	Black Mexican. Golden Bantam, Peep-O-Day, Stowell's Evergreen.
Cucumber	Early White Spine, Arlington, Evergreen White Spine.	Early White Spine, Cool and Crisp, Improved Long Green, Paris Pickling.
Eggplant	Early long Purple, New York Improved.	New York Improved, Black Beauty.
Kohlrabi	Early White Vienna, Early Purple Vienna.	Same.
Leek	Broad-leaved Flag, Musselburgh.	Same.
Lettuce	Grand Rapids, Nonpareil, Big Boston, Trianon Cos.	Black-seeded curled Simpson, Iceburg, Big Boston, Trianon Cos.
Muskmelon	Extra Early Citron, Emerald Gem, Osage, Paul Rose, Rocky Ford.	Emerald Gem, Rocky Ford.
Melon, water	Cuban Queen, Phinney's Early.	Cole's Early, Peerless. For citron use Colorado.
Onion	Southport Globe, Yellow Globe Danvers, Ailsa Craig, Prizetaker, Red Wethersfield, and for pickling, Silverskin.	Danvers, Southport, White Globe, Prizetaker, White Queen. Use Dutch sets for green onions.
Parsley	Triple Moss Curled.	Same.
Parsnip	Hollow Crown, Guernsey, Elcombe's Giant.	Early Round, Hollow Crown.
Peas	Extra Early, Gradus, American Wonder, Telephone, Heroine, Stratagem, various Marrowfats.	Extra Early, Excelsior, Stratagem. Gradus, Heroine.

Class of Vegetable.	For Commercial Purposes.	For Home Gardens.
Pepper	Neapolitan, Ruby King, Chinese Giant.	Neapolitan, Ruby King.
Potato	Early Ohio, Irish Cobbler, Carmen, Delaware, Rural New Yorker.	Eureka, Early Ohio, Delaware.
Pumpkin	Sugar, Winter Luxury, Connecticut Field.	Sugar, Large Cheese.
Radish	Rosy Gem, Scarlet Turnip, rooted for forcing, French Breakfast, Chartier.	Same and also Icicle.
Rubaga	Hazard's Swede, Canadian Gem.	Same. These are Swede turnips for table use.
Rhubarb	St. Martin, Linneaus.	Same.
Salsify	Sandwich Islands.	Same.
Spinach	Victoria Bloomsdale, Flinders.	Victoria, for Spring Sowing; New Zealand, for midsummer.
Squash	Boston Marrow, various Hubbards, Vegetable Marrow.	Bush Scallop, Essex Hybrid, Warty Hubbard.
Swiss Chard	Lucullus.	Same.
Tomato	Earliana, Chalk's Jewel, Ignatum, Stone, Matchless, Trophy, Plentiful.	Earliana, Dwarf Stone, Sunrise, Ponderosa, Plentiful; also fancy kinds, like Yellow Pear, etc.
Turnip	Snowball, Early Milan.	Snowball, Orange Jelly.



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Planting Table for Flowers

In planning the garden it is very essential to have some guide as to the proper time to sow the seeds, and it is equally important to know the color and the height to which the plant will grow under average conditions so that a proper color scheme and arrangement may be worked out. The following condensed table is intended to serve this purpose. The selection of varieties includes the most common as well as the most satisfactory flowers to grow. The annuals are all hardy except one or two half hardy kinds. The perennials have been carefully selected, and the few that are biennials in Canada are indicated by a (x). In with the perennial list are a few summer flowering bulbs marked "b".

ANNUALS.

VARIETY	When to Sow Seed		Thin or Transplant to (inches)	Height (feet)	Season of Bloom	Color of Flowers
	Indoors	Outdoors				
Abronia.....	March	May	12	½ to 1½	July to frost	Yellow, pink, rose
Adonis.....	March	Late Apl.	6	1	June-August	White Crimson
Ageratum (Floss Flower).....	March	May	6	½ to 1½	June to frost	Blue, white
Alyssum (Sweet).....	March	May	6	¾	June-Oct.	White
Alonsoa.....	April	May	6 to 12	1 to 3	July to frost	Scarlet, White
Argemone (Mexican Poppy).....	April in pots	May	12	1½ to 2	July, August	Yellow, white
Aster.....	March, April	May	9	1 to 3	Aug.-Oct.	Yellow, white, red, blue
Balsam.....	April	May	24	2 to 2½	July to frost	Yellow, white, pink, red.
Bartonia.....		May	3	1 to 3	July-Sept.	Yellow
Brachycom (Swan River Daisy).....	April	May	6	½ to 1	End of June to frost	Blue, white
Cacalia (Tassel Flower).....		May	6	1 to 2	July to frost	Scarlet, yellow
Calandrina.....	April	May	6	¾ to 1	July to Sept.	Rose, purple
Calendula (Pot Marigold).....	March	Late Apl	6	1	June-Oct.	Orange, yellow
Calliopsis (Coreopsis).....	March	Late Apl	10	1½	July to frost	Yellow
Callirhoe (Poppy Mallow).....	April	May	9	1 to 3	July to frost	Purple, lilac, red, cherry
Candytuft.....	April	May	4 to 12	½ to 1½	June-Oct.	White
Celosia (Cockscomb).....	March	May	6	1 to 2	June to frost	Yellow, orange, red, pink
Centaurea (Blue Bottle).....	April	May	6	2 to 3	June to frost	Blue, white, pink
Chrysanthemum.....	March	May	8	1 to 1½	June to Oct.	White, red, yellow
Clarkia.....	April	May	12	1½ to 2	July-August	White, rose, violet, crimson
Collinsia.....		May	8	1 to 1½	July, Aug.	White, lilac, violet
Convolvulus.....		Late Apl	2	½ to 1	July to frost	White, blue, violet, rose
Cosmos, Early.....	April	May	12	4	August	White, pink
Cosmos, Late.....	April, May	May	24	6 to 8	Sept. to frost	White, pink, red
Eschscholtzia (California Poppy).....		May	4	¾	July-Sept.	Orange, yellow, white
Caillardia.....	April	May	6	¾ to 1	July to frost	Yellow, red
Gilia.....	April	May	3 to 12	¾ to 2½	July-Sept.	Blue, red, white
Globe Amaranthus.....	April	May	6	1	July to frost	Red, blue, white
Godetia.....	April	May	4	1	July to frost	Pink, white, crimson
Gypsophila.....		May	8 to 12	1 to 2	July-Sept.	Rosy
Hellanthus (Sunflower).....	April	May	12-36	3 to 6	July to frost	Yellow
Hibiscus.....	March	July-Sept. 1	15-24	5 to 7	August	White to red
Ipomoea (Morning Glory).....		Late Apl	6	10 to 15	June to frost	Blue, red, white
Larkspur.....		May 5	6	1 to 1½	June-Sept.	Blue, white, red, pink
Lavatera (Tree Mallow).....	April	May	9	3	July to frost	White, rose

PLANTING TABLE FOR FLOWERS—(Continued.)

VARIETY	When to Sow Seed		Thin or Transplant to (Inches)	Height (feet)	Season of Bloom	Color of Flowers
	Indoors	Outdoors				
Linaria.....	.....	May	6	3	July-Sept.	White, purple, crimson
Linum.....	.....	May	8	2 to 2½	July-Sept.	Red, blue
Lupinus.....	.....	May	6	2	July, Aug.	White, Pink, blue
Malope (Mallow)...	April	May	9	2	July-Sept.	White, rose, red
Marigold.....	April	May	6	½ to 3	July to frost	Yellow
Mignonette.....	March, April	May 10	6	1	July to frost	Greenish yellow
Mirabilis (Four O'Clock).....	April	May	12	1½ to 2	July to frost	White, red, yellow
Nasturtium.....	April	May 1	6	1 to 10	June to frost	Yellow, red, orange
Nemesia.....	April	May	8	1	July-Aug.	Blue, white, orange
Nicotiana (Tobacco)	April	May 10	9	3 to 4	July to frost	White, pink, yellow, red
Nigella (Love-in-a-Mist).....	.....	May	6	1½	July to frost	White, blue
Pansy.....	March	April, July August	4	½	April to frost	Various
Petunia.....	Feb, March	.....	6	1	June to frost	Red, white, pink
Phlox.....	March April	May	9	1	July to frost	Red, white, yellow, pink
Poppy.....	.....	April	6-9	1 to 12	June-August	Pink, red, white and striped
Portulaca.....	.....	May	6	1	Aug.-Sept.	Red, white
Salpiglossis (Pointed Tongue).....	April	May	6	2 to 2½	Aug. to frost	Yellow, white, red, brown
Salvia (Flowering Sage).....	Feb., March April	.....	18	2 to 3	Aug. to frost	Scarlet
Scabious.....	April	May	9	1½ to 2½	Aug. to frost	White, purple, yellow
Silene (Catchfly)...	March	April	4-6	½ to 1	July-Sept.	Red, white, pink
Stocks (Ten Weeks)	March April	May	9	1 to 1½	July-Sept.	Pink, white, scarlet, yellow
Sweet Pea.....	March	April-May	3	6	July-Sept.	All colors
Sweet Sultan.....	April	May	9	1½	July-Sept.	Purple, yellow, white
Zinnia.....	March April	.....	6	1 to 3	July-Oct.	Red, yellow, white, pink

PERENNIALS.

Aconitum (Monk's Hood).....	.....	Aug.-Sept.	9	3	Aug.-Oct.	Blue and white
Adonis Vernalis....	.....	June	.....	1	April	Yellow
Alyssum (Gold Tuft).....	.....	July-Aug.	6	½	May to July	Yellow
Agrostemma (Rose of Heaven).....	April	May	6	1 to 1½	July to frost	Rose, white
Antirrhinum (Snap Dragon) ..	March	May	8 to 12	1½ to 2½	July to frost	Yellow, white, pink, red
Aquilegia (Columbine).....	.....	July-Sept. 1	8	2½	June-Sept.	Yellow, red, blue white
Arabis.....	.....	.....	6	½	April	White
Asperula.....	.....	July-Aug.	6	½	Aug.-Sept.	Blue
Aster (Michaelmas Daisy).....	.....	July-Sept. 1	12	3 to 5	Sept.-Oct.	White, pink, blue
b Begonia.....	April in pots	June	.....	½	July-Aug.	Various
b Bleeding-Heart.....	.....	May Nov.	.....	1½	June	White, pink
Coreopsis.....	.....	July Aug.	15	1½ to 2½	July-Aug.	Yellow
xCampanula.....	.....	July-Sept. 1	12	1 to 4	June-Aug.	Blue, white, pink

PLANTING TABLE FOR FLOWERS—(Continued.)

VARIETY	When to Sow Seed		Thin or Transplant to (inches)	Height (feet)	Season of Bloom	Color of Flowers
	Indoors	Outdoors				
Catananche.....	.....	July-Aug.	6	1½	June-Aug.	Blue, white
Chrysanthemum (Shasta Daisy) (Marguerite).....	.....	July Aug.	18	2	July-Sept.	White
♢ Canna.....	April in pots	June	.....	2½	Aug.-Sept.	Yell riet
Cowslip.....	.....	July-Aug.	6	½	July-Aug.	Yellow
Daisy.....	March	July Aug.	4	½	June-Oct.	White, pink
♢ Dahlia.....	.....	June	.....	3	Sept.	Various
Delphinium (Larkspur).....	.....	July Aug.	9	1 to 6	July to Sept.	Blue and white
Dianthus (Pink).....	March	July Aug.	4	¾	July to frost	White, pink
xDigitalls (Fox-glove).....	.....	July Sept. 1	9	3 to 4	July-Aug.	Pink, white and spotted
Gaillardia.....	.....	July Aug.	6	2	July-Sept.	Yellow and red
♢ Gladiolus.....	.....	May	.....	2½	Aug.	Various
Gypsophila.....	.....	July Aug.	12	1½	July-Sept.	White
Helenium.....	.....	July Aug.	18	4 to 6	Sept.-Nov.	Yellow and red
Heuchera.....	.....	July Aug.	6	1½	July-Sept.	White to red
Hollyhock.....	March	July Sept. 1	12	5 to 7	Aug.-Sept.	White to crimson and yellow
Iberis (Candy tuft).....	April	July Aug.	6	½	June to frost	White
♢ Iris.....	.....	May Nov.	.....	1½ to 4	June-July	White, blue, yell'w
Lathyrus (Everlasting Pea).....	.....	July Aug.	12	8 to 10	July-Sept.	White to red
♢ Lillium.....	.....	May Nov.	.....	1½ to 3	July-Aug.	White, yellow orange, spotted
♢ Lily-of-the-Valley.....	.....	May Nov.	.....	¾	June	White
xLunaria (Honesty).....	March	May	12	1½	June, July	White and purple.
Myosotis (Forget-me-not).....	April	May June	6	½	June-Aug.	Blue, pink, white
♢ Pconia.....	.....	May Nov.	.....	2	June	White to crimson
Phlox.....	.....	July Aug.	9	2 to 3	July-Aug.	White, blue, pink
Platycodon.....	.....	July Aug.	9	¾	July-Aug.	Blue, white
Poppy (Oriental).....	.....	July Aug.	12	2	June-Aug.	Scarlet, orange, and mahogany
Poppy (Iceland).....	.....	June Aug.	6	1	June-August	Orange, white yellow
Polyanthus.....	.....	June Aug.	5	¾	June-Aug.	White, red, yellow
Primrose.....	.....	June Aug.	5	¾	June-Aug.	All colors
Pyrethrum.....	.....	July Aug.	9	2	June, July	White, red, pink
Rudbeckia.....	.....	July	18	4 to 6	Sept. to frost	Yellow and purple
Scabiosa (Mourning Bride).....	.....	July Aug.	9-15	2 to 5	July to frost	White, lavender purple, yellow
Stokesia.....	.....	July Aug.	12	2	July-Sept.	Lavender
Sweet Rocket.....	.....	July-Aug.	9	1½	July-Sept.	Purple
xSweet William....	March	July Aug. 1	6	1	June, July	Red, white, pink, crimson
Verbena.....	.....	July Aug.	6	¾	July to frost	Rosy purple
Violet (English)....	.....	June Aug.	5	¾	June-Sept.	Dark blue, white

What the Crop Tells.

The ratio of straw to grain tells its story to the critical eye.

If for several years the straw production is abnormally high and the grain production is low, these facts point to phosphorus being needed.

If the leaves of the grain are long, loose, hanging and fluttering and the stems too long for their thickness, the soil probably requires calcium.

A bright green to yellowish colored foliage with the tips of the leaves brown or reddish in color, indicates want of nitrogen.

What Weeds Tell.

Broad-leaf plants, like burdock and nettles, indicate moisture, while narrow-leaf plants indicate dryness.

Nitrogen is abundant where chickweed and red pimpernel grow, while lack of nitrogen is indicated by jagged chickweed, field chickweed and vernal whitlow-grass.

Soil that is rich in nitrate of soda (chilisaltpetre) is indicated by the presence of goose foot, oraches and burning nettle.

Poxgloves, spurry and corn marlgolds indicate the presence of calcium.

Elm trees point to fertile soil; oaks are found on clay soils; conifers on sand, and alders on wet land.

What Soil Moisture Indicates.

Soils which hold moisture do not lack nitrogen. The drier the soil may be, as a rule, the greater is the lack of nitrogen.

Moist summers produce an excess of straw, while dry summers reduce the quantity of straw.

The dry soil remains poor in humus. In moist spots the soil is darker and humus content increased.

The heavy clay soils require a heavier dressing of phosphorus and a lighter dressing of nitrogen; while, on the other hand, on the dry soil the reverse is true.

Wet, cold soils are, for the most part, poor in potassium.

There are other and trustworthy ways for discovering the manurial requirements of farm crops on a given soil. While these methods are not difficult to apply, there is not space here to describe them.

No farm should be without its experimental plot, for it has been by experimental work only that anything in agriculture has become known.

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General Garden Hints.

Mulching.—This signifies a dressing of some kind usually manurial, which is placed over the surface of the soil surrounding tree, shrub, or plant of some kind. Its object is to keep moisture within the soil, to prevent the direct action of the sun on the roots, and when waterings are given, particularly in summer, to wash down the good qualities of the manurial covering for the fibres to assimilate. Mulchings should be given more frequently, especially in the case of plants transferred from one place to another.

Restoring Old and Sickly Trees.—Branches or snags that have to be removed should be sawn off quite close to the trunk or limb from which they spring. An application of liquid tar to the wound and renewed once or twice protects against moisture and fungoid diseases. When the new bark has grown over the wound, the tree may be considered safe. The life of a tree decayed in the centre may be prolonged by filling up the holes with cement, and thus keeping out moisture, which is the point to note in the preservation of old or decaying trees.

Room Plants.—Parlor palm (*Aspidistra*), true palms, india-rubber plant (*Ficus elastica*), *Arabia Sieboldi* and *Pteris Tremula*, *Pteris Argylea* and *Hepprolepis* ferns, withstand draughts better than most plants. Always water room plants with tepid water, that of the same temperature as the room itself being advisable. Bulbs, such as daffodils, hyacinths and tulips should be grown more often in bowls and pots. With the special fibre now available, there is little difficulty in doing so. Sponge the leaves occasionally of smooth and thick foliaged plants with tepid water to remove dust which stops up the pores—hence decay.

Pots for Flowers.—These are obtainable from the nurseryman in various sizes, the most frequently used being the 48, as it is called, or "five-inch" in width, the next being the "six-inch," and there are also the small ones, called "thumbs," which

are generally used for the small ferns so much used for decorations. Never use new pots until they have been soaked in water for quite 48 hours, as unless they are treated in this way they absorb moisture from the soil. Dirty pots must be well washed and dried before plants are put in them, and if covered with green substance, scrubbed in strong soda water made hot. Dry well. Cocks or drainage to give free egress for water from the soil should consist of broken pieces of pot and over the hole in the bottom of each pot place a large rather concave bit, then smaller chips or rubble, not overdoing it, to allow free egress of the water. Unless this precaution is taken the soil soon gets waterlogged and sour.

Transplanting Trees and Shrubs.—In dealing with trees and shrubs transplanting is an important detail. There are two leading points, the most suitable time and the method. The best season to transplant evergreens is in late spring, falling this, the fall. Transplant deciduous trees and shrubs in the spring when frost is out of the ground. In transplanting keep the fibrous roots as far as possible intact, and remove with them a large ball of soil, the larger the better. When moving a large deciduous tree or shrub first dig a trench all round it with a fork far enough away to preserve the roots. Lay a damp mat over them while they are exposed. Prepare the site for the tree by digging out a hole large enough to allow the roots being spread out evenly all round and to their full extent. Break up the soil finely, especially that which actually touches the fibres. In planting follow the general rule of not burying that part of the stem from whence the uppermost roots spring more than 2 inches or 3 inches.

Syringing and Spraying.—These are two distinct operations. The object of syringing is to cleanse and refresh the foliage, especially in the evening of a hot day, a large squirt being used which sends out the water either in a stream or from a "rose," the popular name for the nozzle, the

water from the latter being in the form of a spray which may be compared to dew or fine rain. This is most efficacious in the case of mildew and insect attacks, and when mixed with chemical preparations. Water should not be directed with strong force to plants, otherwise bruises will result.

Tying Up.—This is a common practice in gardens. It means tying up plants with string, raffia or bast or other material, with the help of neat sticks and stakes. The lettuce called "Cos" is thus treated to solidify the heart or centre, celery, dahlias, chrysanthemums and roses, the last three familiar instances among plants. Never make the tie so tight that the plant's development is impeded. It should be made secure, but no more.

Watering.—Though an apparently simple operation this needs judgment. Never give water unless the soil is in real need of it. An old gardener's advice is: "Plants in pots are best when occasionally allowed to become root dry, but only for a moment, as the drying of the soil sweetens it, then the soil should be well saturated." If the soil seems moderately damp do not give more moisture. Never water in driblets, but always give a good soaking so that every fibre receives benefit.

Scarlet Harmonies.—Here are general rules: Scarlet and rose colors, the tints respectively of the Oriental poppy and many of the herbaceous poenies should never be allowed in close proximity, but scarlet and crimson merge agreeably with orange and yellow, and the latter with straw color, ivory white and white. The different shades of purple and blue form in themselves quite a color graduation, the lighter blues associating through pale yellow with white, while blue and mauve also harmonize with soft yellow. The latter color may also be used in juxtaposition to pink and rose tints. In this manner, though discordant colors may be represented in the same flower border, they may be disposed in such a way by surrounding them with allied color tones, melting by infinite degrees into others that by gentle graduations eventually harmonize with the opposing hue, as to produce a delightful effect.

Budding.—An operation which applies to one form of tree and shrub propagation. It consists in removing with a proper knife known as a "budding knife," a dormant leaf with a small piece of the bark attached and transferring it to the shoot or stem of the plant to which it is to be attached. The rose is frequently the subject of budding, and fruit trees may be treated in the same way. The stock, that is, the shoot or stem on which the bud is to be inserted, should be opened, and the latter placed just underneath, with only the bud germ exposed, then tied firmly in position.

Orchid.—A genus or family of plants, sometimes terrestrial or living in the soil in the way of most plants, and epiphytal, or living on trees, nourishment being derived from moisture in the air; these are tropical. Orchids are found in almost all quarters of the globe, and are not, as is often surmised, simply wild flowers of tropical jungles. A vast majority are easily grown.

Chrysanthemums.—The name given to a significant class of flowers, some perennial, others annual. They add greatly to the beauty of the greenhouse and conservatory in the fall months, when the more modern varieties are in full beauty. The parent of this modern race first flowered in the British Isles in 1790, plants having been sent from China, the home of the chrysanthemum, and also Japan, to a French nurseryman at Marseilles, named Blanchard.

Shrubbery.—A place in which flowering and other shrubs are grown for decorative effect.

Deciduous.—Signifying a tree or shrub that loses its foliage in the fall and remains bare until spring.

Evergreen.—A tree or shrub that keeps its leaves throughout the year.

Compost.—A name given to a mixture of soils and manure. The soil usually used for plants to be grown in pots consists of fibrous loam, well-decayed leaf-mould, old hotbed manure, such as is obtained from a mushroom bed, and sharp silver sand, the major portion consisting of the first named.

Frames.—A small, usually wooden, contrivance for the sheltering and propagation of plants. It is of the

greatest use in gardens, whether large or small, and is very inexpensive to construct.

Annual Flowers.—Those that bloom the same year as the seed is sown and then die, and they embrace two classes, hardy and half-hardy, a good example of the former being the sweet pea, and of the last mentioned the china aster.

Biennial Flowers.—These sometimes through early sowing will produce plants that flower the same year, but this is simply a matter of cultivation. A biennial means a plant that flowers the year after the seed has been sown, and the hollyhock may be cited as an example. The sowing takes place in early summer.

Everlasting Flowers.—These are real flowers, although their appearance when dried suggests that they are composed of some paper-like material. The immortelles, so called from the years they will remain in much the same condition, are among the best known of the everlastings. *Rhodanthe* and *Helichrysum* are types.

Levelling a Lawn.—Levelling or grading are regarded as difficult operations, but this is not so. An absolutely flat surface is not always either necessary or desirable. Advice may be summed up as follows:—Having worked the main body of soil as nearly level as the eye will guide, from a glance from more than one direction, decide what shall be the height. Set a shallow brick here and at some point several feet distant place another. Upon these a piece of stiff quartering or a narrow board that will not sag should be set, and a common spirit level used to get this perfectly horizontal, raising or lowering the bricks until this is obtained. Put a little soil to this, or remove, as necessary. Repeat this operation from various positions, always taking care that the first guide brick set is always on the level. Of course each other brick, after it is adjusted, will be of the same height, and can be taken as a guide accordingly. A strong piece of string tightly stretched from point to point, is a good guide in the earlier stage, and by driving a few pegs at various parts of the ground, the tops of which are at the desired level, all risk of movement will be avoided.

Turf for Lawns.—This should be obtained from fields fed over fraternally by sheep, but as a rule excellent lawns are obtainable from the best seed mixtures, each nurseryman usually having his own preparation. When turf, however, is used, it is absolutely necessary that it should be free from weeds, particularly twitch, dandelions, plantain and thistles. Cut each turf about 3 inches deep and roll them grass side downwards until they are used, which should be as soon as possible. When the turf is set spread over it some loamy soil, which work in well with a broom into the crevices. Roll and sweep well and give plenty of water during the first summer especially.

Lawn Grass.—This should never be cut until it has grown quite two inches after growth has begun in the spring, and then only at first clipped off, in the case of freshly made lawns in particular. A close watch should be kept for weeks. Roll the lawn occasionally.

Dimensions of Tennis Lawn.—A full court should be as follows:—Length, 78 feet; width, 36 feet; and for single court, a width of 27 feet: the net to be in the centre and extend 3 feet over each side of the court. Height at the ends $3\frac{1}{2}$ feet, centre 3 feet, and service lines 21 feet from the net on each side. Total area of lawn to give ample space on outside of court should be 120 feet by 66 feet.

Hardy Flowers.—A class of plants not affected by frost, that is, will live the year through.

Garden Tools.—These are of several kinds, each adapted to a certain purpose, the principal implements being the spade, fork, hoe, rake, saw, and small cultivator, which accomplishes good work and is very useful in saving time. Always take care of tools, allotting them a place apart, and cleanse well after use.

Labels.—The use of labels may be overdone, but trees, shrubs, flowers and vegetables that are not familiar should be clearly named. These may be made of zinc, and obtained from the nurseryman, or, in the case of fleeting things, such as annuals and vegetables, strips of wood, the surface made smooth and painted over

with white paint, will serve admirably.

Wasps' Nests.—To destroy these many ways are adopted, but a very simple one is to get a strong stick and wrap a wad of rag at the top of it. Soak the rag in tar and thrust it quickly into the hole of the nest at night, after having lighted it. Then stop up the entrance with a thick piece of turf.

Mowing Lawns.—This is gardening work that requires care. It is certainly not everyone that can use the lawn mower aright. Before any mowing is done, roll the lawn well, if the grass is poor, lightly, if not, with more vigor; in the former case once in ten days, in the latter, every two weeks.

Turfy Loam.—This term is used to denote a soil made up of loam of grassy matter, such as from a pasture and roots, their fibry character rendering the material friable, that is, neither too loose nor too hard and sticky. When this pasture "turfy loam" has decayed well it forms the purest plant soil that it is possible to obtain. A proportion of two-thirds clay to one-third sand is perfect. Stones, of course, should be eliminated.

Bulb.—This is frequently used incorrectly. A tuber is often called a bulb, and vice versa, but the true bulb is made up of layers or scales which enclose the germ. The hyacinth is an excellent example of a true bulb.

Scion.—The name of a graft or piece of stem to be inserted in the stem of a tree of which it is to become part.

Grafting.—This operation must take place when the sap is on the move, that is, in spring, and both small and large stems may be selected for the purpose. Many fruit trees are grafted, and this is needful to obtain abundant crops quickly, pears and apples being particularly responsive to this process. The writer has described this gardening practice before in the following words. It consists in placing a piece of stem of one variety of fruit, that may be 6 inches long and the size of a man's finger or less, on to the crown of a small stem, singly, or putting several on the several stems of a large bunch. Grafts are called scions. The graft should be cut into a length of a few inches.

On one side of the lower or base end a slice of bark 3 inches long is cut off, leaving the base end with a point, or wedge-shaped. Then the graft is ready for insertion on the stock. The head should be cut clean off, and the stem be quite free from any side-shoots below. With a sharp knife a slit has to be made down the back of a large stem, and that being lifted at the edges, the slit point of the graft is forced firmly into the slit in the stock, then tied round tightly, and coated with either wax or clay to exclude air. If a small stock, then a slice is taken off the bark of that 3 inches long, and by an upward cut, so when the sliced end of the graft is placed on it, an even fit results. The edges of the bark on both stock and scion must meet to effect a proper union. Tie round the two with bast or raffia and coat the edges with grafting wax, or the whole stem with clay, the object of this being to exclude the air from the portions united together. This describes the general process.

Blanching.—A term used frequently when describing some form of vegetable culture. It is necessary with not a few vegetables to what is called blanch them, that is, exclude the light to render them edible. Asparagus, celery and rhubarb will at once occur to mind as kinds usually subjected to this treatment. In these instances, when the stems are given full exposure to the air and light they are rendered bitter and hard. Blanching is effected by placing the vegetables in a dark place, such as under a greenhouse stage or in specially prepared pits, or when in the open ground covering up closely; the object is to exclude the light.

Division.—In reading text books upon gardening the term "division" occurs frequently, and all it means is simply the operation of dividing the roots of certain plants, of which the perennial larkspur or Delphinium may be given as an example. The original roots in due course become too large and must then be divided into portions when growth is beginning in spring. Use a sharp knife or spade for the purpose.

Drainage.—Of course the general use of this word is well known, but in gardening it applies not only to the soil, such as in the preparation of paths, lawns, and so forth, but to

flower pots. Thus we frequently read in books "the pots should be well drained," which means that in the bottom place pieces of pot, or, as they are called, "corks," to enable superfluous moisture to pass away easily.

Drilling.—This word applies to one item in the sowing of the seed, of which there are two general ways, broad-casting and drilling. In the former the seed is thrown widely but evenly over the piece of ground upon which a crop is desired. Drilling means that shallow furrows or drills are made with a hoe or sharp pointed stick, or with a hand drill, which is very inexpensive, this not only making the drill, but sows the seeds also. Careful drilling means that the seeds are sown at equal depths, and there is no waste of material.

Feeding.—This term is often used in books. It means giving food in either liquid or concentrated form to plants for the promotion of a more abundant crop, whatever that crop may be.

Forcing.—Many fruits, vegetables and plants are brought to maturity by artificial warmth, and that is called forcing. It is a term much used in connection with horticulture.

Layers.—A method of propagation much practised in the increasing of certain trees and plants. A very familiar instance is the carnation, which is usually propagated in this way.

Leaf Mould.—A very valuable material, used chiefly in soil prepared for pot plants. It may be summed up in the following description: "The product of tree leaves." The way to get a good supply is to collect the tree leaves and stack them whilst damp in a heap to decay. If they are dry when collected, soak them in water.

Moulding Up.—At first this strange term may seem difficult to explain, but this and blanching have about the same significance. It means drawing earth to the stem. One excellent illustration is in the case of the potato, the forming tubers being kept from light and air by moulding up the soil to the young shoots. Bush or dwarf roses are also moulded up to protect the bark—the most valuable part—from injury.

Peat.—Every garden should possess its bin of peat, that is, where plants are grown under glass. It is made chiefly of vegetable fibre and

some portion of sand, some orchids and ferns in particular requiring some portion, larger in some cases than in others, in the soil in which they are planted.

Cuttings.—These are slips or pieces of young growth of the plant, and when properly made in preparation for going into the soil, they are called "cuttings." About 1-3 of their length is inserted, and the soil that promotes the formation of strong roots most quickly is that in which sand forms a large part. In due course basal roots are emitted, and the life of the young plant has begun. The base of the cutting should always be just beneath a leaf joint, and two, sometimes three, of the lower leaves removed to give a clear space for insertion in the soil.

Runners.—A few plants are increased or propagated by what is known as the "runner," and the strawberry is chiefly multiplied in this way. The strawberry sends out trailing shoots, and at the end of each of these a little plant is formed which is to give the fruit of the future. Take these off in August or spring and plant in the places in which they are to fruit.

Pruning.—Unless certain classes of fruits are pruned more or less there is no crop, or very little, and that little poor. Thousands of orchards are in sorry plight through neglect of this practice. There are two forms, stem and also root pruning. It is often essential to prune the roots when a tree is making too much leaf and branch growth, which is at the expense of the fruit. There is an absence of fruit spore. This operation requires much care and judgment, and is done by opening a trench at a fair distance from the stem of the tree of sufficient width and depth to get hold of the roots and sever them. In very neglected orchards it is wise to do one-half this year and the other the next to prevent too great a strain on the tree. To get hold of the downward roots dig underneath the ball of soil. When the root pruning has been carefully carried out the beneficial effect is soon seen on the growth and fruit bearing of the trees.

Trenching.—This term is used to denote double digging or deep tilling of the soil, and thus treated the crops

are more abundant than by any ordinary method of cultivation. The way to proceed is as follows:—A trench two feet wide and one foot deep should be thrown out half way across the piece of ground to be worked. Take up the bottom soil a further 12 inches deep, and the 12 inches of the next 2 feet trenching must be thrown on that, breaking up the bottom soil also. Treat the entire piece in this way and when it has been thus manipulated the bottom may be brought to the top. The whole plot is then fertile.

Thinning.—This term is applied to an act the purport of which is to reduce the number of flowers or fruits on a plant or tree to throw greater size into those remaining. The huge chrysanthemums, for instance, that are seen in our gardens, are obtained by reducing the buds to one on each stem or stalk. With regard to fruit trees it signifies the removal of both large and small branches with a saw to reduce crowded growths or those which cross each other. Always cut close to the main stem, make the surface of the wound smooth, then smear over with tar. Thinning out of vegetables invariably takes place to give each seedling proper space for its full development.

Stocks.—The name of a flower and also of a hard stem and root which is the means of increasing roses, fruit trees, and such like. The stock has an influence on the flower itself, or on the fruit of the tree. It is simply a means whereby the various kinds can be rapidly increased.

Spawning.—This word is generally used in connection with the cultivation of mushrooms. The spawn is obtainable in the form of a dry cake of soil and manure which contains the mycellum or thread-like roots, which give rise to the delicious product that is so well known.

A Rock Garden.—This is a portion of garden set apart for the flowers that delight in the surrounding of stone and rock, such as those from the mountains of the world. Gentians, edelweiss, and a host of other plants, may be grown in this section of the home surroundings. At least 18 inches of soil should be taken out so as to provide ample drainage, anything approaching stagnation being

fatal to success. Plants, such as our lady slipper or orchid (*Cypripedium spectabile*), require a soil that may be described as "boggy," a word which needs no explanation. A rock garden should not be made on the level, but where all inequalities have to be formed imitate Nature as far as possible.

Growing Early Vegetable Plants.

Success in market gardening depends largely upon reaching the market early when prices are good and produce finds ready sale. To accomplish this it is necessary to grow strong, thrifty plants which have been hardened and ready for the field the first day weather and soil conditions are favorable for transplanting.

Work usually begins in the fall. Some growers, however, prepare the soil during the spring and summer by first making an application of manure in the spring and then plowing the plot several times during the course of the season. Additional manure may be added at the second plowing if vegetable matter is wanting. Other growers go to the trouble of stacking manure and thick sods in alternate layers of eight or ten inches a year in advance of the time when the soil will be needed. When quite well decayed the pile may be turned several times at intervals of ten days or two weeks. The first plan is more economical and just as satisfactory. Other growers prefer to select any good garden soil and add rotten manure as may be required.

Preparation of Soil.

In the selection of soil, it is important to consider several factors: (1) It should be free from fungus diseases, as club root and other maladies that might cause trouble. Fields which have been producing any of the crops to be started under glass should be avoided in the selection of soil. (2) Stones, sticks, and other rubbish should be screened out. (3) Soils containing a great many weed seeds should not be used. (4) A considerable quantity of sand is always desirable. If the soil does not contain this naturally, it can often be procured at small cost and added as may seem desirable. Sand is especially valuable in starting tender seedlings. The addition of plenty of rotten manure to any good farm soil

will usually put it in good condition for growing vegetable plants.

Both the soil and manure should be procured in the fall before the hard freezing weather and stored in the dry where they will not be frozen hard when wanted for use, probably in mid-winter. The neglect of this matter is certain to cause annoyance. It is best to store the soil during September when it is quite dry and may be screened if necessary. A convenient way to do this is to place a screen with a half-inch mesh over a low wagon, slanting it so the stones and coarser parts will run onto the ground.

Sterilization is being practised more and more by plant growers. It destroys troublesome weed seeds and greatly reduces losses from fungus diseases. There are two common methods, by steam and formaldehyde. There are various ways of applying the steam. One of the most thorough is to place the soil in tight tanks, admitting steam at high pressure. The soil should be subjected to very high temperature for not less than an hour, and a longer period is an advantage.

When formaldehyde is used the soil is soaked with a solution made by adding one and one-half quarts of this solution to fifty gallons of water. One gallon of the diluted solution should be applied to each square foot of the soil.

Sowing the Seeds.

The grower should know the vitality of his seeds before sowing. This may readily be determined by making a simple test several weeks before it is time to make the main sowings. Count one hundred seeds of each variety to be tested and plant in separate rows. The number of plants which come up may then be counted and the germinating power accurately determined, and the thickness of sowing regulated accordingly.

Seeds may be sown in rows or broadcast. The row method takes more time, but it is preferable. The plants then come up with greater regularity. They are likely to be straighter and can be handled more rapidly. When the seed is sown in rows the plants help each other in reaching daylight, and this is an important point if there is much clay in the soil. The plants from rows may be lifted more rapidly and are kept in better order when transplanting

and these advantages more than offset the extra time required in sowing.

Length of Life of Various Seeds

Vegetables.	Years.
Cucumber	8—10
Pumpkin	8—10
Melon	8—10
Squash	8—10
Cauliflower	5—6
Artichoke	5—6
Endive	5—6
Pea	5—6
Radish	4—5
Beets	3—4
Cress	3—4
Lettuce	3—4
Mustard	3—4
Akra	3—4
Rhubarb	3—4
Spinach	3—4
Turnip	3—6
Tulip	2—3
Asparagus	2—3
Bean	2—3
Carrot	2—3
Celery	2—3
Corn	2—3
Leek	2—3
Onion	2—3
Parsley	2—3
Parsnip	2—3
Pepper	2—3
Tomato	2—3
Eggplant	1—2
Herbs	3—4
Anise	1—2
Caraway	1—2
Savory	1—2
Sage	2—3

Time Required to Germinate

Vegetables.	Best temp.	Days.
Bean	75°	5—10
Beet	60°	7—10
Cabbage	70°	5—10
Carrot	60°	12—18
Cauliflower	70°	5—10
Celery	60°	10—20
Corn	75°	5—8
Cucumber	80°	6—10
Endive	60°	5—10
Lettuce	60°	6—8
Onion	60°	7—10
Parsnip	60°	10—20
Pea	65°	6—10
Pepper	80°	9—14
Radish	60°	3—6
Tomato	80°	6—12
Turnip	70°	4—8

Bearing Years of Fruits

	Years.
Apple	25—40

Blackberry	6-14	12 in. x 24 in.	21,780
Currant	20	12 in. x 30 in.	17,424
Gooseberry	20	12 in. x 36 in.	14,520
Peach	8-12	12 in. x 4 ft.	10,890
Pear	50-75	12 in. x 5 ft.	8,712
Plum	20-25	15 in. x 18 in.	23,232
Raspberry	6-12	15 in. x 2 ft.	17,424
Strawberry	1-3	18 in. x 20 in.	17,424

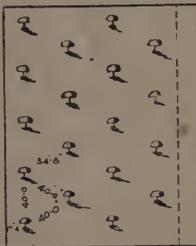
Distance in Planting

	Feet.		
Apple	30 x 40	3 ft. x 5 ft.	2,904
Apple (dwarf)	10 x 15	4 ft. x 4 ft.	2,722
Pears	20 x 30	4 ft. x 5 ft.	2,178
Pears (dwarf)	10 x 15	5 ft. x 5 ft.	1,742
Plums	16 x 20	5 ft. x 6 ft.	1,452
Peaches	16 x 20	6 ft. x 6 ft.	1,210
Cherries	16 x 25	6 ft. x 7 ft.	1,037
Apricots	16 x 20	6 ft. x 8 ft.	907
Nectarines	16 x 20	7 ft. x 7 ft.	888
Quinces	8 x 14	8 ft. x 8 ft.	684

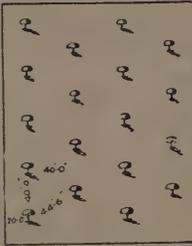
Number of Plants per Acre at Various Distances.

Distance.	Plants.
1 in. x 10 in.	627,279
1 in. x 12 in.	522,720
2 in. x 10 in.	313,632
2 in. x 12 in.	261,360

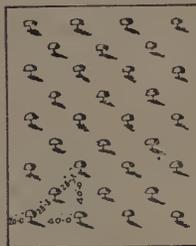
Arrangement of Orchard.



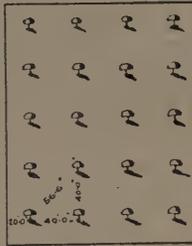
HEXAGONAL



ALTERNATE



QUINCUNX



SQUARE

3 in. x 12 in.	174,240
4 in. x 12 in.	130,680
6 in. x 12 in.	87,120
12 in. x 12 in.	43,560
12 in. x 15 in.	34,848
12 in. x 18 in.	29,040

Useful Orchard Insects.

Bees—Pollenizes and indispensable to a continuance of reproduction of a large percentage of plant life.

Dragon Flies—Feed on a great variety of injurious insects.

Tree Crickets—Feed on plant lice.

Ground Beetles—In larvae and adult stages feed on such insects as go underground to pupate.

Lady Bug Beetles—Feed on plant life and scale insects both in larvae and adult stages.

Wasps—Beneficial because predatory upon other insects, some of an injurious, destructive nature.

Frogs and Toads—Feed almost entirely on insects and slugs.

Cost of Cover Crops for Orchard.

The following figures are comparative. The prices may vary considerably. Lower prices may be secured by buying through associations or in large bulk:

Cow peas, 1½ bus. per acre at \$3.00 per bus.	\$4 50
Mammoth Red Clover, 20 lbs. per acre at 18c	3 60
Common Red Clover, 20 lbs. per acre at 17c	3 40
Crimson Clover, 25 lbs. per acre at 14c	3 50
Winter Vetch, ½ bus. per acre.	4 25
Spring Vetch, 1 bus. per acre.	1 80
Barley, 2 bus. per acre at 75c. per bus.	1 50
Peas, 1½ bus. per acre at \$1.10 per bus.	1 65
Alsike, 20 lbs. per acre at 15c.	3 00

Top Grafting.

Top grafting promotes hardihood in apples. Varieties as McMahon, Tol-

man and Baxter are hardy stock to graft onto Kings and Canada Red and such like varieties from weak crotches which canker badly; scions of these are therefore grafted onto hardier varieties. Illustrations show methods of top grafting.

Formulas for Grafting Wax.

Resin, 4 parts by weight; beeswax, 2 parts; tallow, 1 part. Melt together and pour into a pail of cold water. Grease the hands and pull the wax until nearly white.

For cold weather: 6 lbs. resin, 1 lb. beeswax, and 1 pint linseed oil. Apply hot all over joints with a brush. Put on about 1/8 inch thick.

For warm weather: 4 lbs. resin, 1 lb. beeswax, 1/2 pint to one pint linseed oil. Melt together gradually, turn into cold water, and pull. The linseed oil should be entirely free from cottonseed oil.



Markings on Leaves by Apple Scab

Hints to Packers.

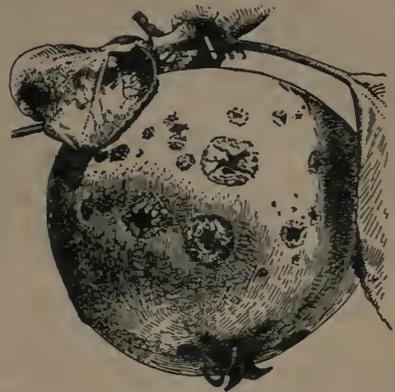
Use only clean, neat boxes.

Use only one size—20 x 11 x 10.

Use diagonal pack when convenient.

Keep the pack, if anything, above the "Fruit Marks Act."

Use the proper size paper for wrapping.



Showing Apple Scab.

Avoid turning stem of one apple to cheek of another.

Pack firmly and of correct alignment.

Make the pack attractive.

Mark the number of apples on the box.

All fancy priced apples should be shipped in boxes.

Only the best grades are preferred.

The box is the only practical pack for transportation.

Packing Apples in Boxes

The Straight Pack: Rows run straight across box and parallel to sides, in boxes of three, four, and five tiers. Apples must fit snugly. Sometimes necessary to turn end row flat. Stem end up.

Diagonal Pack, most important style: Rows go at an angle. It includes the two-two pack (see illustrations). First place an apple in the left-hand lower corner of box and another midway between the cheek of the first apple and the right-hand side of box. Two spaces of equal size will be left. In these spaces two apples are placed. The spaces left by last two apples are then filled, and so on until layer is finished. Second layer is started in right-hand corner for the half tier packs. This throws the apples of second layer into the pocket left by first layer. The three-two pack is the same, except that it is started with three apples instead of two. For these packs it is necessary to have the apples too large to fit four across the box.

Spray Calendar

Plants and Pest	1st Application	2nd Application
APPLE		
Scab or black spot, canker, leaf spot, codling moth and other biting insects, scale insects, blister mite and aphids.	Shortly before the buds burst. Use A1 or B. For San Jose Scale prune severely, spray thoroughly.	Just before the blossoms open. Use A2 or D, with 2 or 3 lbs. arsenate of lead to each 40 gallons of liquid.
PEAR		
Scab or cracking, blight, codling moth, other biting insects, scale insects, blister mite, psylla and slug.	Shortly before the buds burst. Use A1 or B.	Just before the blossoms open. Use A2 or D, with 2 or 3 lbs. arsenate of lead.
PLUM AND CHERRY		
Black-knot, brown rot, leaf blight or shot-hole fungus, curculio, slug and aphids.	Just before the buds burst. Use A1 or B.	Just after fruit is set. Use A2 or D, with 3 lbs. arsenate of lead.
PEACH		
Leaf-curl, scab or black spot, yellows, little peach, curculio, borer, San Jose scale, shot-hole borer.	Before the buds begin to swell. (All must be done before any sign of bursting of buds.) Use A1 or B.	Just after fruit is set. Use 2 lbs. arsenate of lead alone with water for curculio.
GRAPES		
Black rot, powdery mildew, downy mildew, anthracnose, flea-beetle thrip, or leaf hopper.	When 3rd leaf is appearing. Use D.	Just before the blossoms open. Use D.

SPRAY CALENDAR.—Continued.

Plants and Pest.	1st Application.	2nd Application.
CURRANT AND GOOSEBERRY Mildew, leaf-spot, currant worm and aphids, Red spider and San Jose Scale.	Shortly before buds burst. Use A1 or B. Prune and spray heav- ily for scale.	Just before blossoms appear. Use A2, with 2 lbs. arsenate of lead.
RASPBERRY AND BLACKBERRY Anthracnose, red rust, crown gall.	Before growth begins. Use D. Omit if not troubled by anthrac- nose.	When shoots are 6 or 8 inches high. Use D. Omit is no anthrac- nose.

Plants and Pest.	REMARKS.
STRAWBERRY Leaf-spot and white grub.	For leaf-spot set out only healthy plants with no sign of disease. First season spray with D before blossoms open and keep plants covered with mixture throughout the season. Second year spray before blossoming with D and again soon after picking; or mow and burn over after picking. Don't take more than two crops off. Plow down at once after second crop. For white grubs dig out as soon as injury is noticed. Do not plant on land broken up from old meadow or pasture for at least three years after breaking.
CABBAGE AND TUR- NIP Flea-beetles, caterpillars, root maggots, aphids.	For flea-beetle or turnip sow after June 21st, or dust plants as soon as they appear above ground with Paris green, or spray with Bordeaux and a poison and a sticker. Repeat in two or three days. For caterpillars dust with Paris green until heads begin to form on cabbage and cauliflower, then spray with pyrethrum, 1 ounce to 2 gallons water. For root maggots use medium thick tarred felt-paper discs, putting on as soon as plants are set out, or set out plants after July 1st. For aphids use kerosene emulsion as soon as they appear.
POTATO Tip burn, early blight, late blight, scab, Col- orado beetle, flea- beetle.	Keep foliage covered with D from time plants are about 5 inches high. Take special precautions to see this is well done if weather is at all damp after about 15th July, as late blight begins about this time. Add a poison to each application when necessary. For scab, soak tubers before cutting 2 hours in formalin solution, 1 pint of formalin to 30 gallons of water. Spread out on grass to dry. Wash all boxes, bags or other vessels to be used in same liquid. Plant none but perfectly healthy tubers.

SPRAY CALENDAR.—Continued.

3rd Application.

REMARKS.

Just after fruit is formed. Use A2, with 2 lbs arsenate of lead. For worms when fruit is ripening, use hellebore. Look for aphids just before buds burst; if present spray with Black Leaf 40 or kerosene emulsion or whale-oil soap. Of little use to spray for these after leaves curl.

If anthracnose is very severe, set out new plantation of healthy shoots. If disease begins, cut out old canes and as soon as fruit is picked, also badly-attacked new ones, and burn. For red rust remove and burn plants at once. No other remedy. For crown gall set out plants in fresh soil, rejecting any plant with a gall on root or crown.

Plants and Pest.

REMARKS.

BEAN
Anthracnose and bacteriosis.

Get seeds from pods showing no signs of disease. Do not work among the plants if they are wet with rain or dew. Spraying scarcely pays, as a rule.

TOMATO
Leaf blight, black rot, flea-beetle.

Spray plants in seed-bed with D. Keep foliage in field covered with D until danger of staining fruit. Add poison if necessary for flea beetles.

ASPARAGUS
Rust, beetles.

For rust, let no plants, not even wild ones, mature during cutting season. Late in fall when growth is about over, cut and burn old plants. For beetle, let poultry run in the plantation. After cutting season is over spray with arsenate of lead; repeat in two weeks. May add sticker and a little lime.

NOTE—A1—Concentrated lime-sulphur, strength 1030 specific gravity (1035 for San Jose scale)—1030=commercial lime-sulphur diluted 1 to 8 or 9; 1035=1 gallon commercial to 7 gallons water.

A2—Concentrated lime-sulphur, strength 1009 specific gravity=commercial lime sulphur diluted 1 to 30-35.

A3—Concentrated lime-sulphur, strength 1008 specific gravity=commercial lime-sulphur diluted 1 to 33 or 40.

B —The old home-boiled lime-sulphur, 20.15.40 formula.

C —Self-boiled lime-sulphur.

D —Bordeaux mixture, 4.4.40 formula.

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FARM PRESS, LIMITED, 181 Simcoe St.,

TORONTO.

Formulae for Insecticides.

I.—POISONS (for biting insects only).

- 1.—ARSENATE OF LEAD—2 or 3 lbs. to 40 gallons liquid spray; $3\frac{1}{2}$ lbs. for potato beetles. Dry arsenate lead only half these strength.
- 2.—PARIS GREEN—(a) $\frac{1}{4}$ to $\frac{1}{2}$ lb. to 40 gals.; 1 lb. for potato beetles. If used with water alone add 1 to 2 lbs. fresh lime. (b) 1 lb. mixed with 50 lbs. land plaster, air-slaked lime or some similar substance, for dusting on plants. (c) Poisoned bran: mix 1 lb. Paris green with 20 lbs. bran, with $\frac{1}{2}$ gallon molasses, 2 gallons water and 2 or 8 lemons; run latter through meal pupler, add with molasses to the water and stir well, then pour on poisoned bran and mix thoroughly. Apply in evening for cut and army worms.
- 3.—ARSENATE OF LIME.—Boil 1 lb. white arsenate and 1 lb. sal. soda (crystals) with stirring for about 15 minutes in 1 gal. water till the arsenic is dissolved, then add 2 lbs. stone lime and let slake in boiling liquid. Add water to make up for what has evaporated. One quart of this when well stirred is sufficient for 40 gals. spray liquid. Arsenate of lime can be made in large quantities and stored. Label barrel "poison," and be careful to keep white arsenate itself labelled "poison." Keep barrel covered to prevent evaporation. Stir well before using.
N.B.—With Bordeaux 1, 2 or 3 may be used; with lime-sulphur 1; the others cause burning.
- 4.—WHITE HELLEBORE.—1 oz. to 1 gal. water, or dust undiluted over the plants. For root maggot dust close to plants, or pour around roots.

II.—CONTACT POISONS (chiefly for sucking insects).

1.—KEROSENE EMULSION—

Kerosene (coal oil)	2 gals.
Rain water	1 gal.
Soap	$\frac{1}{2}$ lb.

Dissolve the soap in water by slicing and boiling; take from fire, and while hot pour in kerosene and churn vigorously for five minutes. For use dilute with 9 parts water, so that the above 3 gals. of stock emulsion will make 30 gals. of spray mixture.

- 2.—WHALE-OIL SOAP.—For brown or black aphids, 1 lb. in 4 gals. For green aphids, thrip and leaf-hopper, 1 lb. in 6 gals.
- 3.—TOBACCO WATER.—Steep 1 lb. refuse tobacco in 1 gal of water for 1 hour, make up for water that evaporates.
- 4.—Black leaf 40, sold by Tobacco Product Co., Louisville, Kentucky.
- 5.—PYRETHRUM (or insect powder).

Pyrethrum Powder	1 oz.
Water	1 to 3 gals.

Dry mixture. Mix thoroughly 1 part by weight of pyrethrum with 4 of cheap flour, and keep in air-tight vessel for 24 hours before dusting over places.

Note.—Pyrethrum is useless if left exposed to the air.

6.—LIME-SULPHUR WASH—

(See under fungicides.)

Formulae for Insecticides.

I.—BORDEAUX MIXTURE—

Copper Sulphate (Bluestone).....	4 lbs.
Unslaked Lime.....	4 lbs.
Water.....	40 gals.

Dissolve the copper sulphate in a wooden or brass vessel with hot water, pour into a barrel and add cold water to make 20 gals.; slake the lime preferably with hot water; add cold water to make 20 gals.; stir both barrels well, and pour lime into the copper sulphate barrel. (Never mix concentrated milk of lime and copper sulphate solutions.)

A stock solution of each may be made and kept indefinitely if not mixed. Dissolve 40 lbs. copper sulphate in 40 gals. of water by suspending just below the surface of the water in a coarse sack. Each gallon of the liquid will now contain 1 lb. copper sulphate. Slake any desired quantity of lime and put into a box or barrel in shaded place, or sunk in the ground. Keep covered with small amount of water to exclude the air. Calculate how much is required for 4 lbs. lime if well stirred. To test Bordeaux mixture, let a drop of ferro-cyanide of potassium solution fall into a little of the mixture in a saucer, when ready. If this causes it to turn reddish brown, add more lime until no change takes place.

II.—LIME-SULPHUR WASH.

1.—HOME-BOILED (for use on dormant wood only.)

Fresh stone lime.....	20 lbs.
Sulphur (flour or flowers).....	15 lbs.
Water.....	40 gals.

Slake 20 lbs. of lime in about 15 gals. boiling water in a kettle or other boiling outfit. While slaking add the 15 lbs. sulphur made into paste by the addition of a little water. Boil vigorously, with stirring, for 1 hour. Dilute to 40 gals. with cold or hot water. Strain and apply at once.

HOMEMADE CONCENTRATED LIME-SULPHUR.—This may be used as a substitute for commercial lime-sulphur, but is only about two-thirds as strong as a rule.

Sulphur (a fine grade).....	100 lbs.
Fresh stone lime, high in percentage of calcium..	50 lbs.
Water.....	40 or 50 gals.

Put about 10 gals. of water in the boiling outfit, start fire, add sulphur, stir to make paste and break lumps, then add remaining water, and when near boiling put in lime. Stir frequently while slaking and till all the sulphur and lime are dissolved. Add water from time to time to keep up to 40 or 50 gal. mark. Boil 1 hour, then strain through a screen of 30 meshes to inch to storage barrels. Make enough at once for season's work. Cover well to keep out air, or pour oil of any kind over surface to depth of one-eighth inch for same purpose.

3.—SELF-BOILED (chiefly for use on peach foliage).

Freshstone lime.....	8 lbs.
Sulphur (flour or flowers).....	8 lbs.
Water.....	40 gals.

Best prepared in quantities of 24 lbs. at a time to get sufficient heat. Place 24 lbs. lime in a half barrel, add enough cold water to start it slaking well and to keep the sulphur off the bottom. Dust the 24 lbs. sulphur over the lime, having first worked the sulphur through a screen to break lumps, then add whatever further amount of water is necessary to complete the slaking. Stir well with a hoe to prevent the lime caking on the bottom. As soon as the slaking is over, add enough cold water to cool the whole mass and prevent further combination. Strain into spray tank. Keep well agitated while spraying.

III.—DISINFECTANTS (for pruning tools and for wounds on trees).—

- 1.—One pint formalin diluted to 2 gals. with water.
- 2.—Corrosive sublimate, 1 part to 1000 by weight = 1 tablet to 1 pint of water. Apply with a swab on end of a stick.

Caution.—Corrosive sublimate is a deadly poison to man or beast if taken internally. It will also corrode iron or metal, so use in a glass or wooden vessel and be sure to wash these out very thoroughly when through using them.

- 3.—Lime-sulphur about twice spring strength, or bluestone, 1 lb. dissolved in about 14 gals. water may be used to disinfect wounds or cankers, but is not satisfactory in case of pear blight.

STICKER

Resin.....	2 lbs.
Sal Soda (crystals).....	1 lb.
Water.....	1 gal.

Boil together till a clear brown color, which takes from 1 to 1½ hours. Cook in an iron kettle in an open place. Add the above to 40 gallons Bordeaux for use on smooth foliage like onions, cabbage or asparagus. If used with arsenate of lead, Paris green, or arsenate of lime, add 1 to 2 lbs. of fresh lime to every 40 gallons of spray.

Information on Dilution.

To determine how much to dilute for different applications use an hydrometer with specific gravity readings, and apply the following rule:

Put the hydrometer in the clear liquid when it is cold and the sediment has all been settled for a day or two. Note the number to which it sinks. Suppose this is 1:240. The strength for use before the buds burst should be 1:030 or stronger. To determine how much to dilute a strength of 1:240 to get 1:030, divide the three figures to the right in 1:240 by 30, that is 240 divided by 30=8. This means that each gallon of such a wash must be diluted to 8 gals. with water to give us a strength of 1:030, the proper spring strength. For the second application 1:000 is about the right strength. To get it divide the 240 by 9, which gives 2 2-3, or roughly speaking 27. This means that each gallon of a wash of the strength of 1:240 must be diluted to 26 2-3, or 27 gals. to make the right strength for the second application. For the third application and any later ones 1:008 is about the right strength, and to get this we proceed in the same way and divide 240 by 8=30, so that each gallon must be diluted to 30 with water for this application. If the strength of the concentrated were 1:212 or any other number, you would in the same way divide the three figures to the right by 30, 9 and 8 respectively to get the proper dilutions for each spraying.

Note.—Commercial lime-sulphur should be tested with the hydrometer and diluted according to the same rules as the home-made concentrated form.

How to Make Insecticides

Soap Washes

Dissolve one pound of whale oil soap in four gallons of warm water for black or brown Aphis, and one pound in six gallons for green Aphis.

Another remedy for Aphis is the following. Boil 8 pounds of quassia chips in 8 gallons of water for an hour, dissolve 7 pounds of whale-oil soap in hot water, strain the quassia decoction and mix with the soap solution then dilute to make 100 gallons. Spray forcibly while hot, this will kill the plant-lice and not injure the plants.

Formalin

40% solution of formaldehyde in water. 1 pint of commercial to 45 gals. of water. For fungus diseases.

Cook's Carbolic Soap Wash

Hard soap 1 pound, or soft soap 1 quart; crude carbolic acid 1 pint; water (boiling) 1 gallon.

Dissolve the soap in the boiling water, while still hot add the carbolic acid, emulsify thoroughly. This is the stock solution. For use, dilute with 30 to 50 times its bulk of water. Very effective against root-maggots of cabbage, radish and onion.

Hellebore

White hellebore (fresh) 1 ounce; water 2 gallons.

Pyrethrum, or Insect Powder

Pyrethrum powder (fresh) 1 ounce; water 3 gallons; of pyrethrum 1 ounce; flour (cheap) 5 ounces.

Mix thoroughly, allow to stand overnight in a closed tin box, then dust on plants through cheese cloth.

Kerosene Emulsion

The following is the formula recommended by Dr. Fletcher, Central Experimental Farm, Ottawa (Bulletin No. 52).

Kerosene (coal oil) 2 gallons; rain water 1 gallon; soap $\frac{1}{2}$ pound.

Boil the soap in water till all is dissolved, then, while boiling hot, turn it into the kerosene and turn the mixture constantly and forcibly with a syringe or force pump for five minutes, when it will be of a smooth, creamy nature. If the emulsion is perfect, it will adhere to the surface of glass without oiliness. As it cools it thickens into a jelly mass. This gives the stock emulsion which must be diluted with nine times its measure of warm water before using on vegetation. The above quantity of three gallons of emulsion will make 30 gallons of wash. Kerosene emulsion may also be made conveniently by using an equal amount of sour milk instead of soap and water in the above formula, and churning for the same time to get the stock emulsion.

Another method is to use lime, which will hold the kerosene in suspension, or the following, where lime cannot be obtained. (From Bulletin 171, O.A.C.)

The requisite amount of kerosene is placed in a dry vessel and flour added in the proportion of 8 ounces to one quart of kerosene. It is then thoroughly stirred and two gallons of water added for every quart of kerosene; the whole is then vigorously churned for from two to four minutes, and the emulsion is ready for use. It has been found that by scalding the flour before adding the kerosene, an excellent emulsion which does not separate in the least after standing for a week, can be prepared with 2 ounces of flour, by mixing the resulting paste with one quart of kerosene and emulsifying with two gallons of water.

Tobacco Wash (for destroying Aphis)—

Soak 4 pounds of tobacco waste in 9 gallons of hot water for four or five hours (in cold water for four or five days) dissolve one pound of whale-oil soap in one gallon of hot water; strain the decoction into the dissolved soap and apply with a spray pump as forcibly as possibly.

Calendar for Use of Soluble Sprays.

Soluble sprays as put up by commercial spray companies are becoming more popular every year. There is a good deal to be said in their favor, on the score of labor saving, facilities of handling, and for the inexperienced sprayer, the safeguarding against improper mixing and other mistakes of a like nature.

WHAT TO SPRAY FOR	WHEN TO SPRAY	WHAT TO SPRAY WITH
<p>Apple</p> <p>Scales, Cancer, Blister Mite, Aphis, Scab, Bud-moth, Codling Moth, Chewing insects.</p>	<p>1—Just before buds burst in Spring.</p> <p>2—Just before blossoms open.</p> <p>3—Immediately after blossoms fall. Don't wait until they are all off.</p> <p>4—Two weeks later.</p> <p>5—Nine weeks later.</p>	<p>1—Use Lime Sulphur, 1 to 9 or Soluble Sulphur at the rate of 12½ lbs. to 40 gals.</p> <p>2—Use Lime Sulphur at the rate of 1 lb. to 40 gals. of water, adding 2 lbs. of Arsenate of Lead to 40 gals.</p> <p>3—Same material at No. 2.</p> <p>4— Same material as No. 2.</p> <p>5— These are only necessary in some seasons. For these later sprayings use slightly less Soluble.</p>
<p>Pear</p> <p>Scales, Blister Mite, Aphis, Slug, Scab, Codling Moth, Chewing insects.</p>	<p>1—Just before buds burst in Spring.</p> <p>2—Just before blossoms open.</p> <p>3—Just after blossoms fall.</p> <p>4—Two weeks later.</p> <p>Always cut out Blight well below diseased area.</p>	<p>1—Use Lime Sulphur, 1 to 9 or Soluble Sulphur at the rate of 12½ lbs. to 40 gals.</p> <p>2—Use Lime Sulphur, 1 to 40, or Soluble Sulphur at the rate of 1 lb. to 40 gals. of water, adding 2 lbs. of Arsenate of Lead to 40 gals.</p> <p>3— Same at No. 2.</p> <p>4— Same as No. 2. For later sprayings use ¾ lb. Soluble.</p>



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CALENDAR FOR USE OF SOLUBLE SPRAYER.—Continued.

WHAT TO SPRAY FOR	WHEN TO SPRAY	WHAT TO SPRAY WITH
<p>Plum and Cherry Scales, Aphis, Brown Rot, Slug, Curculio, Leaf Blight, Shot Hole Fungus.</p>	<p>1—Just before buds burst in Spring.</p> <p>2—Just after fruit is set.</p> <p>3—Two weeks later. Always cut out Black Knot well below diseased area.</p>	<p>1—Use Lime Sulphur, 1 to 9 or Soluble Sulphur at the rate of 12 1-2 lbs. to 40 gals.</p> <p>2—Use Lime Sulphur, 1 to 40, or Soluble Sulphur at the rate of 1 lb. to 40 gals. of water, adding 2 lbs. of Arsenate of Lead to 40 gals.</p> <p>3—Same as No. 2.</p>
<p>Peach Scales, Aphis, Scab or Black Spot, Curculio, Shot Hole Borer, Curl, Yellows or Little Peach.</p>	<p>1—Before buds begin to swell in Spring.</p> <p>2—After fruit is set.</p> <p>3—One month later. Always remove and burn all trees affected with Yellows, Little Peach or Shot Hole Borer.</p>	<p>1—Use Lime Sulphur, 1 to 9 or Soluble Sulphur at the rate of 12½ lbs. to 40 gals.</p> <p>2—For Curculio use Arsenate of Lead, 2 lbs. to 40 gals.</p> <p>3—Use self-boiled Lime Sulphur, 8, 8, 40.</p>
<p>Grapes Black Rot, Mildew, Biting insects.</p>	<p>1—When 3rd leaf is appearing.</p> <p>2—Just before the blossoms open.</p> <p>3—Just after fruit sets. Spray whenever wet weather threatens, always before rain.</p>	<p>1—Use Lime Sulphur, 1 to 35, or Soluble Sulphur at the rate of 1 lb. to 40 gals. of water.</p> <p>2—Same as No. 1.</p> <p>3—Same as No. 1. Whenever biting insects appear, add Arsenate of Lead, 2 lbs. to 40 gals.</p>

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Injurious Insects.

Name.	Affected.. Plant	Affected. Part	Recommended. Treatment
Common Clover Weevil.....	Clover	Unripe seed	Cut early, rotate frequently, high fermentation in stack.
Bean-Seed Weevil.....	Bean and pea	Seed in granary	Clean seed, pickling seed with blue vitriol and dilute carbolic acid.
Granary Weevil.....	Corn in granary	Inside the grains	Frequent turning of grain, winnow out and destroy the light, affected grains.
Turnip Weevil.....	Turnip, swede cabbage	Galls on the roots	Clean cultivation, liming, gas liming.
Wireworms, Click-Bee- tles of various kinds....	Corn and all crops	Roots just below the surface	Short rotation of crops, plowing in August and cross, plowing in September.
Tooth-legged Flea- Beetle, Hop Flea.....	Turnip, swede	Leaves	Thick sowing, keep down cruciferous weeds.
Bean Weevil.....	Bean, clover	Leaves	Fumigate after harvested, 1 oz. carbon bisulphide for every 100 lbs.
Corn Root Aphis.....	Corn	Roots	Thorough plowing, short rotation of crops, deep and clean cultivating.
Turnip Flea Beetle....		Young Leaves	Sow late, dust with Paris green and land plaster 1 to 20, goodtilth.
Corn Saw-Fly.....	Corn	Stalks at ground	Destroy stubble by burning and also deep plowing.
Turnip Plant Louse....	Turnip, roots, etc.	Roots and crowns	Kerosene emulsion and strong soap suds. Cut out affected plants immediately
Carrot-Blossom Moth, and others.....	Carrot	Young seeds	Dusting hellebore on damp leaves, intersperse a portion of parsnips, which they prefer.

INJURIOUS INSECTS—(Continued.)

Name.	Plant Affected.	Part Affected.	Treatment Recommended.
Pea Weevil.....	Pea	Peas in pod	Harvest early; put in barrels and fumigate with carbon bisulphide. Rake up field and burn.
Otter Moth.....	Hop	Root	Examine roots and hand pick, keep down rubbish at sides of field.
Cabbage Butterfly.....	Cabbage	Leaves	One lb. pyrethrum powder with four lbs. cheap flour. Dust with mixture about twenty four hours after mixing.
Cabbage Fly	Cabbage	Leaf	One lb. Paris green with 20 lbs. lime. Appl. underside of leaf.
Mangold Fly.....	Mangold	Leaf	Good cultivation, liberal manuring, including salt and kainit, spray well.
Hessian Fly.....	Wheat, Barley	Inside leaf sheath	Late sowing in autumn, burning stubble, destroying screenings from threshing machine, deep plowing.
Wheat Midge, Red Maggot.....	Wheat	Ears	Burn stubble, deep plowing, destroy chaff and screenings.
Carrot Fly, "Rust"	Carrot	Root	Single as soon as plants can be handled, spray immediately after thinning out, fine soil.
Crane Fly, "Daddy Long Legs".....	Corn and grass	Root and underground stem	Drainage, autumn cultivation, stimulating manures
Black Slug.....	All crops	Leaves	Good cultivation and manuring, successive dressings of lime, salt, etc.
Red Spider.....	Fruit	Leaves	Spray leaves with strong wash, dress leaves with lime and soot in winter.

Potato Flea Beetle.....	Potato	Leaves	Spray with Bordeaux mixture with or without Paris green.
Tomato Worm.....	Tomato	Leaves	Dust with Paris Green and land plaster, one pound poison to twenty of plaster.
Colorado Potato Bug...	Potato	Leaves	Paris green or Arseate of lead with Bordeaux mixture. Spray early June.
Onion Maggot.....	Onion	Leaves	Treat rows with whitewash, made of lime and water, to form a crust over surface.
Squash Bug.....	Melon and Cucumber	Leaves	Treatment chiefly preventive; spray with Bordeaux mixture.
White Grubs.....	Fruit	Leaves	Spray trees with Paris Green. Appear every three years.
Grasshoppers.....	Vegetables of all kinds	Leaves	"Criddle mixture" sprayed on parts affected

Fertilizers and Vegetables.

Commercial forms of nitrogen, even though expensive, can often be used with profit by the vegetable grower. Nitrate of soda appears to be the most satisfactory form when used in the right way. On account of its soluble condition and the fact that plants can use it directly, it is particularly helpful in forcing the growth of early spring crops. However, it must be applied in proper amounts, at proper times, and by proper methods, or serious harm to the plants will almost certainly result.

Since the amount of phosphorus contained in most soils is small, and since manure is low in that element, applications of some commercial form usually prove profitable. For immediate results, acid phosphate and steamed bone meal are the best forms to use, but if the gardener will provide for his needs two or three years in advance, he can employ the very much cheaper raw rock phosphate. The phosphorus in this form is insoluble, but the large amounts of manure, crop refuse, and cover crops ordinarily plowed under in vegetable growing will be instrumental in changing it to soluble forms. There are even some experiments on record which indicate that certain vegetable crops give marked increases in yields the season immediately following its application.

Potassium is abundant in most Canadian soils, but applications of it sometimes prove profitable. Sulphate of potash appears to be the most satisfactory form for general use, though muriate of potash seems to give equally good results with some crops. Unleached wood ashes are a most satisfactory form of potassium, but unfortunately the supply is limited.

Lime benefits practically all vegetable crops and should be used in liberal amounts by gardeners. Ground limestone is the cheapest form and one of the most satisfactory as well.

Finally, the land should be well drained, either naturally or artificially, and an adequate system of crop rotation should be practiced.

The factors mentioned each bear an important relation to the welfare of the plant. It is only after all of them have received proper attention that maximum crops of high-quality vegetables can be produced.



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Weeds

Name.	Origin.	Time of Flowering.	Time of Seeding.
Burdock.....	Europe	July to September	August to October
Bindweed.....	Europe	June to September	August to October
Blue Weed.....	Europe	July to October	August to October
Canada Thistle.....	Europe	June to August	July to September
Couch-grass Twitch, Ox-eye.....	Europe	June to July	July to August
Chess.....	Europe	June	July
Corn Cockle.....	Europe	June and July	August
Campion, white	Europe	June to August	July and August
Campion, bladder.....	Europe	June to August	July to September
Dock.....	Europe	July to August	July and August
Dodder.....	Europe	June and July	August and September
Falseflax.....	Europe	June to August	July and August
Foxtail.....	Europe	July to September	August to October
Hawkweed.....	Native	July and August	August and September
Paint-brush			

WEEDS—(Continued.)

Identification.	Duration.	Place of Growth.	Method of Control or Destruction.
Erect branching, with large roots	Biennial	Everywhere	Cut off below the crown, and if in seed, burn the tops.
Running or climbing vine	Perennial	Grain field and gardens	Difficult to eradicate, constant cutting below the surface.
Erect, hairy	Biennial	Fields and waste place, sand and gravelly soil	Thorough cultivation is always sufficient. In fence-corners, etc., cut below the crown.
Erect, branching	Perennial	Everywhere	Frequent cultivation, cutting just when the blossom buds are on. Pasture sheep on them.
Creeping, from a jointed root stock	Perennial	Fields and gardens	Constant cultivation is about the only effective remedy.
A coarse grass	Annual	Fields and waste places	Hand pulling in grain, and avoid fall sown crops. Sometimes taken for degenerated wheat.
Erect, branching, flowers purple	Annual	Grain fields	Sow clean seed. Hand pulling in grain.
Erect, branching, hairy, flowers white or pink	Biennial	Grain fields and waste places	Sow clean seed. Hand pulling in grain. Cultivate stubble lands two or three times in the fall.
Erect, branching, flowers white	Perennial	Everywhere	Likely to become troublesome. Frequent cultivation of infested fields and hand-pulling.
Leaves, with strongly curled margins; flower, stem erect from a spindle shaped yellow root	Perennial	Everywhere	Cut off below the crown with hoe or cultivator.
Parasitic, climbing over other plants, and feeding on their sap	Annual	Mostly in fields and gardens	Sow clean grains and seed. Hand-pull it before it ripens seed. Likely to become very injurious.
Erect, branching, flowers small, yellow	Annual	Cultivated fields	Fall cultivation of stubble fields. Hand-pulling in grain.
An erect grass	Annual	Everywhere	Frequent fall cultivation. Plant hoe crops on infested land.
Erect, coarse herb	Perennial	Fields and meadows	Frequent fall cultivation in tillable lands. On meadows, broadcast one ton and a quarter of salt to the acre. A bad weed in Quebec.

WEEDS—(Continued.)

Name.	Origin.	Time of Flowering.	Time of Seeding.
Hound's Tongue	Europe	July and August	August and September
Mustard Charlock.	Europe	June to September	June to September
Oxeye Daisy	Europe	June to August	June to September
Purselane.	Europe	May to October	June to October
Pennycress.	Europe	June to September	June to September
Pigweed Red-root.	Tropical America	July to September	August to October
Plantain (Several species)	Europe	June to September	June to September
Ragweed.	Native	July to September	August to November
Wild Oat.	Native	July	July and August
Sow Thistle	Europe	June to August	July to September
Sorrel.	Europe	June to October	June to October
Wormseed Mustard.	Native	June and July	June to September
Cow Cockle.	Europe	July and August	July to September
Wild Lettuce.	Europe	June to September	July to October
Russian Thistle.	Russia	July to September	August to November
Shepherd's Purse	Europe	May to November	June to November
Lamb's Quarters.	Europe and America	June to October	July to November
Tumbling Mustard.	Europe	June to September	July to September
Ball Mustard.	Europe	June to August	July to September
Hare's Ear Mustard.	Europe	June to August	July to September.

WEEDS—(Continued.)

Identification.	Duration.	Place of Growth.	Method of Control or Destruction.
Erect, hairy, coarse herbs; flowers reddish-purple; seed, a round burr, flat on one side.	Biennial	Waste ground and pastures	A bad pest where sheep are kept. Cut below the crown.
Erect, branching flowers, showy, yellow	Annual	Everywhere	Hand-pulling and burning. Frequent cultivation of stubble fields after harvest. Never let a plant go to seed.
Erect, branched; flower white with yellow eye, large and showy.	Perennial	Pastures, hay fields and waste places	Mowing infested fields early in June is recommended. Ordinary cultivation will destroy it in tilled land.
Prostrate, creeping leaves and stem fleshy	Annual	Gardens mostly	Frequent cultivation in fields and eternal hoeing in gardens.
Erect, branched, towards the top	Annual	Grain fields	A bad weed in Manitoba and spreading in Ontario. Mowing the patches and burning the plants are the most effective remedies.
Erect, branched	Annual	Rich fields and gardens	Frequent fall cultivation, ploughing infested fields after harvest, before seed ripens.
Leaves prostrate; flower stem erect	Perennial	Everywhere	Burn or mow stubbles immediately after harvest. Keep hoe crops cultivated as late as possible.
Erect, branching	Annual	Everywhere	Keep cultivated as late as possible.
Erect aerial; the lawn is covered with brown hairs	Annual	Everywhere	On infested fields grow hoed crops or fallow.
Erect, stem leafy	Annual	Fields and waste places	Cultivate immediately after harvest, and follow with hoed crop.
Stem erect from running root stocks	Perennial	Everywhere, but chiefly in sour, poor soil	Application of lime to infested land and frequent cultivation will eradicate the weed.
Erect, branching, flowers yellow	Annual	Everywhere	Cultivation after harvest and follow with hoed crop. Hand-pull before seeds form in fence corners, etc.
Erect, bushy, flowers pale pink	Annual	Grain fields, etc.	Very bad in Manitoba and Northwest. Hoed crops, summer fallowing where very bad.

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LIVESTOCK

Feeds and Feeding.

A digest of the principles of breeding, feeding and caring for horses, cattle, sheep and swine, from the foremost authorities in Canada and elsewhere. Technical and scientific terms have been avoided where possible and explained when it has been necessary to make use of them.

Digestibility.

The ability of any animal to make proper use of the food supply is of great importance. Of two animals fed the same food, one will consistently digest more than the other. In young animals digestive power is as full as in the aged animal. Differences in the quantity of the daily ration of hay do not affect the proportion digested; an animal will not digest more after being starved. Labor does not increase materially the quantity of food digested. Difference in quality exercises a great influence, as also the addition of some other food.

The study of foods and feeding stuffs has shown that although they differ so much in texture and appearance they are in reality made up of a small number of chemical constituents, namely, protein, fat, carbohydrates, and ash, together with a larger or smaller amount of water. The latter can often be seen, as in the juice of fresh plants. In dry foods, such as hay, no water is visible. A small amount is, however, always present in minute particles in all plant tissues.

Protein is a name given to the total group of nitrogenous materials present. The group is made up mainly of the true proteids and albumens. The best-known examples of these substances are such materials as the gluten of wheat, lean meat, the white of an egg, etc. This group also includes other nitrogenous substances called amides, which are believed to

have a lower feeding value than have true proteids.

The group "fat" includes the true vegetable fats and oil, like the oil in flaxseed and corn, as well as vegetable wax and a few other materials which are extracted by ether or gasoline in the usual laboratory method of estimating fat. The name "ether extract" is often, and quite properly, applied to this group.

The group, "carbohydrates" includes starches, sugars, cellulose, and other bodies of a similar chemical structure.

The group, "mineral matter" includes salts present in the juices and tissues of feeding stuffs. These substances are principally sodium, potassium, lime, phosphorus and sulphur. The term "ash" is often, and very appropriately, used in speaking of this group, as the mineral matter represents the incombustible portion which remains when the feeding stuff is burned.

The functions of food are: (1) to supply material to build and repair the body, and (2) to yield energy. The chemical composition of a feeding stuff serves as a basis for judging of its value for building and repairing body tissue. Its value as a source of energy must, however, be learned in another way. The most in terms of heat, the caloric being used method of measuring method is taken as the unit. A caloric represents the amount of heat sufficient to raise the temperature of one kilogram of water one degree on the centigrade scale, or the temperature of one pound of water four degrees Fahrenheit.

The fuel value of a ration fed to any animal may be calculated from the composition of the food material supplied, on the assumption that 1

pound of protein equals 1,860 calories, 1 pound of fat 4,220 calories, and 1 pound of carbohydrates 1,860 calories.

Nutritive Ratio.

The relation existing between the nitrogenous and nitrogen-free nutrients in the ration is termed the nutritive, or nutrient ratio. In calculating this ratio it is necessary to arrive at a factor which will represent the total value of the fat and the carbohydrates. As will be seen by reference to the preceding values for the production of energy, fat has a value which is 2.25 times as great as an equal weight of carbohydrates. So that the nutritive ratio is actually the relationship existing between the protein in the ration and a factor obtained by multiplying the fat by 2.25 and adding to the carbohydrates. The nutritive ratio may be concisely stated as follows: Protein (fat x 2.25 plus carbohydrates.)

As has been stated, one of the chief functions of food was to supply material to build and repair the body. The different constituents of which feeding stuffs are composed differ in their ability to serve this purpose. All the organs and tissues of the body contain nitrogen. Protein is the only nutrient which supplies this element, and is therefore essential in building up and restoring body tissues. It is plain, therefore, that the demands of the animal for material with which to renew the tissues of the body and to provide for growth of the different parts, must be satisfied by the protein contained in the ration.

Heat and Energy.

The heat and energy which is required in the animal body may be supplied by any one of the three constituents—protein, fat or carbohydrates. If the cost of raising or procuring protein was about the same as it is for carbohydrates, it would be of little importance to do more than assure a sufficient supply of this

ingredient. If the ration contained decidedly more protein than was necessary, the feeder would not be incurring any loss, for this substance is able to supply all of the requirements of the body which may be supplied by carbohydrates or fats. But at the present time protein is very considerably dearer than carbohydrates. Foods rich in protein always command the highest prices. It is essential, therefore, to be as economical as possible in the use of this nutrient, and to limit the quantity as far as practicable. It thus becomes necessary to find what this limit is for the different species of animals, and for the different conditions under which they may be kept. Large numbers of feeding experiments have been made under varying conditions with this end in view. From the results, feeding standards have been worked out, which show the amount of digestible protein, fat, and carbohydrates supposed to be best adapted to different animals when kept for different purposes.

Since certain of the nutrients can replace one another, it often transpires that the physiological standard does not correspond with the standard for most economical production in a given locality. This applies more especially to the protein, which is the most expensive nutrient; but, as a matter of fact, it has often been found in practical experience, that production has been increased and cheapened by making the rations conform more nearly to those suggested by the physiological standard.

To Balance a Ration.

After reading the paragraph on "Nutritive Ratio," and with a definite understanding of the value of such take an inventory of the feeds at your disposal and then read the paragraph in this chapter on "Selection of Feeding Stuffs." Now say that you wish to balance a ration for a steer. In the table on feeding standards we find the total dry matter to be about 30 lbs., protein 2.5 lbs., carbohydrates 15.0 lbs., fat .5 lbs. Now turn to your feeding and computation table and

proceed down the first column and, finding the feeds there similar to those possessed by you, figure out your balanced ration, not forgetting that variety is one of the greatest appetizers and aids to digestion in the business.

Wolff's Standards.

The feeding standards prepared by Wolff, a German investigator in animal nutrition, have been the most widely used of any. These were based largely on the weight of the animal, although an attempt was made to make allowance for the age of the animal and for the kind of work performed. Of late, however, there has been quite a general belief that the standards should take more account of the amount or character of production. In the case of milch cows, for example, it is thought that the standard should be adapted to the amount of milk produced, making the

live weight a matter of secondary consideration. The most important use of protein in feeding cows is in the formation of milk. Hence a cow producing 20 quarts of milk per day will require considerably more protein to elaborate this milk than one giving only eight quarts; and as the milk production of cows bears no particular relation to the live weight, a hundred pounds in weight more or less need make very little difference in the ration. The use of rations varying in accordance with the milk production is comparatively simple, as it only requires that the weight of milk given by the different cows be known. Wolff's standards have recently been modified by Prof. F. Lehmann, as the result of additional experiments and practical experience, and also in the attempt to adapt them more closely to the practical needs of the animal.

Wolfe-Lehman Feeding Standards

Showing amounts of nutrients per 1,000 lbs. live weight for one day's feeding

Animal	Total Dry Matter	Digestible Nutrients			Fuel Value
		Protein	Carbo Hydrates	Fat	
	Pounds	Pounds	Pounds	Pounds	Pounds
Fattening Cattle—					
First period.....	30	2.5	15.0	0.5	34,650
Second period.....	30	3.	14.5	0.7	35,500
Third period.....	26	2.6	15.0	0.7	35,900
Milch Cows—					
Giving 11 pounds milk a day.....	25	1.6	10.0	0.3	22,850
Giving 16½ pounds milk a day.....	27	2.0	11.0	0.4	25,850
Giving 22 pounds milk a day.....	29	2.5	13.0	0.8	33,700
Giving 27½ pounds milk a day.....	32	3.3	13.0	0.8	33,700
Sheep—					
Coarse wool.....	20	1.2	10.5	0.2	22,600
Fine wool.....	23	1.5	12.0	0.3	26,400
Breeding Ewes with Lambs.....	25	2.9	15.0	0.5	35,400
Fattening Sheep—					
First period.....	30	3.0	15.0	0.5	35,600
Second Period.....	28	3.5	14.5	0.6	36,000
Horses—					
Light work.....	20	1.5	9.5	0.4	22,150
Medium work.....	24	2.0	11.0	0.6	26,700
Heavy work.....	26	2.5	13.3	0.8	32,750

WOLFE-LEHMAN FEEDING STANDARDS.—(Continued.)

Animal	Total Dry Matter	Digestible Nutriments			Fuel Value
		Protein	Carbo Hydrates	Fat	
	Pounds	Pounds	Pounds	Pounds	Pounds
Brood sows.....	22	2.5	15.5	0.4	35,170
Fattening swine—					
First period.....	36	4.5	25.0	0.7	57,800
Second period.....	32	4.0	24.0	0.5	54,200
Third period.....	25	2.7	18.0	0.4	40,200
Growing Cattle—					
Dairy Breeds—					
2 to 3 months old, weighing about 150 pounds.....	23	4.0	13.0	2.0	40,050
3 to 6 months' old, weighing about 300 pounds.....	24	3.0	12.8	1.0	33,600
6 to 12 months' old, weighing about 500 pounds.....	27	2.0	12.5	0.5	29,100
12 to 18 months' old, weighing about 700 pounds.....	26	1.8	12.5	0.4	28,300
18 to 24 months' old, weighing about 900 pounds.....	26	1.5	12.0	0.3	26,350
Beef Breeds—					
2 to 3 months' old, weighing about 160 pounds.....	23	4.2	13.0	2.0	40,450
3 to 6 months' old, weighing about 330 pounds.....	24	3.5	12.8	1.5	36,650
6 to 12 months' old, weighing about 550 pounds.....	25	2.5	13.2	0.7	32,150
12 to 18 months' old, weighing about 750 pounds.....	24	2.0	12.5	0.5	29,100
18 to 24 months' old, weighing about 950 pounds.....	24	1.8	12.0	0.4	27,350
Growing Sheep:					
Wool Breeds—					
4 to 6 months' old, weighing about 60 pounds.....	25	3.4	15.4	0.7	37,900
6 to 8 months' old, weighing about 75 pounds.....	25	2.8	13.8	0.6	33,400
8 to 11 months' old, weighing about 80 pounds.....	23	2.1	11.5	0.5	27,400
11 to 15 months' old, weighing about 90 pounds.....	22	1.8	11.2	0.4	25,850
15 to 20 months' old, weighing about 100 pounds.....	22	1.5	10.8	0.3	24,150
Mutton Breeds—					
4 to 6 months' old, weighing about 60 pounds.....	26	4.4	15.5	0.9	40,800
6 to 8 months' old, weighing about 80 pounds.....	26	3.5	15.0	0.7	37,350
8 to 11 months' old, weighing about 100 pounds.....	24	3.0	14.3	0.5	34,300
11 to 15 months' old, weighing about 120 pounds.....	23	2.2	12.6	0.5	29,650
15 to 20 months' old, weighing about 150 pounds.....	22	2.0	12.0	0.4	27,750
Growing swine:					
Breeding stock—					
2 to 3 months' old, weighing about					

50 pounds.....	44	7.6	28.0	1.0	70,450
3 to 5 months' old, weighing about 100 pounds.....	35	5.0	23.1	0.8	55,650
5 to 6 months' old, weighing about 120 pounds.....	32	3.7	21.3	0.4	48,190
6 to 8 months' old, weighing about 200 pounds.....	28	2.8	18.7	0.3	41,250
8 to 12 months' old, weighing about 250 pounds.....	25	2.1	15.3	0.2	33,200
Growing Fattening Swine—					
2 to 3 months' old, weighing about 50 lbs.....	44	7.6	28.0	1.0	70,450
3 to 5 months' old, weighing about 100 lbs.....	35	5.0	23.1	0.8	55,650
5 to 6 months' old, weighing about 150 lbs.....	33	4.3	22.3	0.6	52,000
6 to 8 months' old, weighing about 200 lbs.....	30	3.6	20.5	0.4	46,500
9 to 12 months' old, weighing about 275 lbs.....	26	3.0	18.3	0.3	40,900

QUANTITY AND QUALITY.

In addition to furnishing the requisite amount of nutrients, the food must have a certain bulk. The required bulk is secured by feeding a certain amount of coarse fodder, which aids digestion and helps to keep the animal satisfied and healthy.

The measure of the bulk or total solid matter is the weight of dry matter in the ration. The dry matter is the solid or water-free portion of the food. More latitude is allowable in this than in the case of any single nutrient.

FEEDING STANDARD VALUE.

It should be borne in mind that feeding standards are simply a concise and approximate statement of the amounts of the different nutrients required by animals, as indicated by the results of experiments and observation. They are not to be regarded as infallible or as absolute formulas which can be followed blindly without regard to the conditions. They are intended to apply to the average conditions. No single standard can be laid down for all conditions. Good judgment and intelligent observation on the part of the feeder are necessary in the application of feeding standards as the calculation of economical rations is not merely a matter of applied mathematics. The local conditions, as regards the feeding stuffs which can be grown and purchased economically, and the value of the products, will have much to do in determining how closely the

feeder can afford to adhere to the standard. But such standards or formulas, used in connection with the feeder's observation of his animals and the markets, are very useful, and have served a good purpose in improving the practice of feeding. It is in their abuse that the chief danger lies.

Ration and Yield.

In making allowance for the difference in milk yield in different cows, a uniform basal ration may be fed to all the cows, and the amount of the richer grain food varied to suit the demands. Such feeds as roughage and the less concentrated grain foods may be fed uniformly to all the animals. To the allowance of these feeds could be added a quantity of some such feed as gluten meal, linseed oilcake meal or cottonseed meal, the amount being varied to suit the milk yield of the cow.

FEEDING AND COMPUTATION TABLES

Average digestible nutrients in common American Feeding Stuff
Digestible nutrients in 100 lbs.

Name of Feed	Dry Matter in 100 lbs.	Protein	Carbo Hydrates	Ether Extract
ROUGHAGE				
Hay—				
Timothy.....	86.8	2.8	43.4	1.4
Orchard Grass.....	90.1	4.9	42.3	1.4
Red Top.....	91.1	4.8	46.9	1.0
Kentucky Blue Grass.....	78.8	4.8	37.3	2.0
Hungarian Grass.....	92.3	4.5	51.7	1.3
Mixed Grasses and Clover.....	87.1	6.16	42.71	1.46
Oat Hay.....	91.1	4.3	46.4	1.5
Barley.....	89.4	5.11	35.94	1.55
Red Clover, medium.....	84.7	6.8	35.8	1.7
Red Clover, mammoth.....	78.8	5.7	32.0	1.9
Alsike Clover.....	90.3	8.4	42.5	1.5
White Clover.....	90.3	11.5	42.2	1.5
Alfalfa.....	91.6	11.0	39.6	1.2
Straw—				
Wheat.....	90.4	0.4	36.3	0.4
Rye.....	92.9	0.6	40.6	0.4
Oat.....	90.8	1.2	38.6	0.8
Barley.....	85.8	0.7	41.2	0.6
Wheat Chaff.....	85.7	0.3	23.3	0.5
Oat Chaff.....	85.7	1.5	33.0	0.7
Green Fodders—				
Pasture Grasses (mixed)....	20.0	2.5	10.2	0.5
Kentucky Blue Grass.....	34.9	3.0	19.8	0.8
Timothy.....	38.4	1.2	19.1	0.6
Orchard Grass.....	27.0	1.5	11.4	0.5
Red Clover.....	29.2	2.9	14.8	0.7
Alsike.....	25.2	2.7	13.1	0.6
Alfalfa.....	28.2	3.9	12.7	0.5
Fodder Corn—				
Fodder corn, green.....	20.7	1.0	11.6	0.4
Fodder corn, field cured....	57.8	2.5	34.6	1.2
Corn stover, field cured....	59.5	1.7	32.4	0.7
Corn silage.....	20.9	0.9	11.3	0.7
Roots and Tubers—				
Potato.....	21.1	0.9	16.3	0.1
Beet, common.....	13.0	1.2	8.8	0.1
Beet, sugar.....	13.5	1.1	10.2	0.1
Beet, mangel.....	9.1	1.1	5.4	0.1
Flat turnip.....	9.5	1.0	7.2	0.2
Rutabaga.....	11.4	1.0	8.1	0.2
Carrot.....	11.4	0.8	7.8	0.2
Parsnip.....	11.7	1.6	11.2	0.2
Artichoke.....	20.0	2.0	16.8	0.2
Concentrates				
Corn.....	89.1	7.9	66.7	4.3
Gluten Meal.....	91.8	25.8	43.3	11.0
Hominy Chops.....	88.9	7.5	55.2	6.8
Wheat.....	89.5	10.2	69.2	1.7
Wheat Bran.....	88.1	12.3	39.2	2.7
Wheat Shorts.....	88.2	12.2	50.0	3.8
Wheat Middlings.....	87.9	12.8	53.0	3.4

Beef Feeding Rations.

Mix a few hours before feeding: Ensilage, 40 lbs.; cut straw, 4-5 lbs.; roots, 15 lbs.; long clover, 4 lbs.

The grains are fed as follows:

First and second weeks, none.

Third week, 1 lb. of bran.

4th week, 2 lbs. chiefly bran.

Fifth and sixth weeks, 3 lbs. consisting of bran 2 parts; oil cake and gluten meal, 1 part by weight.

Seventh, eighth and ninth weeks, 4 lbs. of mixture in equal parts.

Tenth, eleventh and twelfth weeks, 5 lbs. above mixture; bran, 1 part; oil cake or gluten meal, 2 parts.

Another method which is very successful: House cattle about middle of November; begin feeding immediately a mixture of 25 lbs. silage, 6 to 7 lbs. cut straw, 1½ lbs. chop. Mix in morning and add a little salt. Increase the meal ration gradually up to 8 or 9 lbs.

The preceding systems are for cattle finished for the winter and spring trade. Cattle to be finished on grass are fed in practically the same manner in so far as the rough food is concerned. The grain ration, however, seldom goes above 3 lbs. per day.

Buying Feeds.

As a rule never pay more than \$6.00 per ton for hay for feeding. Grains are a good buy at \$1.00. Gluten meal and oil cake are profitable.

Roots Versus Ensilage.

Corn is a surer crop and gives more feed per acre than any other crop grown. It requires little labor. Some feeders, however, prefer

feeding both, as cattle do not go wrong so easily. Roots have a peculiar cleansing effect upon the digestive system.

Roots tend to correct any slight derangement that has been caused by other foods. Roots are especially valuable for young stock, whereas ensilage should only be fed in very limited quantities to animals under one year of age.

Water.

Where an abundance of roots is fed very little water is needed. Six pecks of turnips contain about 80 lbs. of fluid. Water should be available at all times.

Sheep Breeding.

Select ewes with good, firm bone and short, strong pasterns, fair size of feet, legs straight and squarely set under. Heavy shearers most profitable; density of fibre and length of staple must be considered. Have flock uniform. Select ram of medium size; must possess good qualities of conformation and wool with strong masculinity, bold carriage and strong bone. He must be pure bred.

Fifteen ewes is the minimum on one hundred acres, and not beyond twenty-five. An increase through lambs can be expected of from 150% to 175%.

Buy ewes in Autumn just after lambs have been weaned. Two shear ewes are to be preferred, as you will know whether they are breeders or not.

Strongest lambs are sired by rams one year and over. Fifteen ewes are enough for one ram. If more are in the flock, the ram should not be allowed to run with them.

Feeds.

Ewes should have a run on stubble fields—not sown to clover, or old pastures under middle of September, and then given access to rape or clover field. If this is not available feed a small quantity of grain to make sure ewes are thriving well when breeding. This is the secret of large percentage of twin lambs.

Wintering Sheep.

Have flock in good flesh when winter sets in. Can be kept doing well on clover hay, a few roots—about 3 lbs. per head per day, and a liberal feed of pea straw. Feed one pound per head each day of mixed oats and bran, about four weeks before lambing. Double grain feed after lambing, and also the mangels and turnips to all that can eat. Roots are too bulky and cold to feed heavily before lambing and affect the unborn lamb. Turnips before lambing and mangels after. Never feed mangels to rams.

Increase in Feed.

Prof. G. E. Day, O. A. C., Guelph, showed in experiments that the quantity of feed consumed per 100 lbs. increase in hogs increases rapidly with the weight.

Increasing from 54 lbs. to 82 lbs.

pigs required 3.10 lbs. of meal per lb. gain. Increasing from 82 to 115 lbs. shotes required 3.75 lbs. of meal per lb. gain. Increasing from 115 to 148 lbs. hogs required 4.38 lbs. meal per lb. gain. Increasing from 148 lbs. to 170 lbs. hogs required 4.55 lbs. of meal per lb. gain.

DAILY GAIN AND KILLING PER CENT OF STEERS

CLASS	Age in Days	Average Daily Gain	Live Weight at Slaughter	Dressing Per Cent.
Short-horn, 1 year old.....	642	2.11	1355	66.13
2 year old.....	963	1.92	1842	67.48
3 year old.....	1321	1.7	2251	69.38
Hereford, 1 year old.....	663	1.97	13.8	65.08
2 year old.....	1020	1.78	1817	67.15
3 year old.....	1349	1.64	2218	69.18
Devon, 1 year old.....	634	1.75	1112	66.01
2 year old.....	1045	1.51	1583	67.73
3 year old.....	1311	1.37	1796	67.32
Aberdeen-Angus, 1 year old.....	668	2.04	1366	65.37
2 year old.....	1008	1.74	1765	66.67
3 year old.....	1346	1.50	2138	67.39
Sussex, 1 year old.....	677	2.15	1452	65.42
2 year old.....	989	1.86	1837	68.18
3 year old.....	1285	1.61	2064	67.98
Red Polled, 2 year old.....	1002	1.64	1631	65.73
3 year old.....	1362	1.49	2022	65.77
Galloway, 2 year old.....	1027	1.64	1688	64.45
3 year old.....	1344	1.47	1969	64.84

TABLE I. GRADING-UP A SCRUB HERD

Disappearance of unimproved blood by the continuous use of pure bred sires on succeeding generations.

Generations	Sires		Dams		Offspring	
	Per cent. purity	Per cent. purity	Per cent. purity	Per cent. purity	Per cent. unimproved blood	Per cent. unimproved blood
1.....	100	0	50 ($\frac{1}{2}$)	50 (1-3)		
2.....	100	50	75 ($\frac{3}{4}$)	25 ($\frac{1}{4}$)		
3.....	100	75	87.5 (7-8)	12.5 (1-8)		
4.....	100	87.5	93.75 (15-16)	6.25 (1-16)		
5.....	100	93.75	96.87 (31-32)	3.12 (1-32)		
6.....	100	96.87	98.44 (60-64)	1.5 (1-64)		



A true Cattalo bull, "Quinto-Porto." Two top crosses of Hereford and two of bison.



A hybrid. Sire, Buffalo bull; dam, Galloway cow.

Lakeview Stock Farm



Dutchland Colantha Sir Mona, No. 10074.

Above is an illustration of the senior herd sire at Lakeview Farm. His sire's dam's yearly records for both milk and butter have only been equalled by three cows in the world. And she is the only cow in the world that has ever held all world records in every division from one day to one year. Sir Mona is a brother to the World's Champion junior 2-year-old, 22,750 lbs. milk, 858.5 lbs. butter; and the World's Champion junior 3-year-old, 21,239 lbs. milk, and 946.71 lbs. butter; and the holder of the World's Champion 3-year-old milk record for one year, 22,645 lbs. His first daughters to freshen have just completed the following records at 2 years old:

Lakeview D.D. 2nd, 21.55; Lakeview Mona R., 18.16; Lakeview Dutchland Queen, 17.32; Lakeview Dutchland Almeda, 13.83; Lakeview Dutchland Artis, 13.00.

Dutchland Colantha Sir Mona
(10074—67776.)

Colantha Johanna Lad

Over 30 A.R.O. daughters, 8 with first calf average 19.11 lbs. of butter in 7 days.

Mona Pauline DeKol, butter 27.18 lbs. Dam of Mona Veeman, butter 30.73 lbs. Baroness Mona Pauline, butter 27.25 lbs.

King Canary Segis, No. 16847, is our junior sire, his sire King Segis Pontiac Howell, is a grand-son of King of the Pontiacs, and his dam, Pet Canary Countess 2nd, Canadian Champion 3-year-old 30-day butter cow, 110.23 lbs. King is being used on the daughters of Dutchland Colantha Sir Mona. The combined blood of these two wonderful sires is bound to be heard from in the near future. Choice stock of both sexes from the above sires for sale. Visitors always welcome.

E. F. OSLER, Prop., Bronte, Ont.

T. A. DAWSON, Mgr.

TABLE OF BREED CHARACTERS

BREED	Colors Found	Favorite Color	Hair	Horns	Size	Special Utility Value
SHORT-HORN	Red, white, red and white, roan	Roan	Fine and fairly short	Horns short, fine incurving, straighter in bulls	Will average largest of beef breeds	Crossing for size and quality
HEREFORD	Light to dark red, bald face, some white at withers	Middle red with white face	Fairly long and fine	Horns long and wide, nearly level	Large	Crossing for size and fattening, and grazing quality
ABERDEEN-ANGUS	Black, sometimes a reddish tinge, white on underline back of navel	Black with as little white as possible	Short and fine	Sharp poll	Very compact and weigh well but hardly as large as Short-horns	Smoothness, compactness, and thick fleshing
GALLOWAY	Black, with an occasional reddish or brownish tinge	Black, white a disqualification	Long and curly	Round poll	Hardly as large as three preceding breeds	For hardiness and value of skins
DEVON	Light and dark red	Bright red	Short and fine	Long and spreading	Not as large as Galloway	For draft purposes
POLLED DURHAM	Short-horn color	Roan	Short and fine	Round poll	Not as large as Short-horn	Polled character
RED POLLED	Light to dark red, and little white	Solid red	Fine	Sharp poll	Medium Size	Dual purpose
WEST HIGHLAND	Yellow, red, black, brindle, some white	Solid color	Long and shaggy	Long and outturning upwards	Small	For rough spare pasture land in cold climate
SUSSEX	Solid red	Dark	Thick	Large, long and level	Almost as large as Herefords	Range in temperature at climate

Selection of Feed Stuffs

In selecting feeding stuffs for his stock, the farmer will naturally be governed by the condition of the market. The cost of feeding stuffs is controlled by other factors than the actual amounts of food materials which they contain; indeed, there often appears to be very little connection between the two. Bearing in mind that the protein is the most expensive ingredient, and the one especially sought in concentrated feeds, the farmer can make his selection with the aid of the tables showing the digestive materials in 100 pounds. This will show him whether feed wheat at 70 cents a bushel is as cheap as corn at 60 cents, and how gluten feed at \$25 per ton will compare with linseed meal at \$30.

Stock Foods.

A considerable number of proprietary articles, sold under trade names, are found on the markets of this country. Judging from the extent to which they are advertised and sta-

tistics which have been collected from feeders, the employment of prepared or condimental feeds must be quite extensive. Extravagant claims are made for them as to their effect upon the general health of animals, and their feeding value, or their ability to increase the feeding value of other foods fed in conjunction with them. They frequently contain a considerable quantity of salt, some fenugreek, aromatic seeds, charcoal, Epsom salts, sulphur, cayenne pepper, gentian, ginger, etc.

Analysis of samples of these feeding stuffs collected from time to time show that none of them can be regarded as concentrated feeds in the common acceptance of the term. The basis of the best of them is linseed or flaxseed meal, or some cereal by-product. They are usually sold at exorbitant prices, ranging from 10 to 20 cents a pound. Neither the claims made for their valuable properties, nor the need of supplying tonics or medicines with the food, will justify the feeder in buying such materials.

Wheat Concentrates

The wheat berry has three distinct coats, composed of tough, thick-walled cells, which contain a large proportion of fibre (much of which is indigestible) and but little starch. Directly beneath the innermost seed coat is a layer of cells, very rich in meat-forming materials, called the aleurone layer; inside this is a soft, white part of the berry, largely filled with starch grains. These also contain meat-forming substances, known as gluten. Inside the inner starchy part of the berry is contained the germ which holds the embryo, or the seed-life of the wheat plant.

Now, as flour is being manufactured the wheat is run through a series of rollers, set at decreasing distances apart, so that the kernels are gradually broken into smaller and smaller pieces. The fine, floury part is separated after each breaking, and the tough outer coats are thus gradually freed from the adhering flour, and make up the bran.

Now, the millers' idea is to obtain all the starch cells and gluten possible from the berry and to clean out the germ and the bran, including the first layer, which would give an undesirable color to the flour, besides lowering its keeping qualities.

Bran is rich in mineral matter, containing 80 per cent. of the phosphates of the wheat berry, hence it is very valuable to feed to young, growing animals for the production of flesh and bone; being somewhat deficient in lime it should be supplemented with hay or legumes, such as clover, alfalfa and peas. It also has certain desirable laxative properties.

The wheat bran on our markets is of two kinds. The country mill kind, made under conditions where machinery is not perfect for the close separation of the starch cells from the seed coats. The other is the "flaky bran," produced in large city mills, where the machinery is up-to-date and close working. The country product is,



Champion fat steer, at Canadian National, 1915.



Champion grade dairy cow at Ottawa, 1914 and 1915. Sire, Lessnessock Oyama's Guarantee.

therefore, higher in starch and lower in protein and fibre than the flaky or roller bran. The value of each depends on the animals to be fed and the combination of feeds to be used in conjunction. Whilst the roller-bran supplies more protein than does country mill bran, its digestibility is likely to be somewhat lower on account of its larger fibre content. The difference is slight, so let the price be the determining factor. Wheat bran is often high priced in comparison with other desirable concentrates, and the fact that it is a common and valuable dairy feed does not make its use indispensable. Sometimes equally valuable concentrates can be purchased at lower cost. It is especially valuable to stock requiring much protein and mineral matter and are able to digest bulky rations. It is well fed with corn meal, buckwheat, middlings, etc.

Wheat Middlings.

Middlings vary in quality from standard middlings to "shorts," which may contain little flour. To a certain extent "middlings" and "shorts" are interchangeable terms, sometimes recognized as one and the same thing. Wheat middlings proper comprise the finer bran particles with considerable flour adhering to them. Shorts often (not rightly) consist of ground-over bran and the sweepings and dirt of the mills, sometimes with ground or unground weed seeds which had been previously separated from the wheat. Then there is the higher grade of middlings, sometimes termed white middlings, containing considerable low-grade flour and a little more crude protein and flour. Middlings have, then, greatest value for pigs of all ages, but should always be mixed with such feeds as corn or barley. They are also helpful to dairy cows. They (middlings and shorts) are both low in lime and should, therefore, be fed in conjunction with alfalfa or clover hay.

Returning again to bran it may be stated that great care must be exercised in feeding it to horses, as it sometimes seriously affects their bones, especially in the younger animals. This is partially due to the lack of lime in bran. Wood ashes, burned lime, rock phosphate ground, or legumes must always be fed in con-

junction. Best grades of bran are of light weight, with large, clean flakes and no foreign matter. Supplied to horses, twice weekly, in the form of a mash made with scalding water, it proves an excellent slight and beneficial laxative. As bran is very bulky, hard-working horses should be fed very limited quantities, as they have no time to digest bulky foods.

Take caution in purchasing, especially shorts, to see that there is no foreign matter in the products. Weeds are expensive buying, and the dirt of the mill floors is unhealthy. Besides, there is a great deal of seeding down to weeds, brought about by the purchase of unclean millfeeds. Owing to the looser method of grinding, the country mill is sometimes the chief offender.

FEEDING EWES IN WINTER.

In the winter feeding of pregnant ewes, an excellent ration is composed of clover hay, two to three pounds, and roots, two to three pounds per day. This is sufficient except when ewes are thin, in which case a meal mixture also should be fed at the rate of about a half pound per day. A good meal mixture consists of oats, two parts; bran, one part, and linseed oil cake or peas, one part. Ewes lambing in February, March or April should be well prepared with the use of the above ration.

The most economical use of roughages is the secret of successful sheep feeding. If good clover hay is absent, the cheaper roughages must be supplemented with grain. Pea straw, unthreshed, is an excellent substitute for clover hay; pea straw, threshed, must be supplemented with grain. Fine grass hay may require an addition of some grain in order to take the place of clover hay. It would be better to feed coarse grass-hays to some other class of stock.

Ensilage may take the place of roots to within a month of lambing, at which time ensilage should be stopped and roots gradually decreased until after lambing.

For feeding sheep the roots may be either mangels, turnips, or sugar beets, except in the case of rams, where turnips only should compose the root ration.

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For full information write to Charles S. Hotchkiss, Department of Agriculture, Edmonton, Alberta.

Hon. Duncan Marshall, Minister of Agriculture.

Commercial Concentrates: What They Are

Supplementary concentrates for the feeding of farm stock are becoming of more common usage every winter time. It is a question as to the average value of the factory bye-products. Are they economical to feed, and what are their distinctive values? Judiciously used, there is no doubt about their value for fattening and milk production, conditioning and finishing. We deal fairly broadly with the aspects of the different known mill products.

Molasses as a Feed.

Molasses is the non-crystallized residue obtained in the evaporation of the sweet juice of sugar cane and sugar beet. The sugar beet molasses contain 20 per cent. moisture, 9 per cent. protein, and 60 per cent. almost wholly sugar; 10 per cent. ash, consisting of potash and soda. It forms a thick, salty-sweetish liquid, very laxative, and thus it must be carefully used and is usually fed with three or four times its proportion of warm water and sprinkled on hay, cut

straw, and other roughage. In some cases it is also used in the manufacture of molasses feeds with absorbents, such as dried brewers' grains, malt sprouts, alfalfa meal, ground grain screenings, pea meal, wheat bran. Value of these feeds varies according to absorbent used. It may be fed to all classes of farm animals with the exception of pigs.

Cane Molasses.

Our black-strap molasses differs from the best variety mainly in its flesh-forming elements. It is sweeter of taste and is greatly relished. In the Southern States, horses are fleshed for market on it, and in Canada it is to a small extent used for the same purpose. One gallon makes a good carbohydrate feed for a horse, and a similar amount may be fed to steers as a maximum allowance. Cane molasses is especially valuable on account of its high sugar content and its palatability; it serves a useful purpose as an appetizer and for preparing animals for show or sale, as it



Hobsland's Masterpiece, champion Ayrshire bull at Canadian National and Ottawa, 1915.

gives them a thrifty appearance and a sleek, shiny coat.

Beet Pulp.

This stuff is obtained in large quantities as a bye-product at beet sugar factories. The carefully-cleaned beets are cut into V-shaped pieces and the sugar extracted. This is purified with lime and sulphur dioxide and evaporated. Molasses is obtained as the residue when the sugar crystals have been removed. The extracted beet pulp contains 80 per cent. to 90 per cent. of water, and about 1 per cent. to 2 per cent. sugar. It is, however, fairly high in carbohydrates and has about the same feeding value as beets and one-half that of corn silage. It cannot be shipped great distances on account of its high water content. It is an excellent feed for dairy cows, sheep and steers. One hundred pounds per 1,000 lbs. body weight is sufficient

Old and New Process Linseed.

Linseed or oil meal is a most valuable feed, properly used. It is of importance to remember that there are two kinds—"Old Process" and "New Process." By the former method of making, the cleaned and ground seeds are placed in large linen bags and subjected to heavy pressure until the residue forms cakes about 1 inch thick and about 13 by 32 inches. The cakes are broken into small pieces or ground into meal and sold as "old process" linseed oil or as oil meal.

In the new process, the flaxseed is ground and heated to about 160 degrees Fahrenheit and then placed in large percolators holding about 1,000 bushels or more. The seed is treated repeatedly with naphtha till nearly all the oil is dissolved. Live steam is then introduced into the percolators and the naphtha gradually driven out of the mass. The meal is transferred to steamheated driers, and when dried is elevated to the meal bins and sacked. The naphtha is evaporated from the oil solution and commercial linseed oil remains.

It stands to reason that the old process stuff has the greater value. It is preferred by stockmen because it forms a jelly when mixed with warm water, and because of its beneficial influence on the health and appearance of farm animals. Owing to its relatively high oil content, it is more laxa-

tive than new process meal, which contains only about 3 per cent. fat. "Old process" also produces a sleek coat and a thrifty appearance, enhances the appetite and makes a steer of excellent handling qualities. The nutritive effect of the two meals is nearly similar. The old meal has better value as a feed for show stock, and in combination with dry feeds. But with feeds of a laxative nature, such as green feeds, roots, and silage, or where large supplies of protein is important, as in the feeding of milch cows, the new process meal may be preferable.

To test whether meal is old or new process, pulverize a small quantity of the meal and place a level teaspoonful in a tumbler. Add ten teaspoonfuls of boiling water, stir and leave to settle. If the meal is new process, it will settle in about one hour and leave about one-half the water clear on top. If it is old process, the whole contents in the glass will remain jelly-like. Linseed meal can be fed safely to all classes of farm animals, and is one of the most desirable stock feeds available. It may be a little more expensive than certain bye-products, but it can be fed to greater advantage in small quantities on account of its medicinal qualities and its general beneficial effect on the appetite of the farm animal.

The qualities fed depend on the proportional cost of oil meal in comparison with other concentrates. If the market price of other concentrates is high and so permits of the feeding of large quantities of oil meal economically, the following amounts can be daily fed with safety: Fattening steers, 3 lbs.; horses, 1 lb.; sheep and hogs, fattening, 1 lb., increased toward finish; calves and lambs, up to one-half pound. For the production of high grade butter, not more than one pound should be fed, as the keeping and table qualities of the butter may be injured, especially if fed in conjunction with feeds with a softening tendency. Calves are better fed boiled flaxseed, especially until they are two to three months old, unless the seed is too dear. Oil meal has been fed advantageously to swine as a slop, a pailful being stirred into a barrel of skim milk and left over the night. This will form a thick, solid mass

which will be greatly relished by the swine. Fed to poultry in small quantities, a tablespoonful to each hen twice weekly, it will brighten the plumage and promote laying.

Cottonseed Meal.

This is the ground residue obtained in the manufacture of cotton seed oil, made as an old process linseed meal. It is readily eaten by cattle and sheep coarsely broken. There are here again two kinds—decorticated, made from seeds with the hulls removed before the oil is extracted; and the undecorticated, so called cold pressed cottonseed meal. This is obtained when the whole uncrushed seed is subjected to the cold pressure process for the extraction of the oil. The difference in composition is as follows: The decorticated is richer in ash, twice as valuable in protein, contains only one-quarter undigestible constituents, nearly as much nitrogen free extract, and 1 per cent. more fat than the undecorticated or cold-pressed cottonseed meal. The former is therefore much more valuable despite the fact that the latter sells for only a few dollars per ton less. Buy only the best varieties.

This meal is valuable when properly fed. In some sections of the States it is their cheapest source of protein. It is an excellent feed for milch cows and can be fed as high as 6 lbs. daily, although one to two pounds per head with other concentrates is about the right quantity. Too heavy feeding makes hard butter.

Fattening steers may receive similarly heavy feeds as milch cows, but only for a period not exceeding 90 days. Fed longer, it may cause fatal sickness. It cannot be safely fed to calves or pigs, on account of certain poisoning tendencies. In Canada, too heavy usage of this meal is not to be recommended.

Brewers' Grains.

These are the bye-products in the manufacture of beer. The barley is steeped in warm water until it sprouts. Starch is thus changed to sugar. When the malted barley contains a maximum amount of sugar, it is quickly dried. The tiny sprouts are separated and form the feed known as malt sprouts, whilst the remaining dried grains make the malt. This is treated with large quantities of water to extract sugar, ash, etc. The residue is



Sir Belle Fayne, senior and grand champion Holstein bull, Canadian National, 1915.

the wet brewers' grains, and on drying becomes dried brewers' grains.

The wet brewers' grains cannot be shipped long distances on account of the large water content, and are generally fed in the immediate vicinity of the brewery. They are rich in protein and are as valuable for feeding as the original grain. Their digestibility is, however, slightly lower; but fed, wet or dry, they are a valuable feed for farm animals, wet grains being especially good for milch cows, brood sows, and fattening swine; and dried grains for cattle and horses. If fed twenty to thirty pounds per day with rough-

age, wet brewers' grains make an excellent feed for dairy cows. They are worth one-fourth as much as dried grains. The latter will keep indefinitely, are high in protein and carbohydrates, and are as digestible as wheat bran. They are cheaper than oats and equally as valuable, especially for hard-worked horses. Malt sprouts are good, are generally dusty, and should be fed with silage and moistened thoroughly. Valuable as a dairy feed, 3 lbs. daily per cow; some cows do not like the bitter taste. It is a cheap source of protein.

Feeding the Horse

In Canada, horses are fed chiefly upon hay, grass and oats, with varying quantities of corn, fodder, roots, by's book on feeding animals, or corn, wheat, wheat bran, rye and barley. It is usual to find in any locality that the foods which are thought suitable for feeding to horses are limited in number, although these foods would exhibit a good deal of variety when the list for all localities was taken.

The customary diet of hay and oats, with the addition of greater or less quantities of such feeds as wheat bran or a small quantity of linseed oil cake meal and a few roots, may always be counted upon to give good results if fed with ordinary care and judgment. Frequently, on account of the nature of the feeds on hand or of the economy in purchasing, other feeds may be used advantageously and safely, if discretion be exercised in their selection. In choosing these foods we should remember the needs of the animal and the demands made upon its energies, hence nutritious foods should be fed during a period of hard work, and foods of a too bulky nature must be avoided if the horse is called upon to endure considerable strain within a short period of time, whether it be in drawing heavy loads or drawing a light load at a rapid pace.

A table giving the nutritive values of several of the commonest feeding

stuffs is included in this chapter; for a more complete treatise, the reader would do well to consult some such standard work of reference as Arms-Henry's "Feeds and Feeding."

Sudden changes of diet are always dangerous. When desirous of changing the food, do so very gradually. If a horse is accustomed to oats, a sudden change to a full meal of corn is apt to cause digestive derangement. If we merely intend to increase the quantity of the usual feed, this also must be done gradually. The quantity of food given must always be in proportion to the amount of labor to be performed. If a horse is to do a small amount of work, or rest entirely from work for a few days, see that he receives a proportionately smaller amount of feed. If this should be observed on Saturday night and Sunday, there would be fewer cases of "Monday morning sickness," such as colics and lymphangitis.

Musty or Moldy Foods.—Above all things, avoid feeding musty or moldy foods. These are frequent causes of disease of different kinds. Lung trouble, such as bronchitis and "heaves," often follows the use of such food. The digestive organs always suffer from musty or moldy foods. Musty hay is generally considered to produce disorder of the kidneys; and all know of the danger to pregnant animals from feeding upon ergotized grasses or grains.

Leaving these somewhat general

Pin Your Faith to the Clydesdale

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The best draft teams sold in Canada to-day, and the best draft teams seen at exhibitions are Clydesdales. Why? Because the Clydesdale is the only breed in Canada that has proved its quality in producing draft horses.

If you have a Clydesdale unrecorded that is eligible, have it recorded at once. It will add dollars to its value.

Application forms, giving full particulars, will be forwarded by the National Record Office, Ottawa, on application.

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Secretary, J. W. Wheaton, 181 Simcoe Street, Toronto.

considerations, brief reference may be made to the different kinds of foods:

Hay.—The best hay for horses is timothy. It should be well cured, crisp, clean, fresh, and possessing a sweet, pleasant aroma. Even this good hay, if kept for too great a length of time, loses part of its nourishment, and it becomes hard, dry and more or less indigestible. New hay is difficult to digest, and tends to produce much salivation (slobbering), and occasional purging and irritation of the skin. If obliged to feed at all, it should be given sparingly.

The average horse on grain should be allowed from 10 to 12 pounds of good hay a day. It is a mistake of many to think that horses at light work can be kept entirely on hay. Such horses soon become pot-bellied, fall off in flesh, and do not thrive. The same is true of colts; unless the latter are fed with some grain they grow up to be long, lean, gawky creatures, and never make as good horses as those accustomed to grain with, or in addition to, their hay.

Straw.—The straws are not extensively fed in this country, and when used at all, it should be in conjunction with a certain amount of hay, and the deficiency made up by a more generous ration of grain. Wheat, rye and oat straw are the ones most used, and of these oat straw is most easily digested and contains the most nourishment. Pea and bean straw are occasionally fed to horses, the pea being preferable, according to most writers.

Chaff.—Wheat and rye chaff should never be used as a food for horses. The beards frequently become lodged in the mouth or throat, and are productive of more or less serious trouble. In the stomach and intestines they often serve as the nucleus of soft concretions, which serve as obstructions in the digestive tract.

Oat chaff, if fed in small quantities and mixed with cut hay or corn fodder, is very much relished by horses.

Grains.—Oats take precedence of all grains as a food for horses, as the ingredients necessary for the complete nutrition of the body exist in them in the best proportions. Oats are, besides, more easily digested and a larger proportion absorbed and

converted into the various tissues of the body. Care must be taken in selecting oats. According to Stewart, the best oats are one year old, plump, short, hard, clean, bright and sweet. New oats are thought to be indigestible. Kiln-dried oats are to be avoided as a rule, for even though originally good, the drying process injures them by rendering them less digestible. Oats that have sprouted or fermented are injurious, and should not be fed. Oats are to be given either whole or crushed—whole in the majority of instances; crushed to old horses and those having defective teeth. Horses that bolt their feed are also best to be fed upon crushed oats and out of a manger large enough to permit of spreading the grain in a thin layer.

The average horse requires, in addition to the allowance of hay above mentioned, about 12 quarts of good oats daily. Moldy oats, like hay and straw, are likely to produce serious digestive disorders.

Wheat and Rye.—These grains may be used as food for horses in small quantities, bruised or crushed, and fed mixed with other grains and hay. If fed alone, in any considerable quantities, they are very likely to produce digestive disorders—laminitis (founder) and similar troubles. They should never constitute more than one-fourth of the grain allowance, and should always be ground or crushed.

Bran.—The bran of wheat is the one most used, and its value as a feeding stuff is variously estimated. It is not to be depended upon if given alone, but may be fed with other grains. It serves to keep the bowels open. Sour bran should not be given. It disorders the stomach and intestines, and may even produce serious results.

Maize (corn).—This grain is not suitable as an exclusive food for young horses, as it is deficient in salts. It is fed whole or ground. Corn on the cob is commonly used as the food for horses affected with "lampas." If the corn is old, and is to be fed in this manner, it should be soaked in pure, clean water for ten



Rosa Bonheur, senior and grand champion Holstein female, Canadian National, 1915.



Champion Record of Performance Jersey of Canada, Sunbeam of Edgeley, 18,744 lbs. milk, 926 lbs. fat in one year.

or twelve hours. Corn is better given ground and fed in quantities of from one to two quarts at a meal, mixed with crushed oats or wheat bran. Be very particular in giving corn to a horse that is not accustomed to its use. It must be commenced in small quantities and very gradually increased. I know of no grain more likely to produce what is called acute indigestion than corn, if these directions are not observed.

Linseed.—Ground linseed is occasionally fed with other foods to keep the bowels open and to improve the condition of the skin. It is of particular service during convalescence, when the bowels are sluggish in their action. Linseed tea is very often given in irritable or inflamed conditions of the digestive organs.

Potatoes.—These are fed as an article of food for the horse in many sections. They possess, in common with other roots, slight laxative properties.

Carrots.—These make a most excellent food, particularly during sickness. They improve the appetite and slightly increase the action of the bowels and kidneys. They possess also certain alterative properties. The coat becomes smooth and glossy when carrots are fed. Some veterinary writers claim that chronic cough is cured by giving carrots for some time. The roots may be considered, then, as an adjunct to the regular regimen, and if fed in small quantities, are highly beneficial.

Grasses.—Grass is the natural food for horses. It is composed of a great variety of plants, differing widely as to the amount of nourishment contained, some being almost entirely without value as foods and only eaten when there is nothing else obtainable, while others are positively injurious or even poisonous. None of the grasses are sufficient to keep the horse in condition for work. Horses thus fed are "soft," sweat easily, purge, and soon tire on the road or when at hard work. To growing stock, grass is indispensable, and there is little or no doubt but that it acts as an alterative when given to horses accustomed to hay and grain. It must be given to such horses in small quantities at first. The stomach and intestines undergo rest, and recuperate if the horse is turned to grass for a time each year. It is also certain that during febrile diseases grass acts almost as a medicine, lessening fever and favoring recovery. Wounds heal more rapidly than when the horse is on grain, and some chronic disorders (chronic cough, for instance) disappear entirely when at grass. In my experience, grass does more good when the horse crops it himself. This may be due to the sense of freedom he enjoys at pasture, to the rest to his feet and limbs, and for many other similar reasons. When cut for him it should be fed fresh, or when but slightly wilted.

PRACTICAL FARM BOOKS

Are you getting satisfactory returns from your land. We have books covering every branch of your business. You will find in them ideas and suggestions of great value on how to make and save money. Below are a few:

Farm Animals. By Hunt & Burkett. It covers the whole field of animal industry \$1.50

Management and Feeding of Sheep. By Thos. Shaw. The most complete work on sheep \$2.00

Breeding of Farm Animals. By H. W. Harper. Well adapted to the needs of the farmer or student \$1.50

Making Poultry Pay. By E. C. Powell. The practical side of poultry keeping, hatching, rearing, marketing, breeds, etc. \$1.00

Hog Feeding.

The following rations for hogs are not given as absolute, but will give an idea of a fairly well balanced ration of common feeds giving good practical results:

Growing Ration.

- Skim Milk.
- Corn Meal.
- Ground Oats.
- Wheat Middlings.
- Oil Meal.
- Salt.

Brood Sow Ration.

- Mixture.
- Ground Corn.
- Oats and Barley.
- 5 lbs. Skim Milk.

Regular Milking Hours.

Result of Dominion Department of Agriculture experiments resulted as follows:

	Average daily yield.	Average per cent. per cow per day.	Average weight of fat per cow daily.
Irregular	26.7	3.96	0.9937

Feed Ratios.

Stating relation which should exist between carbohydrate and proteins.

	Dry Matter.	Protein.	Carbohydrates.	Ratio.
Ox	17.5	.7	8.15	1 to 12
Horse	22.5	1.8	11.8	1 to 7
Milch Cow ...	24	2.5	12.9	1 to 54
Pigs	42	7.5	30	1 to 4

Feeds For Pigs.

Sow on milk, skim milk and wheat, middlings, barley, oats or corn.

Proteins feeds for pigs: Gluten meal, buckwheat, middlings, brewer's grains and peas.

Carbohydrate feeds: Oats, barley, wheat and corn.

Forage crops: Clover, alfalfa, rape, sorghum and rye.

Contagious Abortion.

Cost.

The Vermont Experiment Station has tested the use of Methylene Blue as a cure or preventive of contagious abortion.

"On June 13, 1913, about 8½ months from the beginning of the experiment 92 cows in all stages of pregnancy had been treated. Only one of these animals up to the month of June last has aborted, whilst 56 have calved at full time and 35 are yet to calve."

Methylene Blue can be bought at all drug stores.

Method.

Administer ⅓ to ½ oz. (10-15 grams) night and morning for seven days, beginning early in pregnancy and after a four weeks interval continue the treatment for another seven days and continue at four week intervals during the period of gestation.

The approximate cost is \$15.00 per pound. Each gram costs about three cents, making the daily dosage cost about 60c, and each week's treatment \$4.20 per cow. Material can easily be purchased of wholesale druggists.

Note.—Can either be fed in capsules or on the feed. It is a powerful antiseptic.

Thoroughly disinfect the stables with mercuric chloride or some other reliable germicide. Use mercuric chloride in proportions of 1 to 1,000 of water.

A 1 to 1,000 lysol solution kills the germ in from 3 to 5 minutes. A distinct blue will be noted in the urine from two to six hours after the dose. Small amounts color urine green. Best way to administer is by the use of capsule in balling gum. Better treat the whole herd or that part of the herd which is pregnant.

The Feeding Margin of Stockers

The Feeding Margin.

In feeding cattle, the difference between cost price per 100 lbs. and the selling price per 100 lbs. is known as the margin. A margin is therefore necessary to break even, or to make a profit because at current prices of feed, the cost to produce a pound of meat on a feeder exceeds the price of the meat on the markets in general. So, as a rule, one should feed only when the price of the combined finished product of the animal is sufficiently greater than the initial price, to pay the market price for food consumed, cost of feeding, and interest on capital invested.

An Example.

Speaking of the necessity of a margin: a steer may sell for 6 1-2c per lb. To produce one hundred pounds of meat would require about 700 lbs. of corn, forty pounds cottonseed or linseed meal, and four hundred pounds of alfalfa hay. With corn at 50c. per bushel, cotton seed meal at \$23, and alfalfa hay at \$16 per ton, this would cost about 10c. per lb. In order to break even on the proposition the operator will not feed unless he can get the feeders at enough less than 6 1-2c. per pound to put through the cost of fattening either upon the man who sells the feeder or back upon the producer.

Suppose this steer when finished weighs 1,360 lbs., and at the beginning of the feeding period 1,110 lbs. He therefore gained 250 lbs. at a cost of \$25. The steer sells for 1,350 times 6 1-2 cents, or \$87.75. To break even on the animal it must be bought for \$87.75, minus \$25 the cost of fattening, or for \$62.75. As the animal weighs 1,110 lbs. the cost price \$5.70 or 80c above buying price, is what is known as the margin. To make a profit a larger margin is necessary.

The Influence on Margin.

The marginal rate depends upon the cost of the feeds and their effectiveness in producing gains. If feeds are equally productive, the higher the cost, the greater the margin necessary; if equally costly the more effective the feed the narrower the margin.

The primary cost must also affect

the margin. The cost of gains remaining the same, the higher the initial cost of the feeder, the narrower the margin. For instance, a feeder weighing 1,000 lbs. at the beginning, and at the end of the fattening period 1,250 lbs. At 10c. per lb. the gain costs \$25. If the feeder cost \$4.50 per cwt. he should bring \$70 at a weight of 1,250 to break even, or \$5 per cwt. The margin necessary would be \$1.10 per cwt., or the difference between the buying and selling price, meaning that the value of every pound of your 4 1-2c. beef must be increased to 5.6c. in order to break even. Were the steer bought at \$5 per cwt., the operator would break even at a selling figure of \$6, or on a margin of \$1. If \$6 were paid, the operator would break even at \$6.30 or on a margin of 80c. This will explain why buyers more than break even by paying high prices for feeders, provided there is a good market for finished beeves.

Buying Weights and the Effects.

The buying weight also affects the margin. If the buying cost, the amount gained, and the cost of gain remain the same, the heavier the feeder, the narrower the necessary margin. This argues well in favor of the heavier feeder, but is counterbalanced, because the older and heavier an animal becomes, the more feed it takes to produce one pound of gain. A wider margin is necessary in winter than in summer, because the cost of producing gains is the greater in winter. Young cattle make more economical use of their ration than mature cattle. Hence they can feed on a narrower margin.

Good and Poor Feeders.

If the buying price of good and poor feeders were the same, the better quality of cattle would offer the wider margin. In recent years, however, good feeders have advanced more rapidly in price than choice steers; at times a better margin is offered for feeding steers of less quality, because the price of poor feeders may be comparatively lower than the difference in quality would warrant. Again, the necessary margin increases proportionately, as the length of the feeding period increases. As cattle increase in fatness, the cost of gain increases.

Men who feed cattle for a long period should be rewarded by a corresponding increase in the price received per 100 lbs.

The Feeding Period.

The period between the time the steer is put into the feed quarters and the time he is ready for market constitutes the feeding period. The short feed period lasts from sixty to ninety days. The long feed period averages one hundred and eight days or six months, sometimes more and sometimes less. Cattle are on full feed when they are taking grain and roughage to their full capacity. The period of feeding previous to the full ration is called the "warming up" period, and lasts from two to six weeks depending on whether the cattle have been accustomed to grain. Since this is a filling up process, cattle get on full feed somewhat more rapidly when fed on a ration made up largely of roughage and not much grain. Too much grain is injurious at the beginning.

A larger proportion of animals are short fed because the working margin is narrower and the markets do not show enough difference in price for the degree of finish put upon the cattle to warrant a longer period. Cheaper and larger daily gains can be made during the short period than during the long period, because, since the ration can be made heavier and the steer forced more rapidly he will not waste so much of the ration.

In Favor of Good Feeders.

The good feeder is the only one that should be permitted in the feed stall or lot, and if the making of prime beef is the end desired there is no exception to this rule. However, always work for profit and not for looks. In other words it is sometimes better and more profitable to fatten thin stockers up to the butcher's class than it is to endeavor to run select feeders up to the prime beef class.

In conclusion let me say, that every farmer who feeds cattle for the market should take some reliable paper, either daily or weekly, with a reliable market report and keep himself posted on the market. He should know what type of cattle he has, and in what class they belong, and also at what time of the year they are in greatest demand.

ALFALFA HAY FOR HOGS.

A trial in feeding hogs on alfalfa hay was carried on at the North Dakota Experimental Station by W. H. Peters, Animal Husbandman. The alfalfa hay was cut into half-inch lengths and was fed both dry and steamed. The hogs were also fed a grain ration of barley shorts and tankage. One lot was fed only the grain feed, while with other lots the grain ration was reduced and alfalfa supplied in its place, the aim being to make the alfalfa-fed hogs to the alfalfa was 50c per 100 pounds young pigs the saving in cost due to the alfalfa was 50c per 100 pounds gain on the dry alfalfa, and 40c when the alfalfa was steamed. With the fattening hogs, the saving was \$1.70 per 100 pounds gain for lot fed the dry alfalfa, and \$2.70 when steamed.

Brood sows were also fed alfalfa hay. When the alfalfa was fed the grain ration (barley and oats) could be reduced one-third to one-fourth, and the sows did well on it. No difference was noticeable between their litters and those from the sows fed all grain.

The growing pigs were fed one-fifth to one-sixth as much alfalfa as grain, this being the amount that they would readily eat and keep making as good gains as the all-grain lot.

Of the dry alfalfa the fattening hogs eat one-seventh as much as of grain ration, and of the steamed alfalfa one-sixth as much. The hogs did not eat as large a proportion of the alfalfa as was expected. It, however, reduced the cost of making the gains so that it was well worth while. The price put on the feeds was one cent. per pound for the grains, two cents for tankage, and the alfalfa \$10 per ton.

The observations of the trial indicate: First, that in order to get hogs started to eating alfalfa hay in winter it is necessary to limit the grain to such an extent that the hogs must eat hay or go hungry. Second, that, when handled in this way, they will very readily take to the hay and a limited amount of hay can be fed very satisfactorily, securing just as good results, just as good gains, and at less cost than where grain alone is fed. Third, that the greatest advantage to be gained in feeding hay in the winter is the saving of grain and lowering of the cost of feeding.

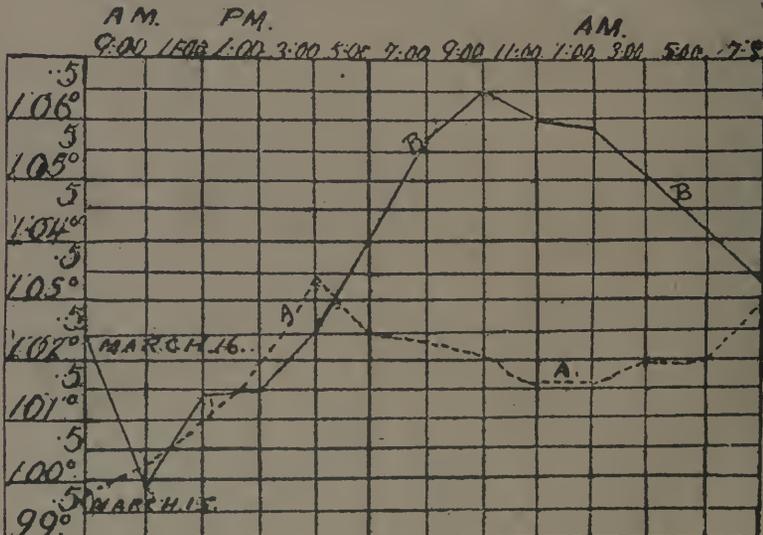
Score Card as Recommended by Prof. G. E. Day, of O.A.C.,
for Swine and Bacon Type.

Scale of Points.	Possible Score.		Points
A. General Appearance:	35		
points.			
Size, well developed for age..	5	shoulder and ham	6
Form, long, smooth, all parts proportionately developed so as to give the impression of a well-balanced, strongly-built animal. Top line, strong; under line, straight; belly trim and neat.....	10	Breast, good width and full..	3
Quality, hair, fine; skin, smooth, showing on tendency to wrinkle; bone, clean and strong but not coarse; flesh, firm and smooth, with no flabbiness at jowl, fore-flank, belly or ham	10	Fore Legs, set well apart, medium length and straight; pasterns, upright; bone, clean and strong; feet, medium size and strongly formed	4
Condition, well covered with firm flesh, especially along		D. Body: 30 points.	
Style, active and sprightly, back and loin, but not heavily loaded with fat.....	6	Back, medium width, rising slightly above the straight line, and forming a very slight arch from neck to root of tail	6
walking without a swaying movement, and standing well up on toes. Breeding animals should show strong character	4	Loin, wide as rest of back, strong and full, but not unduly arched	5
B. Head and Neck: 8 points.		Ribbs, good length and moderately arched	4
Snout, medium length and moderately fine	1	Side, fairly deep; long, smooth and straight between shoulder and ham; a straight-edge laid over shoulder point and ham should touch the side throughout	3
Face, broad between eyes; poll broad and full	1	Heart Girth, full, but not flabby at fore-flanks, flMed out even with side of shoulder; there should be no tucked-up appearance back of fore-legs, nor droop back of shoulder top	5
Eyes, good size, full and bright	1	Flank, full and low.....	2
Jowl, fair width and muscular, but very neat, showing no flabbiness	2	E. Hindquarters: 14 points.	
Ears, moderately thin, and fringed with fine hair.....	1	Rump, same width as back; long and slightly rounded from a point above hips to tail, and somewhat rounded from side to side over top..	4
Neck, medium length and muscular, but possessing no tendency to arch on top..	2	Ham, full without flabbiness; thigh, tapering towards hock without wrinkles or folds, and carrying flesh well down towards hock...	6
C. Forequarters: 13 points.		Hind Legs, medium length; hocks, set well apart, but not bowed outward; bone, clean and strong; pasterns, upright; feet, medium size and strongly formed.....	4
Shoulders, smooth, somewhat rounded from side to side over top, and very compact; no wider than back, and not running back on side so as to shorten distance between			
		Total	100

Score Card as Recommended by Prof. G. E. Day, of O.A.C., for Beef Cattle.

Scale of Points.	Possible Score		
A. General Appearance: points.	28	Eyes, large, prominent, clear and placid	2
Estimated weight.....lbs.		Face, short, with clean cut appearance	1
Weight, according to age....	4	Forehead, broad	1
Form, deep, broad, low set, smooth; top line and underline straight	8	Ears, medium size and fine texture	1
Flesh, naturally thick fleshed. See further under quality..	4	Neck, thick and short, with full neck vein; junction of neck with head clearly defined. In bull, crest well developed	5
Quality, bone strong, but of fine texture and clean; skin pliable and elastic; hair, soft and thick. All parts evenly covered with firm flesh, which should be mellow to the touch, but not soft and flabby nor yet in hard rolls or ridges.....	8	Horns (when present) fine in texture, flattened at base, not more than medium size	2
Style, active, and vigorous, but not restless; should show strong character	4	C. Forequarters: 11 points.	
B. Head and Neck: 12 points.		Shoulders, smooth, covered with flesh, well laid back into ribs, compact and moderately broad on top.....	5
Muzzle, broad and clearly defined; mouth large; nostrils large	2	Brisket, prominent and blunt; breast full and wide.....	3
		Dewlap, light	1
		Legs, straight and short; arm broad and well muscled; bone flat, clean and strong..	2

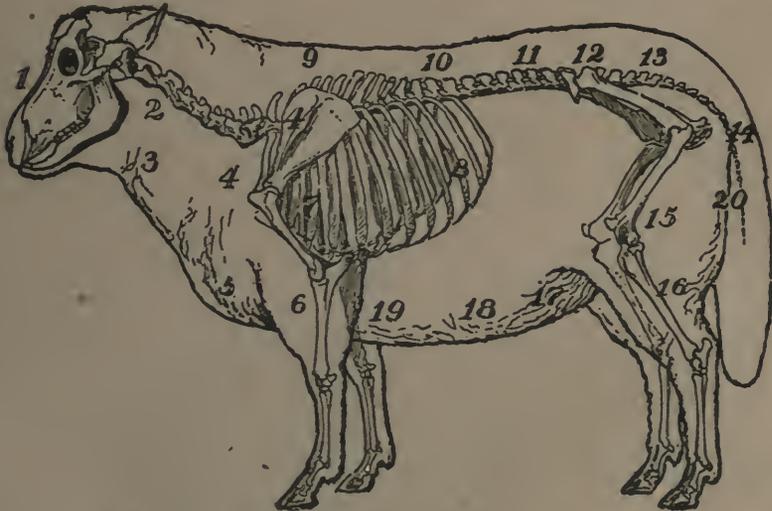
VARIATION IN TUBERCULIN TEMPERATURES.



D. Body: 29 points.		well covered, not prominent	4
Chest, deep and wide; fore Flank, full and even with shoulders well filled, leaving no depression; heart girth large	9	Sirloin and Rump, straight on top, long, wide, well filled between hook and pin-bones, smooth	5
Ribs, long, well arched; thickly fleshed	7	Pin-bones, wide apart, smooth, not patchy	2
Back, broad, straight, well fleshed and smooth	7	Tail Head, smooth; in line with back; tail fine, falling at right angles to top line.	1
Loin, deeply fleshed, coming out full to hocks and carrying width evenly from Hocks, wide, but smooth and flanks, full; space back of underline	3	Thighs, full, deep and wide..	3
E. Hindquarters: 20 points.		Twist, full and deep, nearly as low as flank	3
Hocks forward	5	Legs, straight and short; bone flat, clean and strong	2
		Total	100

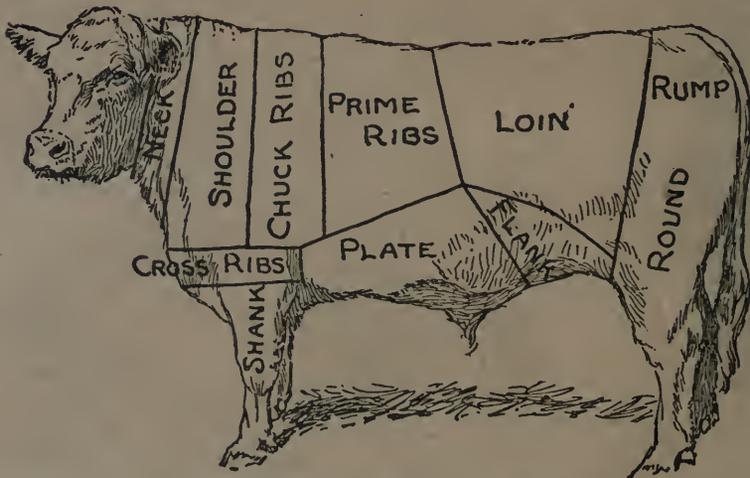
Score Card as Recommended by Prof. G. E. Day, of O.A.C. for Mutton Sheep.

Scale of Points.	Possible Score.	line straight	8
A General Appearance: points.	24	Quality, bone strong, but of fine texture and clean; hair soft and thick; skin fine; all parts evenly covered with firm flesh which should be mellow to the touch, but not soft and flabby, nor yet in hard rolls or ridges;	
Estimated weight .....lbs.; score according to age	4		
Form, deep, broad, low set, of proportionate length, and smooth; top line and under			



Parts of Sheep. 1, Head; 2, Neck, 3, Shoulder Vein; 4, Shoulder; 5, Brisket; 6, Foreleg; 7, Chest; 8, Ribs; 9, Top of Shoulders; 10, Back; 11, Loin; 12, Hip; 13, Rump; 14, Tail; 15, Hind Leg; 16, Flank; 17, Belly; 18, Fore Flank; 19, Fore Flank; 20, Twist.

- | | | | |
|--|---|---|---|
| light in offal | 3 | terns strong and upright;
arm broad and well mus-
cled | 2 |
| Style, spirited and attractive,
indicating vigor and breed-
ing | 4 | D. Middle: 26 points.
Chest, deep and wide; breast
full; brisket prominent and
blunt; space back of shoul-
ders well filled, leaving no
depression; heart girth
large | 9 |
| B. Head and Neck: 11 points. | | Back and Ribs, back broad
and straight, well fleshed
and smooth; ribs deep, well
arched, thickly fleshed.... | 9 |
| Muzzle, fine, lips thin, but
large mouth and nostrils.. | 1 | Loin, deeply fleshed, coming
out full to hips and carry-
ing width evenly from hips
forward | 6 |
| Eyes, prominent and bright.. | 1 | Flank, full and even with the
underline | 2 |
| Face, short, clean-cut appear-
ance | 2 | E. Hindquarters: 17 points. | |
| Forehead and Poll, wide be-
tween the eyes and also be-
tween the ears | 2 | Hips, wide, level, smooth.... | 3 |
| Ears, medium size, fine tex-
ture, erect | 1 | Rump, long, wide, level, well
filled from hips to tail
head, smooth | 4 |
| Neck, thick and short, taper-
ing nicely from shoulders
to head, with full neck
vein, and broad and full on
top in front of shoulders,
carrying head erect; throat
free from folds; in ram,
crest well developed..... | | Thighs, full, deep and wide,
both on inside and outside. | 4 |
| C. Forequarters: 6 points. | | Twist, full and deep, nearly
as low as flank..... | 4 |
| Shoulders, fitting smoothly
into ribs, evenly covered
with flesh, moderately
broad, but compact on
top | 4 | Legs, straight and short, set
well apart, strong, but with
clean, smooth shank; pas-
terns strong and upright.. | 2 |
| Legs, straight and short; set
well apart; strong but with
clean smooth shank; pas- | | | |



"Illustration of Beef Animal, indicating the various cuts of beef as they are known to the trade."

F. Fleece and Skin: 16 points.

(1) Wool:

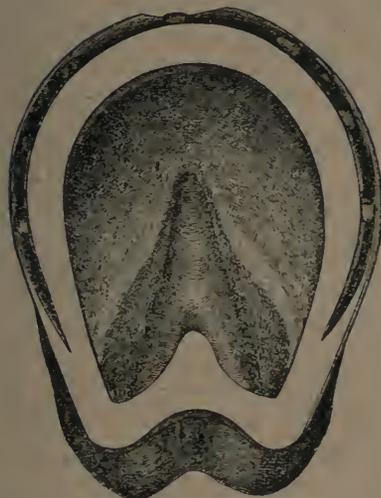
Quantity, long, dense, even	6
Quality, fine, pure, crimp, close, regular, even ..	5
Condition, bright, sound,	

clean, lustrous, good
secretion of yolk..... 4

(2) Skin:

A healthy, light cherry
color and free from
dark spots 2

Total 100



An acute angle left fore hoof shod with a bar toe. Note width and position of bar and nails placed well forward.



Toe weight to increase length of stride. The weight is properly placed, but the nails should go further forward.

English Milking Shorthorn.

The following table will convey a good idea of the excellent milk yield of the English Shorthorn cow or the dual purpose cow. All of these cows are of the Bates type and worth a good deal of money both from a beef and a producing point of view. As explained in the footnote, these records do not include the milk given the first two months after freshening. These records are certificated and were made in Great Britain.

Wild Cranford 4th....1902	12,126
Oxford Alma	10,976
Sweetbriar	10,873
Flora Foggathorpe ...	11,643
Cranford Beauty	12,113
Waterloo Cranford	
18th	8,783
Wild Queen 13th	12,006
Red Rose A	11,968
Furbelow Princess 3rd.	11,794
Wild Eyebright 9th...	11,693
Barrington Anna	8,765

Barrington Darling 2nd	1905	8,346
Darlington Cran 8th..	1905	11,905
Red Rose 11th	1905	8,832
Wild Queen 16th	1906	8,260
Waterloo Lily	1905	11,875
Darlington Cranford		
22nd	1905	12,905
Wild Belle	1905	9,926
Red Rose C.	1905	8,976
Barrington Duchess		
40th	1905	10,485
Waterloo Cranford		
14th	1905	7,975
Barrington Cranford		
12th	1905	10,567
Oxford Annette	1905	9,327
Red Rose 13th	1905	10,642
Oxford Cranford 7th..	1905	*5,216
Red Rose 14th	1906	8,576
Darlington Cranford		
23rd	1906	10,476
Fair Foggathorpe 3rd.	1906	8,866
Lady Carlisle 9th A...	1906	9,768
Lady Carlisle 10th...	1906	10,136
Barrington Rosebud ..	1907	7,794
Cran Foggathorpe 8th.	1907	7,434

Registration of Pure-Bred Live Stock

All pure-bred animals, in order that they may be recognized as such, must be recorded in some recognized Stud, Herd or Flock Book. In Canada, the records are kept under the supervision of the society or club formed for the advancing of the interests of each particular breed.

For purposes of economy and other reasons, all these Breed Associations—with the exception of the Holstein-

Friesian Association of Canada—united to form the Canadian National Live Stock Records, whose headquarters are at Ottawa. All applications for registration or transfer of pure-bred live stock should be addressed to The Accountant, Canadian National Records, Ottawa, Ont., or, in the case of Holstein-Friesian cattle, to the Secretary, W. A. Clemons, St. George, Ont.

Canadian Books of Record.

HORSES

Name of Breed	Book of Record	Name of Association.
Clydesdale	Clydesdale Stud Book of Canada	Clydesdale Horse Association of Canada.
Hackney	Canadian Hackney Stud Book	Canadian Hackney Horse Society.
Shire	Canadian Shire Horse Stud Book	Canadian Shire Horse Association.
Percheron	Canadian Percheron Stud Book	Canad. Percheron Horse Breeders' Association.
Thoroughbred	Canadian Thoroughbred Stud Book	Canadian Thoroughbred Horse Society.
Belgian Draft	Canadian Belgian Draft Stud Book	Canadian Belgian Draft Horse Breeders' Association.
French Canadian	French Canadian Horse Breeders' Stud Book	French Canadian Horse Breeders' Association of Canada.
Shetland, Welsh, New Forest, Polo and Riding, Exmoor and Hackney Ponies	Canadian Pony Stud Book	Canadian Pony Society.
French Coach	Canadian French Coach Stud Book	Canadian French Coach Horse Breeders' Association.
Suffolk Horse	Canadian Suffolk Horse Stud Book	Canadian Suffolk Horse Society.
Standard Bred	Canadian Standard Bred Stud Book	Canadian Standard Bred Horse Society.

CATTLE

Name of Breed	Book of Record	Name of Association.
Shorthorn	Dominion Shorthorn Herd Book	Dominion Shorthorn Breeders' Association.
Ayrshire	Canadian Ayrshire Herd Book	Canadian Ayrshire Breeders' Association.
Hereford	Canadian Hereford Herd Book.	Canadian Hereford Breeders' Association.
Jersey	Canadian Jersey Cattle Club Record	Canadian Jersey Cattle Club.

CANADIAN BOOKS OF RECORD

CATTLE—Continued.

Name of Breed	Book of Record	Name of Association
Galloway.....	North American Galloway Herd Book	North American Galloway Association.
Aberdeen Angus.....	Canadian Aberdeen Angus Association's Record	Canadian Aberdeen Angus Association.
Guernsey.....	Canadian Guernsey Herd Book	Canadian Guernsey Breeders' Association.
French Canadian.....	French Canadian Cattle Breeders' Herd Book	French Canadian Cattle Breeders' Association of Canada.
Red Polled.....	Canadian Red Polled Herd Book	Canadian Red Polled Association.
Holstein-Friesian.....	Holstein-Friesian Herd Book of Canada	Holstein-Friesian Association of Canada.

SWINE

Name of Breed	Book of Record	Name of Association
Yorkshire, Berkshire, Tamworth, Chester White, Poland China, Duroc Jersey, Hampshire, Essex.....	Dominion Swine Breeders' Record	Dominion Swine Breeders' Association.

SHEEP

Name of Breed	Book of Record	Name of Association
Shropshire, Leicester, Oxford Down, Cotswold, Lincoln, Dorset, Hampshire, Southdown, Suffolk Cheviot, Blackface	Canadian National Records	Dominion Sheep Breeders' Association.

Membership Fees

The annual membership fee to each Association is \$2.00, with the following exceptions: Canadian Hackney Horse Society, \$3.00; Dominion Sheep Breeders' Association, Canadian Jersey Cattle Club, North Ameri-

can Galloway Association, Canadian Guernsey Breeders' Association, French-Canadian Cattle Breeders' Association and the French-Canadian Horse Breeders' Association, \$1.00.

Transportation of Pure-Bred Animals

All animals recorded in the Canadian National Records are entitled to reduced freight rates over the Grand Trunk, Grand Trunk Pacific, Intercolonial, Canadian Pacific and Canadian Northern Railways when shipped for breeding purposes. These

rates do not apply when animals are shipped to Exhibitions, or for the purpose of contesting in races. Canadian freight classifications as to weights govern.

There is no reduction when animals are shipped by express.

Rules and Regulations Governing Eligibility of Animals for Registration

Horses

Clydesdale

Imported Animals.—Stallions and mares, recorded and bearing registration numbers in the Clydesdale Stud Book of Great Britain and Ireland, whose sires and dams, together with their sires and dams, are also recorded and bear registration numbers in said Stud Book, provided that the breeding of such sires and dams, if already recorded in the Clydesdale Stud Book of Canada as ancestors, comply with this rule.* (See Note.)

When recording animals imported in dam, certificate of service must be furnished from the breeder, signed by the owner of the sire at the time of service.

An imported animal is one which has been imported from Great Britain and Ireland. Applications for

registration of animals imported from Great Britain after April 1st, 1909, must be accompanied by a tabulated certificate in addition to the regular export certificate issued by the Clydesdale Society of Great Britain and Ireland, showing ancestors, numbered as stated above.

Canadian-Bred Animals.—(a) Stallions and mares by sires and out of dams recorded in the Clydesdale Stud Book of Canada.

(b) Clydesdale mares having four top crosses by sires recorded in the Clydesdale Stud Book of Canada. Application for registration of four-cross pedigrees shall be certified and sworn to, or affirmed by the breeder before an officer authorized to administer oaths.

Fees for Registration

For Imported Animals		For Canadian Bred Animals	
	To Members	To Non-Members	
Males, if recorded within 30 days after importation	\$ 3.00	\$ 4.00	Animals under 12 months of age..... \$1.00 \$2.00
Females, if recorded within 30 days after importation.....	2.00	3.00	Animals over 12 months of age..... 2.00 4.00
Males, if not recorded within 30 days after importation.....	25.00	50.00	Registration of transfers.. .50
Females, if not recorded within 30 days after importation.....	25.00	50.00	Duplicate certificates.... .50
			New certificates, replacing old ones from which shipping vouchers have been used..... .50
			Extended Tabulated Pedigrees..... .50 2.00

*Note.—The breeding of many horses recorded in the Scottish Book does not come up to this standard.

Hackney

The members of the Hackney Horse Society held a general meeting on the 2nd of August last at the Carls-Rite Hotel and decided that the rule of entry be amended to read as follows:

The pedigrees of the following animals may be admitted to registry—

- (1) Bred in Great Britain or Ireland.
 - (a) A stallion or mare recorded in the English Hackney Stud Book.
- (2) Bred in Canada.
 - (a) A stallion or mare by a sire and out of a dam recorded in the Canadian Hackney Stud Book,

with the exception of the produce of mares recorded in the Canadian Hackney Stud Book, as foundation stock, or the stallion produce of mares recorded in the Canadian Hackney Stud Book, as half registered.

(b) A mare by a sire recorded in the Canadian Hackney Stud Book, provided her dam is by a sire recorded in the Canadian Hackney Stud Book.

(c) A mare by a sire recorded in the Canadian Hackney Stud Book, provided her dam is a Thoroughbred mare recorded in the Canadian Thoroughbred Stud Book.

(d) The stallion produce of mares recorded under clause C

are not eligible to registration.

Owners of animals that can comply with the above conditions will be well advised if they send their application for registration to be published in volume three of the C.H.H.S.B. to either the secretary, H. M. Robinson, Toronto, or the National Live Stock Records Office, Ottawa.

Fees for Registration.

	To Members.	To Non-Members.
Each animal	\$2.00	\$4.00
Transfer of Ownership..	1.00	2.00
Duplicate certificates ..	1.00	2.00
New certificate	1.00	1.00
Recording ancestors ...	1.00	1.00

Shire.

Animals recorded in the English Shire Horse Stud Book, or in the American Shire Horse Stud Book, in which case all ancestors back to and including those imported from Great Britain, must be recorded. All animals, the sires and dams of which are recorded in the Canadian Shire Horse Stud Book.

Fees for Registration.

	To Members.	To Non-Members.
Animals under three years	\$1.00	\$2.00
Animals over three years	2.00	4.00
Transfer of ownership..	.50	.50
Duplicate certificate ..	.50	.50
New certificate .....	.50	.50
Tabulated Pedigree ...	2.00	2.00

Percheron.

Animals recorded in the Stud Book Percheron de France, or in the American Percheron Stud Book, if, on investigation their pedigrees are found to be correct and proper, and the progeny born in Canada of animals already registered in the Canadian Percheron Stud Book.

Fees for imported animals the same, but the rates are calculated on whether they are recorded before or after one year of date of importation.

Fees for Registration of Canadian or American Bred Animals.

	To Members.	To Non-Members.
Males, when recorded before Sept. 1st of the		

year following year of foaling	\$3.00	\$5.00
Females, when recorded before Sept. 1st of the year following year of foaling	1.00	2.00
Males, if recorded after Sept. 1st of year following year of foaling	4.00	6.00
Females, if recorded after Sept. 1st of year following year of foaling	2.00	4.00
Transfers .....	.50	.50
Duplicate certificates ..	.50	.50
New Certificates .....	.50	.50

Thoroughbred.

Animals recorded in the General Stud Book (Great Britain), American, French, Belgian or Australian

Stud Books, and the progeny born in Canada from sires and dams registered in the Canadian Thoroughbred Stud Book.



The two year old mare "Nancy Ryecroft." Sire, Ryecroft Model—grand champion Clydesdale female, Canadian National, 1915.



The Drummond Cup Winners, Guelph Winter Fair, 1915

Fees for Registration			Fees for Registration of Canadian Bred Animals		
	To Members	To Non-Members		To Members	To Non-Members
Each registration, if animal is Canadian bred and recorded in America.....	1.50	2.00	Each registration if animal is recorded in the year in which it is foaled.....	\$ 1.00	\$ 2.00
Trotting, register prior to May 1st, 1910.....	1.00	2.00	Each registration if animal is recorded after the 31st of December of the year of foaling.....	5.00	10.00
Transfers.....	.50	1.00	Transfer or Duplicate Certificate.....	1.00	2.00
Duplicate or New Certificate.....	.50	1.00	Animals foaled out of Canada—each registration.....	2.00	4.00

Belgian

Animals recorded in the Stud Book des Cheveaux de Traits Belges, or in the American Register of Belgian Draft Horses. Progeny born in Canada of sires and dams registered in the Canadian Belgian Draft Stud Book.

Fees for Registration

	To Members	To Non-Member
Stallions.....	\$ 3.00	\$ 4.00
Mares.....	1.00	2.00
Transfer or Duplicate Certificate.....	.50	.50

French-Canadian

Animals, the sires and dams of which are recorded in the Canadian National Records for French-Canadian Horses.

Fees for Registration:

To members	\$1.00
To non-members	3.00

Transfers:

To members .....	.25
To non-members .....	.50
Copy of Certificate of Registration:	
To members .....	.25
To non-members .....	.50
Annual Membership Fee....	1.00

Standard-Bred

Animals recorded as Standard Bred in the American Trotting Register (Chicago), or the produce of sires and dams recorded in the Canadian Standard Bred Stud Book:

Fees for Membership.

Life membership	\$25.00
Annual membership	2.00

Registration Fees.

Members, including certificate..	\$1.50
Non-members, including certificate	3.00

Transfers.

To members .....	.50
To non-members	\$1.00

Duplicate Certificates.

Members .....	.50
Non-members	\$1.00

RULES OF ENTRY.

The following animals may be admitted to Registry:—

Trotting Standard.

1. (1) An animal recorded as Standard in the American Trotting Register under the rules governing the Trotting Division.

(2) An animal whose sire and dam are recorded as Standard in the American Trotting Register under the rules governing the Trotting Division.

(3) An animal whose sire and dam are recorded in the Trotting Division

of the Canadian Standard Bred Stud Book.

(4) A mare sired by a registered Standard Trotting Horse providing her first, second and third dams are each sired by a registered Standard Trotting Horse.

Pacing Standard.

(1) An animal recorded as Standard in the American Trotting Register under the rules governing Pacing Division.

(2) An animal whose sire and dam are recorded as Standard in the American Trotting Register under the rules governing the Pacing Division.

(3) An animal whose sire and dam are recorded in the Pacing Division of the Canadian Standard Bred Stud Book.

(4) A mare sired by a registered Standard Pacing Horse providing her first, second and third dams are each sired by a registered Standard Pacing Horse.

(5) The progeny of a registered Standard Trotting Horse out of a registered Standard Pacing mare or the progeny of a registered Standard Pacing Horse out of a registered Standard Trotting mare.

3. Every application for registration must be made on a blank which will be furnished free for the purpose, and must state sex, color and markings, name, date of birth, name and registration number of the sire and of the dam. Applications must be signed by the breeder if the animal was foaled his property. If the dam was sold after being bred, the person owning her when the foal was born must sign the application, but transfer of the dam is necessary before owner's signature will be accepted, and in addition, the owner of the sire must certify to service on the transfer application.

Application for registration under rule 4 of either the Trotting or Pacing Division, must state (a) name and registration number of the sire; (b) names and registration numbers of the sires of the first, second and third dams; (c) the breeders of the first, second and third dams, and must be sworn to or affirmed before an officer authorized to administer oaths.

The owner of the sire of an animal offered for entry, must certify to service. Signature will not be accepted unless such ownership appears on the

books of the Canadian Standard Bred Horse Society. This signature is not required where the animal is already on record in another book.

When applying for registration of imported animals the foreign certificate of registration must be forwarded in addition to the usual applications. For registration of animals imported in dam certificates of service must be supplied certified by the owner of the service stallion.

When an animal is a twin it shall be so stated when applying for registration, and the sex given of the animal with which it is a twin. Should a twin be entered upon the record without such statement, no subsequent application for entry of animal twin with the same will be accepted.

4. The breeder of an animal is the owner of the dam at the time she was bred. The first owner is the owner of the dam at the time the colt was foaled.

6. In case of change of ownership of an animal the seller must make the transfer of ownership on the books of the Canadian Standard Bred Horse Society. The certificate of registration must be forwarded to the Record Office with an application for transfer made on the form supplied. Transfer will be endorsed on the back of the certificate. If the application is for a female, and she is in foal, the owner of the service stallion or his authorized agent must certify to service.

When the pedigree of an animal may have been admitted or ownership transferred through misrepresentation or fraud, the Board of Directors shall, on the discovery of the same, declare the entry or transfer void, together with any entries or transfers of descendants of such animal, and subsequent application for entry or transfer dependent on the signature of any person implicated in such fraud shall be refused.

In making application for registration of animals, it is understood that the pedigree is to be accepted only on condition that the given particulars are correct, and that if it should be ascertained previous to the publication of the succeeding volume, that these particulars are in any way incorrect, the Canadian Standard Bred Horse Society may, at its discretion, omit the pedigree or publish it in an

altered form. It is further understood that should the pedigree be published in the Canadian Standard Bred Stud Book prior to the discovery of an error, the Society may cancel the entry and publish the correction in such form as the Executive Committee may determine. It is further understood that the Canadian Standard Bred Horse Society will not be held responsible for any loss or damage that may be sustained through inaccuracy, omission, alteration or cancellation of an entry.

9. Duplicate names must be avoided. To this end the right is reserved to change any name when necessary, preserving, however, as far as practicable some characteristic of the name given in the application. The word "Young" shall not be used in connection with a name unless the pedigree has been previously so recorded in another book.

10. No duplicate certificate will be issued unless a Statutory Declaration is furnished setting forth reason why such certificate is required.

French Coach

1. (a) Animals imported from France and recorded in the Stud Book Français Registre des Chevaux de Demi-Sang.

(b) Animals recorded in the French Coach Horse Stud Book of America or in the French Coach Horse Register, if upon investigation the pedigree is found to be correct and proper.

(c) Animals the sires and dams of which are recorded in the Canadian French Coach Horse Stud Book.

(d) The ancestry of all animals previously recorded in the French Coach Horse Stud Book of America or in the French Coach Horse Register must be recorded back to and including ancestors imported from France.

(e) Applications for recording pedigrees of imported animals must state date of importation, name of vessel and port of entry.

Fees for Registration

For animals recorded before

September 1st of the year following the year of foaling:		
Stallions.....	\$ 3.00	\$ 5.00
Mares.....	1.00	2.00
If recorded after September of the year following year of foaling:		
Stallions.....	4.00	6.00
Mares.....	2.00	4.00
For animals imported from France, if recorded within a year of the date of importation:		
Stallions.....	3.00	5.00
Mares.....	1.00	2.00
If recorded more than a year after date of importation:		
Stallions.....	4.00	6.00
Mares.....	2.00	4.00
Transfers.....	.50	.50
Duplicate Certificates....	.50	.50
New Certificates replacing Certificates of which shipping vouchers have been used.....	.50	.50
Life Membership.....	20.00	20.00
Annual Membership.....	2.00	2.00



Fistulous ears. With-



Shoe Boil.



Capped hock on right, bone spavin on left.



Calf knee at left and a "buck" at right.

Suffolk

(a) Stallions or mares recorded in the English Suffolk Stud Book.

(b) Stallions or mares recorded in the American Suffolk Horse Stud Book, in which case all ancestors back to and including ancestors imported from Great Britain, must also be recorded.

(c) Animals the sires and dams of which are recorded in the Canadian Suffolk Horse Stud Book.

Fees for Registration for Canadian Bred Horses

Animals if recorded before

December 31st of the year of foaling.....	\$ 1.00	\$ 2.00
Animals if recorded after December 31st of the year of foaling.....	2.00	4.00
Transfers.....	.50	.50
Duplicate Certificates....	.50	.50
New certificates replacing old ones of which shipping vouchers have been used.....	.50	.50
Tabulated Pedigrees.....	2.00	2.00
Fees for Registration for Imported Horses		

	To Members	To Non-Members
Males.....	\$ 3.00	4.00
Females.....	2 00	3.00

Ponies

Shetland Ponies

(a) Animals imported from Great Britain and recorded in the Shetland Stud Book of Scotland, or in the Shetland Islands Pony Stud Book.

(b) Animals, whose sires and dams are recorded in the Shetland Section of the Canadian Pony Stud Book.

(c) Animals recorded in the American Shetland Pony Club Stud Book.

(d) Animals imported from Great Britain prior to January 1st, 1909, not recorded in the Shetland Stud Book of Scotland, or in the Shetland Islands Pony Stud Book, will, on passing inspection, be recorded as foundation stock.

(e) Animals descended from known ancestors, not recorded in the Shetland Stud Book of Scotland or in the Shetland Islands Pony Stud Book, imported prior to January 1st, 1909, will, on passing inspection, be recorded as foundation stock.

Welsh Ponies

(a) Animals imported from Great Britain and recorded in the Welsh Pony and Cob Society Stud Book.

(b) Animals the sires and dams of which are recorded in the Welsh Section of the Canadian Pony Stud Book.

(c) Animals recorded in the Am-

erican Welsh Pony and Cob Stud Book.

(d) Animals imported from Great Britain prior to January 1st, 1909, not recorded in the Welsh Pony and Cob Stud Book, will on passing inspection, be recorded as foundation stock.

(e) Animals descended from known ancestors not recorded in the Welsh Pony and Cob Stud Book, imported from Great Britain prior to January 1st, 1909, will, on passing inspection, be recorded as foundation stock.

New Forest Ponies.

(a) Animals imported from Great Britain, bred by reputable breeders—a certificate to this effect must be provided by the Secretary of the English "Society for the Improvement of the Breed of New Forest Ponies."

(b) Animals the sires and dams of which are recorded in the New Forest Section of the Canadian Pony Stud Book.

Polo and Riding Ponies

(a) Animals imported from Great Britain and recorded in the Polo and Riding Pony Society's Stud Book.

(b) Animals, the sires and dams of which are recorded in the Polo and Riding Section of the Canadian Pony Stud Book.

Exmoor Ponies

(a) Animals imported from Great Britain, bred by reputable breeders.

A certificate of breeding signed by the breeder must accompany the application for entry. Name of vessel on which imported, and port of entry, must be given.

(b) Animals, the sires and dams of which are recorded in the Exmoor Section of the Canadian Pony Stud Book.

Hackney Ponies (Standard 14.1)

Bred in Canada.

(a) Stallions with three top crosses of sires recorded in either the Canadian Pony Stud Book or the Canadian Hackney Stud Book.

(b) Mares with two top crosses of sires recorded in either the Canadian Pony Stud Book or the Canadian Hackney Stud Book.

(c) Pony stallions or mares recorded in the Canadian or American Hackney Stud Book.

(d) Stallions or mares by sires and out of dams recorded in the Canadian Pony Stud Book.

Bred in Great Britain.

2. Bred in Great Britain or Ireland and recorded in the English Hackney Stud Book.

(a) Stallions with three top crosses of *full registered sires and with two registered dams.

(b) Mares with two top crosses of *full registered sires and with one registered dam.

(c) Mares with one top cross of *full registered sires with a registered inspected dam.

*Full registered sires are those (a) that are recorded as such in any of the first sixteen volumes of the English Hackney Stud Book, or (b) those recorded since volume 16, providing they were eligible to full registration under the rules in force for entries in volume 16 of the English Hackney Stud Book.

Fees for Registration

	To	To Non-
	Members	Members
Pedigrees of animals, under two years of age.....	\$ 1.00	\$ 2.00
Pedigrees of animals over two years of age.....	2.00	4.00
Transfers and Duplicate Certificates.....	.50	.50

Cattle

Shorthorn

Animals that trace in all their crosses to imported animals registered in the Ayrshire Cattle Herd Book Society of Great Britain and Ireland. Registrations in the Ayrshire Cattle Herd Book Society of Great Britain and Ireland of stock imported previous to 1899 will not be required; those imported in, or after 1899 must trace to ancestry distinctly designated; but, owing to the difficulty in keeping proper records prior to that date, it will be sufficient to know that the ancestry has been imported. Before the pedigrees of the Canadian-bred animals are eligible for registration in the Canadian Ayrshire Herd Book, their sires and dams back to and including the imported

animals must be recorded.

Fees for Registration

	To	To Non-
	Members	Members
Animals under 24 months old.....	\$ 1.00	\$ 1.50
Animals over 24 months old.....	2.00	3.00
Transfers.....	.25	.25
Duplicate Certificates....	.25	.25
Transfer and Duplicate (combined).....	.50	.50
New certificates replacing Certificate of which shipping vouchers have been used.....	.25	.25

Ayrshire

1. (a) Animals that trace in all their crosses to ancestors registered or eligible for registration in the 40th or preceding volumes of the

English Shorthorn Herd Book. Provided that in the case of animals imported since 1865, registration in the English Herd Book will be required. Those imported prior to 1865 must trace to ancestry distinctly designated. (b) Animals the sires and dams of which are recorded in the Dominion Shorthorn Herd Book. (c) Animals the sires and dams of which are recorded in the American Shorthorn Herd Book, providing such sires and dams trace in all their crosses as indicated in clause (a) of this section. All ancestors back to and including the imported ones must be recorded in the Dominion Shorthorn Herd Book, for which a fee of 50 cents each is charged.

Fees for Registration

	To Members	To Non-Members
Females under two years of age.....	\$ 1.00	\$ 2.00
Females over two years of age.....	2.00	4.00
Males under two years of age.....	2.00	4.00
Males over two years of age.....	4.00	8.00
Transfers, if made within 90 days of date of sale..	.50	1.00
Transfers, if made after 90 days of date of sale.....	1.00	2.00
Duplicate Certificates.....	.25	.50
Old form Certificates exchanged for National Certificates.....	.25	.25
Special extended Certificates.....	.75	1.00
For recording pedigrees of imported cattle.....	1.00	2.00
For recording pedigrees of cattle entered in American Ayrshire Herd Book	1.00	2.00
For recording pedigrees of ancestors to complete pedigrees of animals owned by applicant.....	1.00	1.00
For recording pedigrees of ancestors to complete pedigrees of animals not owned by applicant.....	.25	.25
Registration of Farm Names.....	1.00	1.00

This registration gives exclusive use of name registered.

Hereford

No pedigree is eligible for registra-

tion in the Canadian Hereford Breeders' Association Herd Book unless it traces on side of both sire and dam to stock recorded in the American Hereford Herd Book or imported stock from Great Britain, and if imported since 1889, must be recorded in the English Herd Book.

Fees for Registration

	To Members	To Non-Members
Membership, \$2.00 for the Calendar year.		
Animals under two years of age.....	.75	\$ 2.00
Animals over two years of age.....	2.00	4.00
Transfers.....	.25	.50
Duplicate Certificates.....	.25	.50
Old form Certificates exchanged for National Certificates.....	.25	.25
Special Extended Certificates.....	1.00	2.00
For recording pedigrees of imported cattle.....	.75	2.00
For recording pedigrees of cattle entered in American Hereford Record..	.75	2.00
For recording pedigrees of ancestors to complete Canadian Registrations to residents of the United States, back to and including the imported animal.....	.75	2.00
For recording pedigrees of ancestors to residents of Canada, back to and including the imported animal.....	.50	.50

Jersey

Animals imported from the Island of Jersey.

Animals imported from Great Britain or Ireland recorded in the English Jersey Herd Book, in which case they must trace in all their crosses to ancestors recorded in the Island of Jersey Herd Book.

3. Animals recorded in the American Jersey Cattle Club Herd Register.

4. Animals, the sires and dams of which are recorded in the Canadian Jersey Cattle Club Herd Book.

5. Animals recorded in the New Brunswick or Nova Scotia Herd Books, providing such animals trace in all their crosses to animals re-

corded in the Island of Jersey Herd Book or the American Jersey Cattle Club Herd Register.

6. Applications for registration of animals recorded in the American Jersey Cattle Club Herd Register must be accompanied by American Certificates showing applicant's ownership.

7. Application for registration of animals imported from the Island of Jersey or from Great Britain and Ireland must be made on application forms for imported animals.

Fees for Registration for Canadian-Bred Animals

	To Members	To Non-Member
Animals under 2 years of age.....	\$ 1.00	\$ 1.50
Animals over 2 years of age.....	1.50	2.00
Transfers, if made within 90 days of date of sale..	free	
Transfers if made after 90 days of date of sale.....	.25	.50
Duplicate Certificates.....	.25	.25

Animals Imported from the Island of Jersey or Great Britain.

	To Members	To Non-Member
.....	\$ 1.00	\$ 2.00

Animals Entered in the American Jersey Cattle Club Register

	To Members	To Non-Member
.....	\$ 1.00	\$ 2.00

Animals Recorded in the Nova Scotia or New Brunswick Herd Books
No charge.

Galloway

(a) Animals imported from Great Britain and recorded in the Galloway Herd Book of Great Britain.

(b) Animals the sires and dams of which are recorded in the American Galloway Herd Book, in which case all ancestors back to and including the imported cross must be recorded.

(c) Animals the sires and dams of which are recorded in the North American Galloway Herd Book.

Fees for Registration.

	To Members	To Non-Member
Animals under six months of age	\$.50	\$ 1.00

Animals over six months of age	1.00	1.50
Transfers .....	.25	.25
Duplicate Certificates .....	.25	.25

Aberdeen Angus

Animals recorded in the Aberdeen Angus Herd Book (Scotland) or in the American Aberdeen Angus Breeders' Association Herd Book, Canadian bred animals whose sire and dam are registered in the Canadian Aberdeen Angus Herd Book. Males, red in color, or with a noticeable amount of pure white above the underline or on the leg or legs or with scurs shall not be recorded.

No animal over two years of age will be accepted for registration in the Canadian Aberdeen Angus Herd Book, unless previously recorded in the Aberdeen Angus Herd Book (Scotland), or in the American Aberdeen Angus Association Herd Book.

Fees for Registration.

	To Members	To Non-Member
Animals under one year	\$ 1.00	\$ 2.00
Animals over one year and under two	3.00	5.00
Transfer presented for record within 90 days of date of sale .....	.25	.25
Transfer presented for record after 90 days from date of sale..	1.00	1.00
Duplicate Certificates	1.00	1.00

Guernsey

All animals must be imported or must be traceable through both sire and dam to animals imported from the Island of Guernsey. All imported animals before being eligible for entry must be registered in the Herd Book of the Royal Guernsey Agricultural Society, the General Herd Book of Guernsey, or the Herd Book of the English Guernsey Cattle Society. In order to secure the entry of imported animals one of our regular application blanks must be filled out and certified to by the Secretary of the Island or English Herd Book in which the animal is registered, and sent by him under seal to the Registrar of the Canadian Guernsey Breeders' Association. In the case of Cana-

dian bred animals the sire and dam of each must be registered before the animal can be. Animals recorded in the American Guernsey Cattle Club Herd Register may be re-registered at a nominal fee of fifty cents per head.

Fees for Registration

	To Members	To Non-Members
For animals owned and entered	\$ 1.00	\$ 2.00
For re-registration of animals recorded in the American Guernsey Cattle Register	1.00	1.00
Transfer Certificates in all cases .....	.25	.25

French-Canadian

An animal, the dam and sire of which are recorded.

Colour for Cows.—The colour for cows may be black or brown, or dark brown, with or without a yellow stripe along the back and around the muzzle, or a gray stripe around the muzzle. The colour may also be fawn or brindle.

Colour for Bulls.—The colour for bulls may be black or brown, or dark brown, with or without a yellow stripe along the back and around the muzzle, or a gray stripe around the muzzle.

Registration should not be refused if females have a little white under the belly, on the forehead or in the switch, nor to bulls having a little white under the belly, or in the switch.

The horns must be all white or all black, white with black tips, or black with white tips.

FEEES FOR REGISTRATION

	To members	To non-members
1. If an animal is accepted before the 31st December of the year of birth.....	\$0.50	\$1.00
2. If an animal is accepted before the 31st December of the year following the year of birth.....	1.00	2.00
3. If an animal is accepted before the 31st December of the second year following the year of birth.....	2.00	4.00
4. If an animal is accepted before the 31st December of the third year following the year of birth.....	3.00	6.00
5. If an animal is accepted after the 31st December of the third year following the year of birth.....	4.00	8.00

TRANSFERS

.....	0.25	0.50
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DUPLICATE CERTIFICATES

.....	0.25	0.50
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Red Polled

Animals imported from Great Britain recorded in the Red Polled Herd Book.

Animals recorded in the American Red Polled Herd Book, in which case all ancestors back to and including those imported from Great Britain must also be recorded in the Canadian Book.

Animals whose sires and dams are recorded in the Canadian Red Polled Herd Book.

The color shall be red, the switch of the tail should be mixed with white, a portion of the udder may be white, and also a little white on the belly along the milk veins. Any animal with any additional white, or with horns, scurs, or abortive horns shall not be recorded for breeding purposes.

Fees for Registration

	To Members	To Non-Members
Each registration.....	\$ 1.00	\$ 2.00

Transfers of ownership....	.25	.25
Duplicate Certificates.....	.25	.25
Registration of ancestors to complete pedigrees.....	.25	.25

Holstein-Friesian.

Sec. 4.—Pure bred Holstein-Friesian may be held to mean and refer only to those large improved black and white cattle already registered in the Holstein, Dutch-Friesian and Holstein-Friesian Herd Books, such as are descended from them in direct line, both as to sire and dam, and such imported animals, or their descendants as are registered in the Netherlands, Friesian, or North Holland Herd Books, proved by the affirmation of breeder of the animal satisfactory to the Inspector. The color markings shall be black and white in any proportion, with the exception of switch, part of belly, and lower part of two legs or feet white. All imported animals shall be registered in the name of the importer. The applications for registry of animals imported in dam must be signed by the importer. No imported animal shipped from Europe after February 6th, 1894, shall be eligible for registry in the Herd Book unless the animal or its dam and sire are registered in the Netherlands, Friesian, or North Holland Herd Books. All applications for registry of animals imported from the United States must be accompanied by a form of application with

markings sketched and described, signed by the breeder or owner, also by the certificates of registry and transfer in the Holstein-Friesian Herd Book, or the Wetsern Holstein-Friesian Herd Book. All animals must be registered in the Canadian Herd Book before their offspring can be registered.

Article VIII.—Fees.

Membership fee	\$5.00
Annual due, to be paid 1st of February	1.00
Registration for members	1.00
Registration for non-members..	2.00
Registration for members (animals over one year of age)..	2.00
Registration for non-members (animals over one year of age)	4.00
Transfers (members) .....	.25
Transfers (non-members) .....	.50
Transfers after ninety days after sale .....	.75
Transferring Canadian-bred animals from American to Canadian Herd Book .....	.25
Registration of animals imported since Feb. 1, 1902, and previous to March 1, 1909, bulls.	10.00
Registration of animals imported since Feb. 1, 1902, and previous to March 1, 1909, cows.	5.00
Import Certificate, bulls	25.00
Import Certificate, cows	10.00
Registration Certificate of new form .....	.10
Duplicate Certificate .....	.50
Registration of Farm Name ..	1.00

Swine

The Dominion Swine Breeders' Association have established records for the following breeds: Yorkshire, Berkshire, Tamworth, Essex, Poland China, Chester White, Duroc Jersey, and Hamshire. Animals recorded as below and their progeny, tracing through both sire and dam, are eligible for registration:

Berkshire

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the British Berkshire Herd Book.

(c) Animals recorded in the American Berkshire Record, in which case all ancestors back to and including ancestors imported from Great Britain must be recorded.

Yorkshire

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the Large White Section of the English National Pig Breeders' Association Herd Book.

(c) Animals recorded in the American Yorkshire Record, in which case all ancestors back to and in-

- MANOR FARM HOLSTEIN-FRIESIAN - — CATTLE —

Where
Quality
Type and
Production
are Equal
Considerations



Our Motto
Buy
The
Best
and Breed
Them
Better

HEAD OF KING SEGIS PONTIAC POSCH

1st Prize Two Year Old Bull, London, 1915, 2nd at Toronto, 1915

Above is a photograph of the head of our herd sire, King Segis Pontiac Posch, who is a son of King Segis Pontiac Alcartra, the famous \$50,000 bull, and Fairmont Netherland Posch, a 32.40 lb. four year old. As a two year old she made 29.60 lbs. of butter in 7 days. She was the youngest cow in the world to make 29 lbs., being only seven hours late in calving for the junior two year old class.

Breeding such as this is seldom equalled in any country, and, above all, "King" is a show individual. Your next herd sire should be a son of this world-famous sire, and out of our young daughters of Prince Hengerveld of the Pontiac's. Write for further particulars. Visitors always welcome. Address all correspondence to

GORDON S. GOODERHAM, Manor Farm, CLARKSON, ONT.

cluding ancestors imported from Great Britain, must be recorded.

Tamworth

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the Tamworth Section of the English National Pig Breeders' Association Herd Book.

(c) Animals recorded in the American Tamworth Swine Record, in which case all ancestors back to and including ancestors imported from Great Britain must be recorded.

Essex

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals imported from Great Britain bred by reputable breeders.

(c) Animals recorded in the American Essex Swine Record.

Poland-China

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the following United States Poland China Records: America, National, South-western or Standard.

Chester White

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the O.I.C. Record (United States).

Durox Jersey

(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the American Durox Jersey Record or in the National Durox Jersey Record.

Hampshire

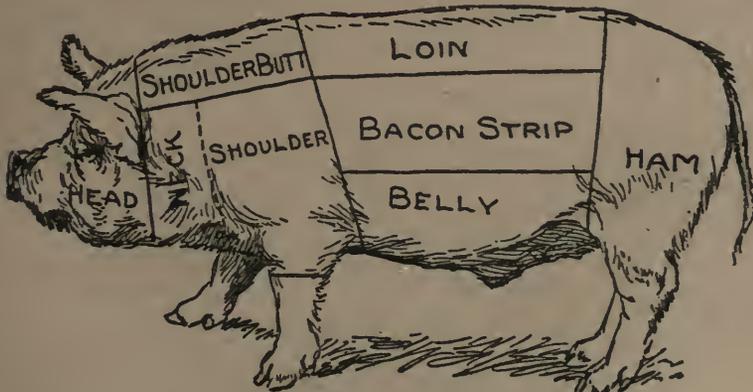
(a) Animals the sires and dams of which are recorded in the Dominion Swine Breeders' Record.

(b) Animals recorded in the American Hampshire Record.

Fees for Registration.

	To Members.	To Non-Members.
Each registration	\$1.00	\$1.00
Transfer of ownership ..	.25	.25
Duplicate Certificates...	.25	.25

Utilizing Pork. Head: Head-cheese, sausage, bean pork; Shoulder Butt: Roast, steak, butt-fat; Shoulder: Steak, picnic ham, roast; Loin: Fat back, tenderloin, roast, chops; Bacon Strip: Bacon, salt pork; Belly: Salt pork; Ham: Cured ham, steak; Feet: Pickled pig's feet.



Cuts of Pork.

Sheep

Records have been established by the Dominion Sheep Breeders' Association for the following breeds: Lincoln, Shropshire, Oxford Down, Cotswold, Dorset, Southdown, Hampshire, Leicester, Highland Blackface, Cheviot and Suffolk.

Shropshire

(a) Animals imported from Great Britain, recorded in the English Flock Book of Shropshire Sheep.

(b) Animals whose sires and dam are recorded in the Shropshire Division of the Canadian National Records or in the American Shropshire Sheep Record.

Leicester

(a) Animals whose sires and dams are recorded in the Flock Book of Great Britain.

(b) Animals whose sires and dams are recorded in the Leicester Division of the Canadian National Records, or in the American Leicester Breeders' Association Record, or in any Record taken over by the Canadian National Records.

Cotswold

(a) Animals imported from Great Britain, recorded in the English Cotswold Flock Book.

(b) Animals whose sires and dams are recorded in the Cotswold Division of the Canadian National Records, or in the American Cotswold Registry.

Oxford Down

(a) Animals imported from Great Britain, recorded in the English Oxford Down Flock Book.

(b) Animals whose sires and dams are recorded in the Oxford Down Division of the Canadian National Records or in the American Oxford Down Record.

Lincoln

(a) Sheep imported from Great

Britain, recorded in the English Lincoln Flock Book.

(b) Animals whose sires and dams are recorded in the Lincoln Division of the Canadian National Records, or in the National Lincoln Sheep Breeders' Record.

Dorset Horn

(a) Animals imported from Great Britain, recorded in the English Dorset Horn Sheep Breeders' Association Flock Book.

(b) Animals whose sires and dams are recorded in the Dorset Division of the Canadian National Records, or in the Continental Dorset Club Record.

Suffolk

(a) Animals imported from Great Britain, recorded in the English Suffolk Flock Book.

(b) Animals whose sires and dams are recorded in the Suffolk Division of the Canadian National Records, or in the American Suffolk Sheep Record.

Hampshire Down

(a) Animals imported from Great Britain, recorded in the English Hampshire Down Flock Book.

(b) Animals whose sires and dams are recorded in the Hampshire Division of the Canadian National Records, or in the American Flock Record of Hampshire Down Sheep.

Southdown

(a) Animals bred in Great Britain and Ireland, and recorded and numbered in the Southdown Flock Book of England, provided their sires and dams are also numbered and recorded in said Flock Book.

(b) Animals owned in, or imported from Great Britain and Ireland, not entered in the Southdown Flock Book of England, may be recorded as provided in clause (c).

(c) Animals bred in America and

tracing in all their crosses to flocks of reputable breeders in Great Britain and Ireland, or to those already recorded, provided their sires and dams and grand sires and grand dams are eligible, and are also recorded in the Southdown Division of the Canadian National Records.

(d) Animals that are immediate descendants of those recorded in the Southdown Division of the Canadian National Records, or in the American Southdown Record.

Cheviot

(a) Animals imported from Great Britain and recorded in the Cheviot Sheep Flock Book.

(b) Animals whose sires and dams are recorded in the Cheviot Division of the Canadian National Records, or in the American Cheviot Flock Book.

Blackface

(a) Animals imported from Great

Britain from flocks recognized as being pure bred. A certificate to this effect must be furnished signed by the Secretary of the Blackface Sheep Breeders' Association (Scotland).

(b) Animals whose sires and dams are recorded in the Blackface Division of the Canadian National Records.

2. Application for registration must be made upon blanks which will be furnished free.

Fees for Registration

	To Members	To Non-Members
If animals are recorded before the first of December of the next year following the year of birth.	\$.50	\$ 1.00
If animals are recorded after the time limit fixed	1.00	1.00
Transfers.....	.25	.25
Transfers which may be necessitated by a change in a firm name where no consideration passes.....	Free	
Duplicate Certificates.....	.10	1.0



"Gainford Marquis," senior and grand champion, Canadian National, 1915.

Day of Month and Week, with space for Name of Animal served, &c.		Animals served on given dates of present month, due to give birth as follows:			
		Mare 48 wks.	Cow 40 wks.	Ewe 21 wks.	Sow 16 wks.
1	Sat	Dec 3	Oct 8	May 28	Apr 23
2	S	4	9	29	24
3	M	5	10	30	25
4	Tu	6	11	31	26
5	W	7	12	June 1	27
6	Th	8	13	2	28
7	Fri	9	14	3	29
8	Sat	10	15	4	30
9	S	11	16	5	May 1
10	M	12	17	6	2
11	Tu	13	18	7	3
12	W	14	19	8	4
13	Th	15	20	9	5
14	Fri	16	21	10	6
15	Sat	17	22	11	7
16	S	18	23	12	8
17	M	19	24	13	9
18	Tu	20	25	14	10
19	W	21	26	15	11
20	Th	22	27	16	12
21	Fri	23	28	17	13
22	Sat	24	29	18	14
23	S	25	30	19	15
24	M	26	31	20	16
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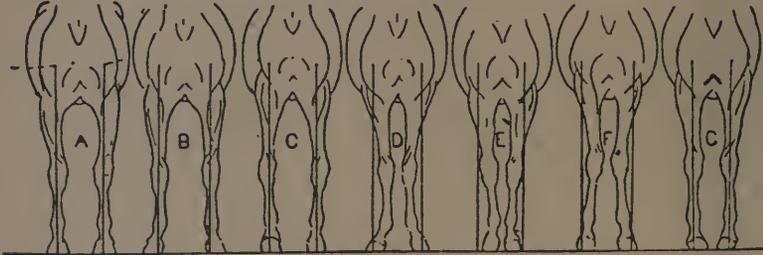
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Common Unsoundness in the Horse

Bone spavin is one of the most serious forms of unsoundness from which the horse is liable to suffer. As a rule it is easily detected by comparing the size of the hocks for any variation in size or shape. The best view can be obtained by stooping in front of the horse and looking between the front

blind spavin in which no enlargement is present, due to the fact that the inflammation is confined to the centre or softer tissues of the bone. Such cases are difficult to diagnose and even experts are at a loss at times to be sure whether this condition is present or not.



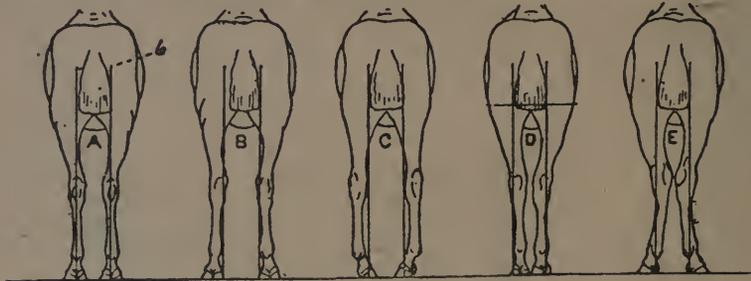
FRONT VIEW OF FORE LEGS.

A vertical line down from point of shoulder shall fall upon centre of knee, cannon, pastern and foot. A only shows the correct formation.

legs under the body when any enlargement can easily be noticed. In suspected cases the diagnosis can be confirmed by lifting the foot from the ground and bending it forward and upward bringing the hoof as near the stifle joint as possible and retaining it in that position for a minute or two, then letting it down and causing the animal to walk off at once. When if a spavin is present the lameness is likely to be very noticeable for the first few steps. There is a somewhat rare form of spavin called occult or

Ringbone

Is another disease of bone somewhat similar to spavin, but situated on the pastern between the hoof and the fetlock. The enlargement usually grows completely around the limb and is easily detected. If the growth is close down to the hoof the lameness will usually yield to treatment and the animal be made to go sound, but the enlargement will always remain. If, however, the growth is an inch or so higher up on the pastern, more or less permanent lameness is likely to re-



REAR VIEW OF HIND LEGS.

Vertical line drawn downward from point of buttock should fall upon centre of hock, cannon, pastern and foot. A only indicates correct formation.

sult because of a joint becoming involved.

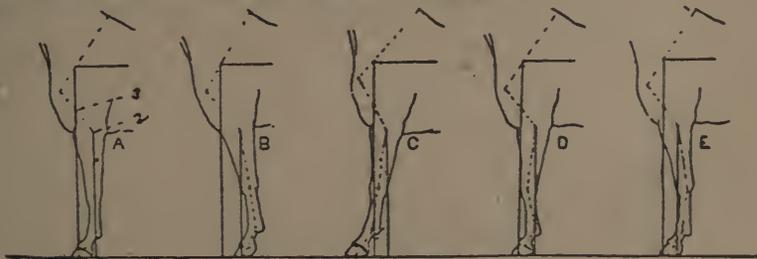
Sidebones

Are found just above the hoof at the side near the heel and almost invariably on the front feet, they are not so serious as spavin or ring-bone. Often no pronounced lameness is noticed, but only a stiffness of gait. A horse may have those blemishes, and if it be a useful animal at any ordinary work. They are serious in a horse that

troublesome lameness will result. A horse with a splint is unsound, even though not going lame.

Bog Spavin.

Is a soft, puffy, enlargement on the inside of the hock. It is not so serious as bone spavin, and as a rule does not interfere with the usefulness of an animal.



SIDE VIEW OF FRONT LEGS.

Vertical line from point of shoulder.

has to go on hard roads or pavements, but for the ordinary work of a farm cause little or no trouble. Horses that have naturally good, strong feet are not very liable to suffer from side bones, while the weak footed horse is very much predisposed to the trouble.

Splints

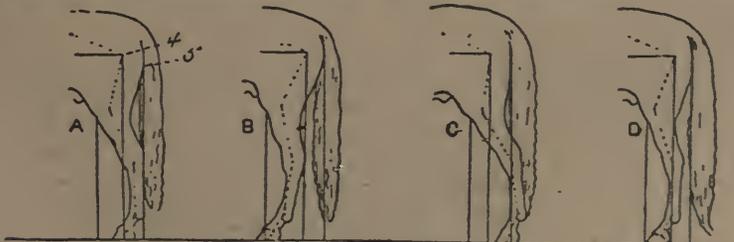
Are bony enlargements on the cannon bone of the front legs. They are considered by many as a minor form of unsoundness. Usually they cause little or no trouble, the animal performing his work without showing any lameness. At times, however, especially when the enlargement is close up to the knee joint, more or less

Thorough-pin

Is practically an aggravated form of bog spavin, the enlargement passing right through the hock joint and forming a puffy enlargement on the outside of the hock opposite the spavin.

Curb.

A curb consists of a sprain of a ligament on the back border of the hock forming an enlargement which can be readily detected by looking at the limb from the side which will present a rounded or bowed formation on the posterior border of the joint. While the lameness caused by a curb yields readily to treatment the enlargement can seldom be removed.



SIDE VIEW OF HIND LEGS.

Vertical line down from hip joint should fall upon centre of foot and divide the gaskin in the middle. Vertical line from point of foot should coincide with angle of hock and pastern joints. A only shows correct formation.

Navicular Disease

Is a very serious form of lameness, it consists of a diseased condition of the joint which is situated inside the hoof. The symptoms consist of a stiffness or stiltiness of gait, a tendency to trail the front feet when moving backwards. Horses suffering from this form of lameness will usually, when backed out of the stall trail the bedding back with the front feet. As the disease progresses the affected foot or feet will become somewhat narrow. When standing the horse will ease first one foot and then the other. The lameness is always more noticeable when the animal is taken out for exercise after standing in the stall over night. Exercise has a tendency to limber the patient up to a certain extent.

Chronic Lamanitis.

Is another serious disease of the feet manifesting much the same symptoms as navicular disease. It consists of a chronic inflammation of the soft tissue of the foot. Once thoroughly established it is practically incurable and reduces the value of a horse very much, rendering him almost useless for hard or fast work on hard roads or pavements.

Corns.

A corn is simply a bruise of the sole resulting in an inflammation of the

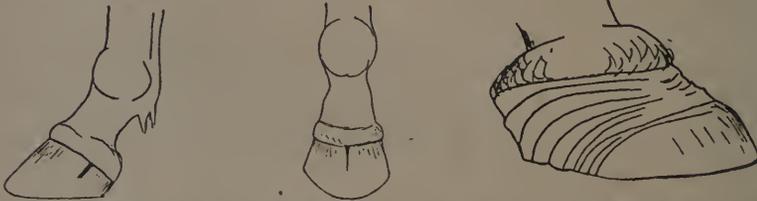
deeper seated tissues, and usually found on the inside quarter of the sole. This is a somewhat serious form of unsoundness, for although it can be successfully treated, it is quite likely to recur unless the foot is very carefully looked after.

Quarter Cracks.

A quarter crack is a crack or split in the wall of the hoof, extending from the shoe up to the soft tissue at the top of the foot. It is always an indication of a weak foot, and although it can usually be treated successfully it is very likely to occur again if the animal is put to work on hard roads.

String Halt.

Is a nervous disease causing the horse to lift one or both hind feet very high at each step. It is very easily detected when in an advanced stage, but sometimes in the early stages the symptoms are very obscure. In suspected cases it is well to excite the animal, then make him move backwards or move him sharply first to one side and then quickly to the other, when if this trouble is present it will likely be detected. This disease does not interfere with the usefulness of an animal except in very advanced cases, but because of the fact that it is a progressive disease and likely to get worse as the animal grows older, it is considered a serious form of unsoundness.



To extreme left is indicated a Quarter Crack. In centre the fissure in foot indicates Sand Crack. To the right a bad case of Acute Founder.

ANIMALS WHEN AT REST

Animal	Pulse, per minute	Respiration per minute	Temperature Fahrenheit
Horse.....	36 to 40	8 to 10	100°
Ox.....	40 to 45	12 to 15	101° to 102.5°
Sheep.....	70 to 80	12 to 20	103°
Swine.....	70 to 80	10 to 15	103°
Dog.....	90 to 100	15 to 20	102.5° (very changeable)

The Age of the Horse

The age of the horse is an important factor in determining his present and prospective value. Familiarity with the characters which most certainly indicate age are, therefore, often extremely useful. A knowledge of these characters is not difficult to secure, but skill in their application depends much on familiarity and continued practice.

General Considerations

In estimating the age of the horse, the teeth furnish the best index. Yet **there are other general considerations** that play an important part, especially in the case of young and very old animals. In very old horses, white hairs make their appearance around the temple, the eyes, the nostrils and elsewhere; the poll, or top of the head, becomes more pointed, the sides of the face more depressed, and the hollows above the eyes more marked. Bear in mind these considerations are general, and must be considered as a whole; each, alone, is of very little or no use.

While differences in the appearance of the teeth are considered the **most important and the most accurate** means of estimating the age of domestic animals, and are the means employed by all horsemen, yet these are not absolutely accurate, and much depends on conditions as well as on the individuality of the animal. The teeth of horses that have bones of somewhat open structure are likely to indicate that the animals are somewhat older than they are; while the teeth of horses whose bones are of fine, close texture, may indicate them to be younger than they are. Again, a horse which has always been fed on soft, succulent food is likely to show a young mouth; whereas, one fed on hard, dry food is likely to show an older mouth. Thus it is apparent that the texture of the bones, the breeding, the kind of food the horse has eaten, and other conditions, have more or less influence on the teeth.

The horse, when full-grown, has

forty teeth, twenty on either jaw, divided as follows: Six incisors, two canines (one on either side), and twelve molars (six on either side). Since only the incisor, or nipper, teeth are inspected in estimating the age, they alone will be considered. It is the order in which they make their appearance that enables us to estimate the age up to five years, and the manner in which their surface is worn that aids us in the estimation up to eight years of age. After the horse has passed the eighth year, it is sometimes difficult to determine his true age by the teeth.

It is not often that one is obliged to inspect the teeth of a horse under three years of age in order to make an estimate of its age. Therefore, the period of colthood will be passed over and we will consider the condition of the incisors when the horse has reached the age of two and one-half to three years.

Two and One-half to Three Years Old.

At about two years and nine months to two years and eleven months the central permanent incisors will appear, and at three years of age the outer part of the teeth, and sometimes the inner also, will be up and in wear. The permanent incisors are larger in every way than the temporary or milk teeth; they are also less smooth and regular, and are usually darker colored, so that no difficulty is experienced in distinguishing the permanent from the temporary incisors.

Four Years Old.

At about three years and nine months, the intermediate incisors appear. At four years of age, they are fully up and in wear on the outside, and sometimes on the inside. The central incisors show one year's wear, and the cups are not so deep as they were when the colt was three years old. If the colt be a male the tusks should be evident. They would still be sharp and flattish on the insides.

Five Years Old.

At the age of about four years and nine months, the permanent corner incisors make their appearance. When the horse is full five years of age, the outer exterior parts meet, although almost one year of wear must take place before the lateral or corner teeth are worn level over their entire surface. The horse has now a full mouth, and the central incisors show two years' wear. The cups show on all, but are deepest and freshest in the corner teeth.

Six Years Old.

At six years the cups in the central incisors of the lower jaw have disappeared, or nearly so; have become smaller in the intermediates, and the corner teeth are worn level over their entire surface.

Seven Years Old.

At seven years of age the cups in the intermediate incisors of the lower jaw have disappeared, although small dark spots may often be seen. The corner teeth still retain their cups, although they are rather shal-

low. It is well to bear in mind that from the time when the teeth of the lower jaw are well up and in wear to the time that the cups have disappeared from the lower jaw is three years. The teeth in the upper jaw retain their cups for a much longer time; in fact, just twice as long, disappearing in six years after they have made their appearance.

Eight Years Old.

At eight years of age, the cups have disappeared from the teeth of the lower jaw. One must not be misled by the slight, dark-colored indentations that are still present, for they are not deep enough to be called cups. By the time the horse has reached this age, the shape of the teeth have undergone marked changes. (Compare Fig. 9 with Fig. 10.) In the first place, the teeth were thin from outside to inside, and comparatively broad from right to left; while, in the latter case, they are much thicker from inside to outside, and have become more triangular in shape. If viewed from the side, they will appear somewhat longer,

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and will meet at a sharper angle than they did when the horse was younger. As the age advances, the angle formed by the teeth of the upper and lower jaw becomes more acute.

At Nine Years of Age, the cups will have disappeared from the upper central incisors; from the upper intermediates at ten years, and at eleven years the cups will have all disappeared from the upper jaw. The cups are not likely to disappear at as regular intervals in the upper jaw as they did in the lower jaw. Therefore it is not always possible to tell the age of a horse within a year or two after he has passed his eighth year.

After the horse has passed the twelfth year the matter of two or three years amounts to little. Much depends on the individuality of the animal, as some animals are worth more at eighteen than others at fourteen. One's judgment of the value of a horse at these ages should be formed on general appearances and activities rather than on age.

The Age of Cattle and Sheep.

The only reliable method of judging the age of cattle is by means of the incisor or nipping teeth. Cattle have eight temporary incisors, or sucking teeth, in the lower jaw, but none in the upper. A pad of tissue replaces the latter. The molar teeth consist of six teeth in each jaw—upper and lower—three of which (twelve in all) are temporary, or replaceable, and for convenience are spoken of as the first, second and third temporary molars, in contradistinction to those which follow, and termed the fourth, fifth and sixth permanent molars.

At a month old, most, or all, of the temporary sucking teeth are in the mouth. At six months the fourth permanent molar will be seen. At twelve months the fifth permanent molar will appear. At two years the sixth permanent molar will be well up, but shows itself in one year and

nine months. At or about two years and six months, the first and second temporary molars are shed, and replaced by permanents; so that by the time an ox is three years of age, the third molar has been replaced and a complete set of permanent molars are now in the jaws.

Most attention must be paid to the changes in the incisors, because these are so easy to note.

It is quite an easy matter to tell the difference between temporary and permanent incisor teeth. The permanents are much broader and larger and when seen side by side with the temporary ones, it is impossible to mistake one for the other. The same remarks are equally applicable to the sheep.

If a mouth is examined at one year and nine months, a pair—the central pair—of permanent incisors will be seen. These are cut at about one year and six months, so that at one year and three-quarters they are well developed. At two years and three months to two years and nine months the permanent middle incisors are well up. Cattle vary in dentition, but as a rule it is two years and nine months to three years before the lateral permanent incisors are well up. At three to three and one-half years, the corner permanent incisors usually appear, and this completes the dentition. To judge the age after this period is speculative, and only approximate at best. The incisors gradually wear away, the corner teeth showing the least signs of wear. In horned cattle the rings formed upon the horns are used as a rough means of determining the animal's age. Add two years to the total number of rings, as the first ring is not formed until after the second year.

Sheep have twenty temporary teeth, eight being incisors, or nipping, teeth, precisely the same as in the ox, and the reader must refer to these for the several designations relating thereto. The central pair of permanent incisors are cut when the animal is about one year of age, and

the perfect development of these teeth must be taken as evidence that the yearling stage has been passed by a month or two. The middle permanent incisors will usually appear when the animal is from one year and nine months to two years of age. Some latitude must be allowed, say a couple of months either way, as the rate of development, as affected by feeding and care, will affect the time at which the permanent teeth will appear. The lateral pair will usually

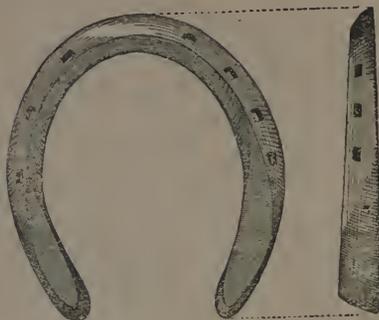
appear when the animal is two years of age. The average is two years and three months, with an extreme of two years and one-half. The corner incisors are usually replaced by permanent by the time the animal has reached the age of three years. When the sheep is four years of age all the incisors are up and in wear. The animal has by this time a "full mouth," and estimations as to its age after this period is reached are, of necessity, speculative.



Right hand shoe built to prevent interfering. Inner branch has no nails, and is fitted and beveled under the hoof.



Ground surface of shoe to left. Inner nailer's branch is same in depth as the outer and caulked on to balance foot squarely on the ground.



Common form of punched heel weight shoe to induce high action in front feet. The profile here shows a roll at toe and raised heels. As this lowers action the shoe would be better if of uniform thickness and no roll.



Right fore ice shoe for roadster. Toe and outer heel caulks cut at right angles, and the inner caulk is slender and blunt. Back surface of toe shoe should be perpendicular.

Veterinary

Some Useful Prescriptions.

In localities where there are practically no facilities for obtaining professional aid for the stock-breeder, the following prescriptions will prove useful. These are contained in F. T. Barton's book on "Cattle, Sheep and Pigs," page 189.

Ringworm.

Wash parts thoroughly with hot water and soft soap. Apply mercurial or iodide ointment. See that the rings are thoroughly covered. Apply every other day until the disease disappears. Ringworm is a parasitic disease and should be dealt with immediately it is noticed.

Ointment for Sores, Ulcers, Etc.

Boracic Acid Ointment.. $\frac{1}{2}$ ounce
Oxide of Zinc Ointment.. $\frac{1}{2}$ ounce
Red Oxide of Mercury Ointment 3 drachms

Mix thoroughly. Directions: Apply a little to the sore place twice daily.

Before applying wash thoroughly with a weak solution of some reliable coal tar disinfectant.

Ointment for Mange.

Oil of Tar 2 drachms
Red Oxide of Mercury Ointment $\frac{1}{2}$ ounce
Green Iodide of Mercury Ointment 2 drachms
Vaseline 1 ounce

Mix. Directions: Rub in well once daily.

Ointment for Inflamed Udder.

Extract of Belladonna. 1 ounce
Benzoated Lard $4\frac{1}{2}$ ounces
Lanoline $4\frac{1}{2}$ ounces
Mix thoroughly in that heat. Directions: Smear over the inflamed udder twice or three times daily.

Turpentine Ointment for Setons.

Common Turpentine..... 1 ounce
Lard 3 ounces
Melt together over warm water, and stir cold. Dress seton.

Blistering Ointment.

Powdered Cantharides .. 1 ounce

Prepared Lard 6 ounces

Melt together in a jar, surrounded by hot water, for three hours, and stir occasionally; while hot, filter through paper, and allow the clear liquid to cool. Uses: For blistering.

Oxide of Zinc Ointment.

Powdered Oxide of Zinc. 3 ounces
Glycerine 2 ounces
Benzoated Lard 13 ounces
Mix in a stone mortar. Uses: For slight abrasions and ulcers.

Sulphur Ointment.

Flowers of Sulphur 2 ounces
Lard 16 ounces
Mix. Uses: For mange and Eczema.

Liniment of Turpentine.

Soft Soap 2 ounces
Camphor 1 ounce
Spirits of Hartshorn... 2 drachms
Oil of Thyme $\frac{1}{2}$ drachm
Oil of Turpentine 16 ounces

Dissolve the camphor in the turpentine; then add the soap until this is all dissolved; this latter can be done by rubbing in a mortar, or shaking in a bottle. Now add the other ingredients. Uses: For slight attacks of sore throat, sprains, bruises, rheumatism (join felon) and colds about the chest, etc.

Directions: If used for sprains or rheumatism, let the liniment be rubbed in well, and then apply a hot flannel bandage.

Liniment for Rheumatism and Stiff Joint.

Tincture of Opium 2 ounces
Tincture of Belladonna. 1 ounce
Spirits of Ammonia... 1 ounce
Liniment of Capsicums.. $1\frac{1}{2}$ ounces
Chloroform $\frac{1}{2}$ ounce
Oil of Turpentine 2 ounces
Opodeiodoc 1 ounce

Mix, and shake before rubbing in. Directions: Apply night and morning to the joints or stiff muscles.

Blistering Liniment.

- Croton Oil 1 ounce
- Oil of Turpentine 6 ounces
- Olive Oil 1 ounce

Mix, by shaking the bottle. Directions: Rub the part to be blistered for ten or twenty minutes.

Green Liniment.

- Verdigris 4½ ounces
- Powdered Alum 3 ounces
- Treacle ¾ pound

Boil, and mix together until the mixture has a brown tinge. Uses: For foul affecting the feet, and foot-rot of sheep.

Camphor Liniment.

- Camphor 1 ounce
- Olive Oil 2 ounces

Dissolve the camphor on the oil with the aid of heat. Uses: A stimulating liniment; very useful for applying to the throat, chest or belly after fomenting.

Strangles.

Cold, sore throat, yellow discharge from nostrils, swelling or tumor under throat. Put poulticé to tumor; give in gruel 4 drams chlorate of potassium. Feed gruel and bran mashes.

Cooling Lotion for Sprains, etc.

- Nitrate of Potash 2½ ounces
- Sal Ammoniac 2½ ounces
- Cold water 1 pint

Directions: Dip cloths into the liquid and apply to the inflamed part.

Lotion for Mange.

- Slaked Lime 8 ounces
- Flower of Sulphur 8 ounces
- Water 3½ pints

Mix, and boil together until the liquid measures one quart. Now filter it, and dress all the diseased parts; or what is better, dress the animal from head to foot. Six times this quantity may be made at once for a trifling sum.

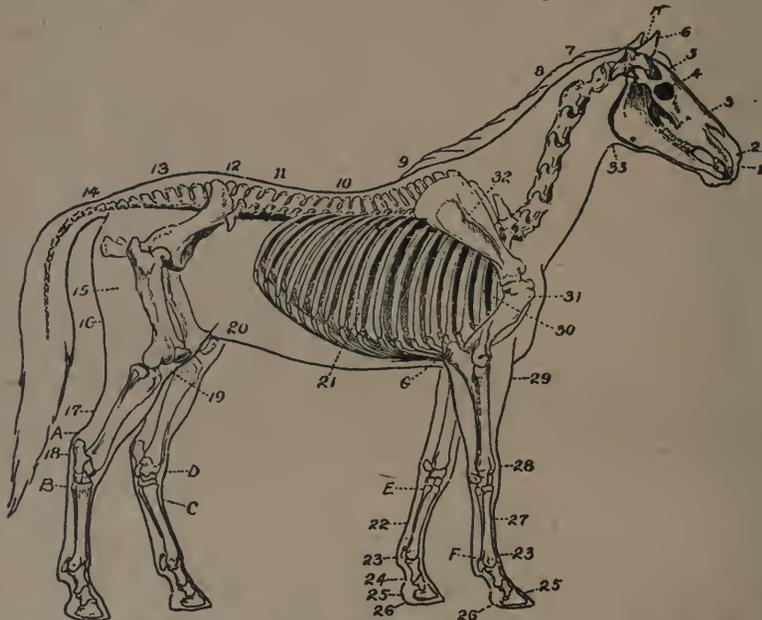


Fig. 40. Parts of the horse. 1, Muzzle; 2, nostrils; 3, face; 4, eye; 5, forehead; 6, ear; 7, neck; 8, crest; 9, withers; 10, back; 11, loin; 12, hip; 13, croup; 14, tail; 15, thigh; 16, quarter; 17, gaskin or lower thigh; 18, hock; 19, stifle; 20, flank; 21, ribs; 22, tendons; 23, fetlocks; 24, pastern; 25, foot; 26, heel of foot; 27, canon; 28, knee; 29, forearm; 30, chest; 31, arm; 32, shouder; 33, throatlatch; A, thoroughpin; B, curb; C, bog and blood spavin; D, bone spavin; E, splint; F, windgall; G, cappel elbow; H, poll evil.

White Lotion.

White Vitriol (Zinc Sulphate)	$\frac{3}{4}$ ounce
Sugar of Lead	$\frac{3}{4}$ ounce
Water	1 pint

Mix, and filter through blotting paper; use the clear liquid, after adding another pint of water.

Directions and Uses: Is a first-class lotion for all kinds of sores, bruises, stings, etc.

Eye Lotion.

Sulphate of Zinc.....	40 grains
Solution of Sulphate of Atropine	2 drachms
Water	8 ounces

Mix. Directions: Apply to eye twice daily with a soft piece of cloth. Uses: For inflammation of the eye and cloudiness of vision.

Saline Purgative (for Adult Cattle Only)

Epsom Salts	$\frac{1}{2}$ pound
Glauber's Salts	$\frac{1}{2}$ pound
Common Salt	$\frac{1}{2}$ pound
Ginger	1 ounce
Powdered Pimento	1 ounce

Mix. Directions: Give in a quart of warm water. Treacle can be added if thought desirable.

Anodyne Draught (Anti-Pain or Colic Draught. For Cattle Only).

Tincture of Belladonna..	3 drachms
Tincture of Hyoscyamus..	4 drachms
Chloral Hydrate	2 drachms
Laudanum	3 drachms
Chloric Ether	1 ounce
Water	1 pint

Mix. Repeat in four hours' time, if necessary. Uses: For internal inflammation, and straining after calving.

Extra Strong Purgative (For Cattle Only).

Epsom Salts	1 pound
Gamboge	$\frac{1}{2}$ ounce
Powdered Carbonate of Ammonia	$\frac{1}{2}$ ounce
Powdered Ginger and Allspice, of each	1 ounce

Mix the ingredients together, and give the whole in a quart of warm water, to which a quarter of a pound of treacle has been added. Uses: For fardel-bound, or any form of constipation in cattle.

Strong, Oily Purgative (for Cattle Only).

Croton Oil	20 drops
Oil of Juniper	30 drops
Oil of Peppermint	20 drops
Linseed Oil	1 pint

Mix together whenever a powerful purgative is indicated.

Aperient Draught (Laxative Medicine) (For Cattle Only).

Sodium Sulphate	$\frac{1}{2}$ ounce
Liquid Extract of Sacerd Bark	5 drachms
Tincture of Rhubarb..	3 drachms
Tincture of Belladonna..	3 drachms
Sal Volatile	3 drachms
Chloric Ether	3 drachms
Water added	1 pint

Mix, and give just as it is. Uses: In fevers of various kinds. It may be repeated if needful.

Laxative or Aperient Powders (For Cattle Only).

Epsom Salts	2 pounds
Glauber's Salts	2 pounds
Powdered Nux Vomica...	1 ounce
Powdered Ginger	2 ounces
Aniseed	2 ounces

Mix thoroughly and divide into twenty-four powders.

Directions: Give one every evening in a pint of cold gruel. Treacle can be added to increase the activity of these powders. Uses: Whenever it is believed that the animal requires its bowels gently and gradually acted upon.

Tonic Powders (for Cattle Only).

Powdered Cinchona Bark	6 ounces
Powdered Gentian.....	6 ounces
Powdered Nux Vomica..	$1\frac{1}{2}$ ounces
Powdered Bicarbonate of Potash	$1\frac{1}{2}$ ounces

Linseed Meal 6 ounces
 Mix thoroughly in a mortar, and divide into one dozen powders. Directions: Give one powder night and morning in a pint of warm ale, gruel, or water.

Tonic Draught (for Cattle Only).

Quinine 1 drachm
 Dilute Sulphuric Acid. 2 drachms
 Tincture of Steel. ½ ounce
 Tincture of Calumba

Root 1 ounce
 Water added to make one pint.

Mix and give thrice daily, just as it is. This will be found a most excellent draught for assisting in restoring the health of the animal.

Gentian, Ginger, and Iron Powders (for Cattle Only).

Powdered Gentian Root. . . 4 ounces
 Powdered Ginger Root. . . 4 ounces
 Powdered Sulphate of Iron 2 ounces

Mix, and divide into twelve powders. Directions: Give one night and morning in a pint of ale, gruel, or water.

Draught for Tape-Worm (for Cattle Only).

Liquid Ext. of Male Fern. ½ ounce
 Linseed Oil 1½ pints
 Oil of Juniper 30 drops

Mix. Directions: Before giving, withhold food for twenty-four hours. Repeat in a week's time.

Some Popular Remedies for Sheep and Lambs

There are some diseases in sheep and lambs that are beyond the reach of medicinal agents, whereas, on the other hand, there are others which are benefited by the simplest of remedies. The recuperative powers of tea for sheep and lambs are well known among flockmasters, from half to a pint of strong tea being given two or three times a day. The following will be found a safe and efficacious saline purge, and can be repeated if necessary:

Saline Purgative Drench.

Epsom Salts 4 ounces
 Powdered Ginger 2 drachms
 Aniseed 2 drachms
 Bicarbonate of Soda. 2 drachms

Mix, and dissolve in a half-pint of tepid water. The whole to be given to a sheep, or half the quantity to a lamb, at about 6 months.

Saline Diuretic Draught.

Epsom Salts 4 ounces
 Powdered Nitre 1 drachm
 Powdered Ginger 2 drachms
 Mix, and give as above.

Laxative and Stimulant Draught.

Epsom Salts 1 ounce
 Powdered Carraway Seeds 2 drachms
 Powdered Carbonate of

Ammonia 1 drachm
 Powdered Gentian 2 drachms
 Mix, and give in half a pint of warm tea.

Tonic Draught.

Powdered Cinchona
 Bark 1 drachm
 Powdered Sulphate of
 Iron 1 drachm
 Powdered Gentian 2 drachms
 Aniseed 1 drachm

Mix, and give as above.

Draught for Scour.

Chlorodyne 1 drachm
 Prepared Chalk 2 drachms
 Sal Volatile 1 drachm
 Starch Gruel 4 ounces

Mix, and give the whole, and repeat night and morning.

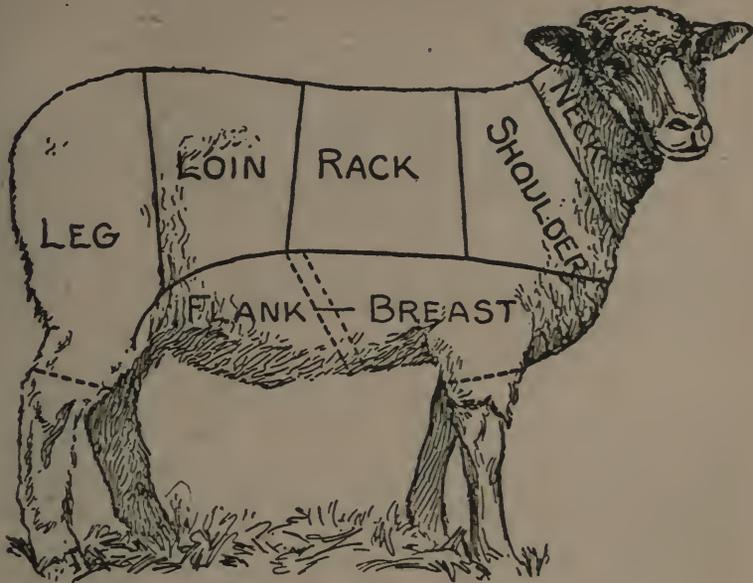
Draught for Hisk or Hoose.

Oil of Eucalyptus. ½ drachm
 Terebene 1 drachm
 Linseed Oil 4 ounces

Mix, and give the whole. Repeat twice or thrice weekly.

Dressing for Wounds.

Use some reliable coal tar disinfectant and same recipe as for sores and ulcers as prescribed elsewhere in this section.



Cuts of a mutton.

Apply to wounds two or three times a day.

Remedy for Scab.

Small infected areas of the skin may be treated by applying sulphur iodide ointment. Lime and sulphur dips are recommended by the U.S. Bureau of Animal Industry. Following ointment recommended, potassium sulphide 10 parts, potassium carbonate two parts, and lard three hundred parts.

Draught—Anti-Pain for Ewes.

Laudanum 2 drachms
 Sulphuric Ether ½ ounce
 Sweet Spirits of Nitre.. 2 drachms

Cold Water 4 ounces

This draught can be repeated every four or six hours if necessary.



Quittor on left. Ringoone on right.

• **Disinfectants.**

For disinfectant use any reliable coal tar disinfectant, such as advertised.



CROPS OF TWO TYPES.

Crop on the left is too short and steep. On the right a good draft type.



A straight and a too sloping type of pasterns.

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One Thousand Per Cent. Profit---For You

An investment that pays 1,000% is some investment! This one is sound, true and tried, and has been a profit builder for hundreds of the biggest money makers in the stock raising, sheep and hog raising and poultry raising business in Canada and the United States. Zenoleum pays every man who uses it 1,000% profit. Ten dollar's worth of Zenoleum will make 100 dollars more profit for any one who uses it wisely and well. It keeps stock healthy, and prevents losses which often run into hundreds of dollars.



**Zenoleum Kills Lice,
Mites, Fleas, Ticks and all
Pestering Parasites, and Cures and Prevents Disease**



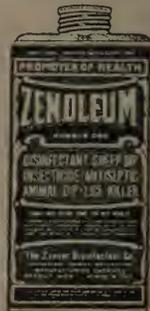
Zenoleum is harmless. It does not injure the skin, is not inflammable, explosive or greasy. It is clean to use and has a pleasant odor. Zenoleum has three times the germicidal power of carbolic acid. Zenoleum is used in large quantities by 50 Agricultural Colleges, and all testify to its wonderful power to kill germs, lice and parasites, to purify and disinfect stables, pens and poultry houses. Can be used anywhere fearlessly, indoor or outdoor, wherever there is disease infection or parasite pest. Zenoleum is cheap, but wonderfully effective. A \$1.50 tin of Zenoleum goes as far as \$40.00 worth of carbolic acid. It means money to every farmer, who saves expense from disease and death of live stock, and keeps his barn, stables and outhouses sweet, clean and sanitary.



The greatest Germicide and Disinfectant yet discovered—A genuine Coal Tar Product

Ask your dealer for a trial tin. 25c, 50c, 90c and \$1.50. For most purposes use one part Zenoleum to 100 parts water. If your dealer has no Zenoleum, don't take a substitute, but send direct to us. We will send it to you by return mail, carriage prepaid, on receipt of price.

Write for **FREE Folder on Animal Diseases and Cures.**



ZENNER DISINFECTANT CO.,

308 Sandwich St. East

Windsor, Ont.

Animal Diseases and Remedies

Abscess.—Indicated by swelling, heat, redness and pain. Poultice until ready to break. Then make incision, and apply antiseptic washes. Do not allow wound to close too soon.

Actinomycosis or Big Jaw.—External swellings on jaw, or internally in mouth. Swelling may break and fungous growth appear. Disease is infectious.

Give potassium iodide, 1 to 2 1-2 drams in water, daily for a week; omit one week; then resume for a week.

Acid Stomach.—Soda, chalk, or charcoal.

Afterbirth Retention.—Wind the free part on a stick or wisp of straw and pull gradually while gently loosening "buttons" from wall of uterus with other hand.

Anemia.—Better diet; iron; gentian, or cod liver oil.

Anthrax.—High fever. Rapid pulse. Great weakness. Ears cold. Later, uneasiness, kicking, labored breathing. Finally bloody discharges from mouth and nose, and blood in urine.

No cure. Destroy animal. Disinfect. Vaccinate healthy animals.

Appetite, loss of.—Change of diet, gentian and other tonics.

Azoturia.—Sudden oppression, weakness, perspiration, and inability to stand soon after leaving stall. Occurs in horses fed too highly and exercised too little.

Light feeds when not at work; Epsom salts; soda, aloes.

Bites of Insects.—Ammonia.

Bots in Horses.—Cramps. Rubbing of rump against stall. Appetite depraved. Craving for salt. Itching of upper lip. Presence of parasites in manure.

Cathartics; carbon bisulphide in gelatine capsules.

Bog Spavin.—Round, smooth tumor in front of hoof and somewhat inward. Prominent vein on surface.

Rest; high-heeled shoe; blister; cold water.

Bone Spavin.—A bony growth on hock joint. May be on front of joint, or may be at other points in region of hock joint. Also may be no visible growth at all; the most serious of all.

Same treatment as bog spavin; actual cautery if necessary.

Broken Wind.—See Heaves.

Bronchitis.—Head hangs. Rattling cough. Mouth hot. Frothy discharge from nostrils. Later the ribs rise and fall greatly in breathing. Horse stands constantly.

Warm blankets; mustard poultice; nitre; aconite; belladonna.

Capped Hock.—Disturbance resembling an abscess on point of hock, caused by kicking stall, etc.

Hot and cold applications; blister.

Choking.—Manipulate the foreign body with hand, or use probang.

Cholera.—See Hog Cholera.

Colic.—Animal lies down. Kicks toward body with hind feet. Looks around toward flank. Jerks tail. Groans. Where severe, animal plunges about and groans loudly.

Laudanum, chloral hydrate, cannabis indica, or soda; change diet.

Conjunctivitis.—Swollen and watering eyes. Inflammation.

Boric acid wash.

Constipation.—Linseed oil, aloes, or castor oil.

Corns.—Open swelling; rest horse; use rubber bar pad in shoe.

Convulsions.—Chloral hydrate or bromide of potash.

Curb.—The rear line of the hock bulging backward. Soreness and lameness.

Hot applications; blister; high-heeled shoe.

Diarrhoea.—Linseed oil and laudanum; boiled linseed jelly.

Distemper.—Good diet; quinine; strychnine; belladonna; dry quarters.

Dysentery.—Intestinal disease attended by fluid, bloody passages. Fever. Animal lies down. Much thirst.

Calomel; opium.

Eczema.—Inflammation of skin accompanied by small blisters filled with straw-colored liquid.

Tar, ichthyol, iodine, or boric acid.

Enteritis.—An inflammation of the intestines. Animal flinches under pressure on the abdomen.

Linseed oil; laudanum; chloral hydrate.

Farcy.—See Glanders.

Fever.—Aconite, acetanilid, quinine, or nitre.

Fistula.—Ulcers, usually on withers or poll.

Open affected part; wash with iodine

or solution of corrosive sublimate, or reliable coal tar disinfectant.

Flatulence.—Also known as wind colic. Symptoms the same as with colic.

Stomach tube; charcoal, soda, or chloroform.

Foot Rot.—Swelling above hoof and between claws. May be followed by deep abscess.

Remove loose tissue; apply tar, blue vitriol, or other antiseptic.

Founder.—Bodily disturbance accompanied by lameness in one or more feet. Animal avoids use of affected feet, or places them carefully. Avoids weight on affected feet. Respiration active. Urine high colored.

Cold applications; poultices, aconite. Frost bite.—Ichthyol; oil of turpentine.

Gapes.—Do not give young chicks access to garden soil; touch inside of throat with feather dipped in turpentine.

Garget.—Congestion of the udder following calving. Surface of the udder pits on pressure.

Hot applications; belladonna or gum camphor ointment.

Gastritis.—Inflammation of the stomach. Usually recognized only by similar condition extending into the intestines.

Opium; lime water; subnitrate of bismuth.

Glanders.—Safely diagnosed only by veterinarian. Nodules on mucous membranes, hard bunched enlargements inside of jaws at base of tongue.

No cure; destroy all affected horses and disinfect premises.

Heaves.—Air expelled with difficulty in breathing, especially under exertion.

Moisten the food; give Fowler's solution of arsenic.

Hemorrhage.—Ice, opium; ergot or iron salts.

Herpes.—A skin eruption; small white blisters in clusters.

Apply lead acetate. Iodine, silver nitrate.

Hog Cholera.—Highly contagious, usually fatal. Shivering, loss of appetite, dulness and rough, poor appearance. Later difficult breathing, offensive discharges and red patches between hind legs and ears, on belly, etc. Emaciation and convulsions.

Incurable. Destroy infected animals. Disinfect premises; vaccinate

healthy animals and establish quarantine.

Hoven.—Caused by formation of gas in rumen or paunch, and characterized by swelling of left flank.

Soda; turpentine; tap fourth stomach.

Hydrophobia.—See Rabies.

Indigestion.—Dieting; linseed oil, gentian, or ginger.

Inflammation.—Ice; laxatives; aconite.

Influenza.—Rapid fever. Animal stands with head down. Chills. Grinding of teeth. Eyes swollen and full of tears. White of eye pink in color. Belladonna; quinine; dry, warm quarters.

Jaundice.—Eyes, nose and mouth yellow.

Dieting; Epsom salts; aloes; calomel; hydrastis.

Knuckling.—Deformity of fetlock joint.

Attention to shoeing.

Lameness.—Call expert veterinarian.

Lockjaw.—See Tetanus.

Maladie du Coit.—Discharges of viscous liquid. Weakness. Paralysis of hind limbs. Stupidity. Emaciation.

Destroy affected horses.

Mammitis.—See Garget.

Mange.—Excessive itching. Hair may be thin at affected part. Caused by minute parasite.

Dip sheep and cattle in a lime-sulphur wash or spray them with a crude oil emulsion.

Malaria.—Quinine; aloes.

Megrims.—Congestion of the brain. Eyes staring. Animal falls suddenly. Breathing labored. Nostrils dilated.

Rest; laxatives.

Milk Fever.—Occurs usually in cows that have been feeding heavily. Follows calving. Eyes red. Animal cannot stand. Senses dulled. Animal becomes unconscious.

Pump udder full of sterilized air; or inject the udder with a solution of iodide of potassium.

Osteomalacia.—Softening of bone. Depraved appetite. Stiff gait. Swollen joints. Joints "crackle." Skin dry.

Change diet; give phosphate of lime.

Poisoning.—For plant poisoning, give potassium permanganate and aconite or atropine, according to symp-

toms. For mineral poisoning, give linseed oil, lard, or milk, followed by laudanum or a stimulant, according to symptoms.

Pneumonia.—Chill, followed by fever. Pulse full. Nose hot and dry. Bowels constipated. Followed by difficult breathing, frequent cough, rattling in breathing. Warm, dry quarters; hot applications; aconite; alteratives.

Poll Evil.—See Fistula.

Quarter Crack.—Draw crack together; fasten with nails; apply tar.

Quittor.—See Fistula.

Rabies.—Nervousness. Disposition to bite or kick on slight provocation. Eyes bloodshot. Painful swallowing. Convulsions. Hind limbs paralyzed.

Destroy animals; cauterize bite wounds; apply Pasteur treatment. A very rare disease.

Rheumatism.—Stiffness. Pain in certain muscles. Increased thirst. Animal stands with back arched. Joints may swell.

Apply stimulating lotions; give salicylic acid and bicarbonate of potash.

Rickets.—Affects bones of growing animals. Legs become crooked. Joints large. Bones too thick.

Better diet; cod-liver oil; lime water.

Ringbone.—A bony growth on the foot, often around the upper border of the hoof.

Rest; blister; cautery; neurotomy.

Roaring.—Chronic loud breathing as air is drawn in.

Surgical operation, removing the arytenoid cartilage.

Saddle Galls.—Cleanse; apply antiseptic washes.

Sand Crack.—Narrow cracks in horny covering of hoof.

Bind hoof; apply tar ointment.

Scab.—See Mange.

Sores.—Cleanse, open; apply antiseptics.

Spavin.—See Bog and Bone Spavin.

Splint.—Bony enlargements on inside of leg below knee. Usually on foreleg. Causes lameness when animal is hot.

Rest; cold applications; blister.

Stomach Stagers.—See Indigestion.

Scours.—Intestinal catarrh in calves, accompanied by great weakness. Animal stands with back arched. Dung thin and offensive.

Add formalin to the calves' milk at

the rate of one part to 4,000, or dilute milk with one fourth lime water.

Sore Mouth.—Wash with solution of permanganate of potash, boric acid or chlorate of potash.

Sunstroke.—Exhaustion. Tongue hanging out. Animal staggers and falls.

Ice or cold water on the head; give whiskey or other stimulants.

Swollen Legs.—Laxatives; saltpeter; moderate exercise.

Strangles.—Membranes of eyes and mouth bright red. Yellowish discharge from nostrils. Soft swelling under jaw.

Inhalations of steam; open abscess under throat.

Tapeworms.—Treat dogs frequently with vermifuges and prevent them from eating infested parts of other animals.

Tetanus.—Characteristic spasms of muscles of face, neck, limbs and body. Early symptoms are difficulty in swallowing, and inability to open jaws widely. Tail elevated. Finally all muscles rigid.

No cure with drugs; apply antitoxin method.

Throughpin.—See Bog Spavin.

Thumps.—Aggravated hiccoughs. Usually the result of worms or over-feeding.

Physic and reduce food. Give exercise in pasture if possible, and charcoal; for worms give dried sulphate of iron in food.

Ticks.—Dip or spray cattle with crude oil; starve ticks by rotation of pastures.

Allow no rats about hog pens; eat no uncooked or underdone pork.

Tuberculosis.—Tuberculin test the only sure means of detecting this disease. Should be applied to all cows.

Test cows with tuberculin; separate reactors from healthy animals; dispose of or destroy all infected animals; disinfect premises and vaccinate all calves.

Tympanitis.—See Hoven and Colic.

Vomiting.—Hot water; lime water; morphine.

Worms.—For round-worms in horses areca nut, aloes, or creolin; for lung-worms in calves and lambs, sulphurous inhalations, turpentine; for stomach worms in calves and lambs, benzine, gasoline or turpentine in milk.

—G. & F. ALMANAC.

Principles and Practices in Breeding.

Determination of Sex.

More than five hundred theories exist on this subject. Under the theory of evolution any theory may probably come true half the time. Theory of male and female testicles disproved by the fact that stallions with but one testicle sire, both male and female. Same theory applied to females disproved on similar grounds. Theory of strong personality disproved by the fact that sires are generally better bred than dams, yet do not give a preponderance of male foals. That service early in heat produces male (some say female) disproved because in mature females are served early in their season.

It is noticeable that nearly every theory on the determination of sex contains some trace of male superiority.

It would seem, then, that there are various circumstances that appear to

influence the sex of offspring. These seem in some cases to be connected with nulution and in others with the inherent nature of the germ. The present knowledge is insufficient to solve the problem of sex differentiation, but it is safe to say that none of the traditional facts are warranted by the known facts.—“Davenport.”

Grading.

By “grading” is meant the mating of a common or relatively unimproved parent with one that is more highly improved, that is, a “pure bred.” The mating might be made either way, but in practice the male is taken for the pure-bred parent for economic reasons. One pure-bred bull with a herd of twenty cows can give all the calves in the herd a pure-bred sire (that is, make them half bloods), whereas if the making of half bloods were at-



Daisy Dean by Dunure Baron, Champion Heavy Draft Canadian National, 1915.

tempted in the other way it would require twenty pure-bred individuals, and the crop of calves would have no more improvement; besides which, the improvement made would be not in one but in twenty lines, each with its shade of difference.

Expressed in terms of money, it is possible to give all the calves in a herd a pure-bred sire—that is, make them all half bloods—at a total cost of approximately two dollars per calf, assuming, of course, a reasonable number of cows in the herd and a bull at a moderate price, but good enough for grading. If the making of half-blood calves were accomplished in the other way, however,—that is, by providing the pure-bred parent on the dam's side,—it would cost, at the same relative rate, close to forty dollars as a minimum. This shows the necessarily extreme cost of pure bred as compared with grades.

Improvement by grading is of course limited to herd improvement. It adds nothing to the breed, but it distributes breed excellence rapidly and with extreme certainty. Such a sire is almost surely prepotent over the dams, whatever they may be, and the mathematics of mating shows that if the practice is continued for six generations, but one and a half per cent. of the original unimproved blood will remain, as is shown in the table accompanying.

By this we see that the unimproved blood soon becomes insignificant and rapidly disappears. This is why it is that in the early days of a breed the sixth or seventh cross is declared eligible to record.

It should be noted that if any one of these generations be bred with itself (grades with grades) no progress is made. Thus individuals of the second generation are one fourth unimproved, and, bred to a generation of their own kind, they will still remain one fourth unimproved. By the same principle, half bloods bred to half bloods will produce half bloods indefinitely. The effects of grading cease the moment we discontinue the pure-bred sire.

Abuse of Grading.

The chief drawback in grading is that it is likely not to be followed up. The breeder is almost certain to choose some promising half or three-

quarter blood for a sire because he "looks as good" as a pure bred, and then by the law of ancestral heredity all improvement stops except the little that can be accomplished by the slow process of selection.

Advantages of Grading.

For economic purposes grades may be equal to pure bred, but they are worthless for breeding purposes; this is the plain conclusion of what is well-known of the principles of breeding. Grading is cheap. By the use of a single individual it secures at once something more than half of the total excellence of the breed, and if followed up it will secure in time, through sires alone, practically all of it.

This is the system of breeding to be recommended to the great mass of stockmen, and if it could be generally adopted and followed up it would add millions to agriculture. Every stockman knows that the great bulk of the best cattle in the markets are high-grade Shorthorns and Herefords. Figures surely show that the less-known Angus and its close relative the Galloway, are equally successful for grading purposes. The failure to make the most of grading is the largest single mistake of our farmers and the most conclusive evidence of shortsighted business policy on the part both of the general farmer and of the breeder of pure-bred stock.

The Breeder's Business is the Production of Sires.

The professional breeder is a producer of sires, and he should sell males, not females. He should take the amateur kindly into his confidence and explain that while he himself is in the business for profit, and his animals are for sale, yet he fully realizes that grading is the breeding for beginners. He can easily show the novice that if he will keep his old females, or, if not, get plenty of such as are easily available, he can have as many grades within a year as he can provide females now, and that speedily he will own a herd that for all practical purposes except breeding will be as good as anybody's, all at a cost of only two or three dollars per calf, and correspondingly less or more for other animals. Such a course will demonstrate at once the excellence of the breed.

and make friends, not enemies, of the man and his neighbors.

The burden is upon the breeders and owners of pure-bred flocks and herds to lead in a crusade for grading. They need the market for their excess of males, and if this market were fully developed, and the mass of stockmen fully alive to the advantages of grading, this market alone would absorb at good prices all the male output from our breeding herds,—a consumption they stand sorely in need of attaining.

The female output of our breeding herds should be used, first, to re-enforce the home herds, and after that to supply deficiencies in other reputable herds. Any further surplus animals should go to the open market, except in some rare cases in which they are needed for the real founding of new herds.

Begin Animal Breeding by Grading.

Grading is the safest beginning, even for the prospective breeder of pure-bred stock. Not only is it cheap and safe, but it will bring out clear and strong in the grades the main breed points, and a few generations of grades from low to high will spread out before the eyes of the breeder such a panorama of breed characters as he would not see in years of pure breeding on a small scale; indeed, there is no quicker, cheaper, or more thorough way of becoming acquainted with a breed than through its grades.

Disadvantage of Grading.

The only disadvantage that can be mentioned is this,—that the first results are so eminently satisfactory that some promising grade is likely to be selected as a sire, regardless of the law of ancestral heredity, whereupon all further improvement stops. This is so likely to be the case that it may be said in general that the very success of grading is the greatest guaranty of its failure.

Advantages of Crossing.

Notwithstanding the operation of Mendel's law as a general principle, crossing is a fruitful source of new strains. Hybridization is better adapted to plants than to animals because of the need of vigorous selection afterward and, therefore, of relatively large numbers. It was a favorite method of plant improvement twenty years ago,

but it has fallen largely into disuse because of the inconstancy of Mendel's middle term (the 50 per cent. apparent hybrids) and because as good or better results can often be secured by selection alone, without destruction of the pedigree and the influence of the ancestry.

Disadvantages of Crossing (Hybridizing).

The difficulty of securing a blend out of a violent cross, or indeed anything that will breed pure, and the great mass of long-continued and disappointing reversions experienced, have turned attention largely away from this system of breeding, to one which, if less spectacular, is eminently safer, and, so far as we now know, fully as fruitful of results.

It is the opinion of the writer, however, that as we learn by experience it will be found that certain races of plants will lend themselves well to this means of producing new varieties, and that the old-time enthusiasm for hybridization will return in these exceptional cases.

Crossing is a powerful means of inducing variability,—indeed, it is the most powerful method known to breeders. It is altogether too fruitful of variants to be manageable in animal breeding, and only sheer necessity, after all other methods have failed, would warrant its trial among these slow-breeding races.

If animals are to be hybridized it can probably best be accomplished by combining, not two races simply, but three or more, leaving the one nearest that which is wanted untouched until a fairly favorable cross between two others has been secured. Then the pure form, if bred with the cross, might be influenced thereby, but would of course remain prepotent. Such a plan of action aims rather at the modification of a breed than at the creation of a new one.

Hybrids Often Sterile.

All degrees of productivity are found in hybrids, from extreme fertility to absolute sterility. Some crosses are more fertile than either parent. Such a cross would be made readily in nature. Others are absolutely or nearly sterile. It is safe to assume that about all the possible fertile hybrids were long ago produced in na-

ture, and either went down under natural selection, or became good species before they came into our hands. However, modified strains may yet be hybridized, and sterile hybrids may often be propagated asexually.

The classic hybrid is the mule or hinny, the cross between the horse and the ass, and is nearly always sterile. The lion and the tiger mate freely, in captivity at least, but the mating is in most cases fruitless. Even here, however, hybrids have been born.

The Reciprocal Cross.

Strange as it may at first appear, the two possible crosses by interchange of the sexes often, though not always, differ substantially. It is said that the common mule more nearly resembles the ass, and the hinny the horse. Other instances have been noted, and the point has been urged that reciprocal crosses are in general dissimilar. It is the writer's opinion that the rule applies only to those particular characters in which the one parent (either male or female) is prepotent over the other because of sex. However, statistical evidence on reciprocal crosses is almost totally lacking.

The whole subject of hybridization seems at present to promise little of interest to animal breeders beyond the production of the common mule, but if we may place a shrewd guess, it will yet be found a fruitful source of new varieties in certain races of plants, in which propagation is so easily effected by budding, grafting, or other form of a sexual multiplication, thus avoiding the effects of Mendel's law in a way quite impossible with animals.

Line Breeding

By "line breeding" is meant the restriction of selection and mating to the individuals of a single line of descent. The purpose of this system of breeding is real breed improvement,—to get the best that can be gotten out of the race and better than ever before if possible.

Line breeding excludes everything outside the approved and chosen line of breeding. It not only combines animals very similar in their characters, but it narrows the pedigree to few and closely related lines of descent. This "purifies" the pedigree rapidly

and gives the ancestry the largest possible opportunity. The system is eminently conservative. It discourages variability, and rapidly reduces it to a minimum. Moreover, whatever variations do occur will be in line with the prominent characters of the chosen branch of the breed.

Advantages of Line Breeding.

The nature of results secured by this system can almost certainly be predicted; and when they do appear, and improvement is at hand, it is backed up by the most powerful hereditary influence obtainable, because of the simplicity and strength of the ancestry, which, if the selection has been good, all "pulls" in the same direction. The records of all breeds will show the pronounced results that have followed judicious line breeding. A volume could be filled with pictures of famous animals so produced. Those shown are the swine, for the reason that the pig is popularly supposed to be the most sensitive to close breeding.

Disadvantages of Line Breeding.

The chief danger in line breeding is that the breeder will select by pedigree, abandoning real individual selection. A line-bred pedigree is valuable or dangerous in exact proportion as the individuals have been kept up to grade. It will not replace selection, but, on the contrary, calls for the most discriminating care within the line.

If the breeder selects by paper, and not in the yards, and a few generations of inferior animals creep in, then line breeding will consign the whole bunch to the limbo quicker and more certainly than will any other known system of breeding,—a fate that has overtaken more than one line that unfortunately became prematurely fashionable.

Line Breeding the Best System for Improvement.

No other system of breeding has ever secured the results that line breeding has secured, and if the present state of knowledge is reasonably sound, no other system will ever be so powerful in getting the most possible out of a given breed or variety, especially of animals, and this with the greatest certainty as we go along. The only requirement is, not to aban-

don individual selection. A pedigree is not a crutch on which incompetence can lean; it is a guaranty of blood lines,—a field inside of which breeding operations and selection may with confidence be confined.

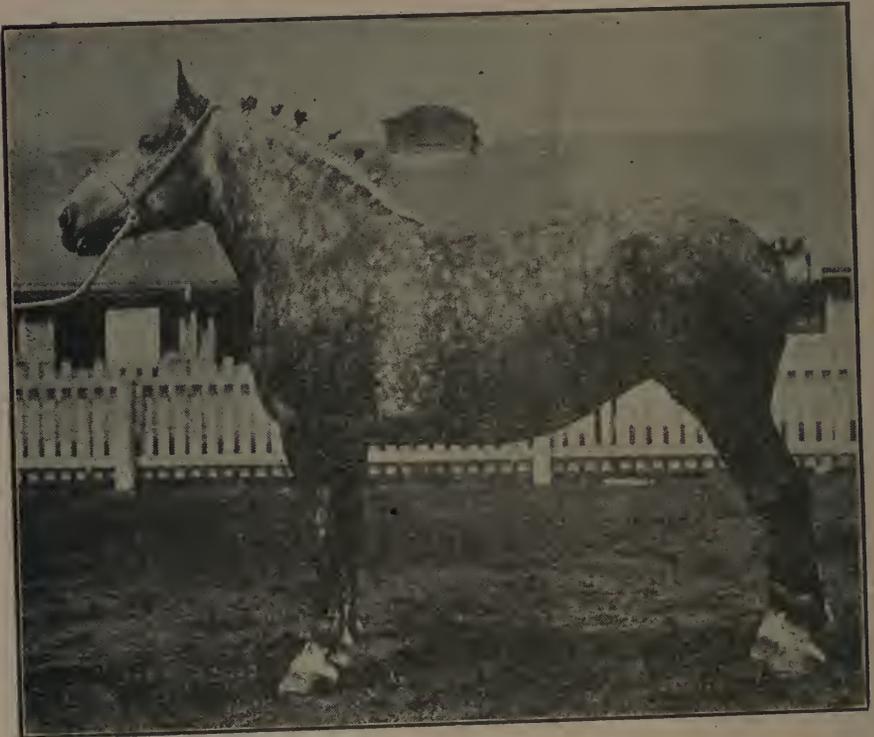
The word "confined" is used advisedly, for, after line breeding has been practiced for a few generations, the ancestry becomes a kind of pure breed of its own,—a breed within a breed, so to speak,—and any attempt to introduce blood from other lines is likely to be followed by the pains and penalties of hybridization; for a departure from line breeding is a kind of crossing in a small degree, and so rapidly do blood lines become intensified that line-bred animals assume all the attributes of distinct strains, as they in truth are, and they will be likely to behave as such ever after.

In saying that line-bred animals tend to behave like pure strains, and that their progeny from union with other strains behave like hybrids, it

is not meant that such unions should never be made, or that such behavior is as persistent as with real crosses. In truth, many lines are so stubborn as never to blend with others afterward (behaving like the most strongly established races), but, on the other hand, most of them will yield to well-directed and persistent effort; that is to say, a line-bred herd can be modified, and in time made to assume the characters of another family, but the process is attended with a struggle and not a few failures. It has been fashionable at times to decry line breeding, but the fact remains that a few generations of good breeding soon bring the herd and its career to a point where line breeding must be practiced or a worse alternative must be accepted, for with well-selected strains all outbreeding is mixed breeding.

Inbreeding.

Line breeding carried to its limits involves the breeding together of in-



Labenoiniere, Champlon Percheron Female Canadian National, 1915.

dividuals closely related. When it involves the breeding together of sire and offspring or of dam and offspring or of brother and sister, it becomes inbreeding, or "breeding in and in." It is line breeding carried to its limits, and of course possesses all the advantages and disadvantages of that form of breeding carried to their utmost attainable degree.

Forms of Inbreeding.

Three forms of inbreeding are possible among animals namely:

1. Breeding the sire upon his daughter, giving rise to offspring three fourths of whose blood lines are those of the sire,—a practice which, if followed up, soon results in offspring with but one line of ancestry, thus practically eliminating the blood of the dam. This form of breeding is practiced when it is desired to secure all that is possible of the blood of the sire.

2. Breeding the dam to her own son or sons successively, thus increasing the blood lines of the female side. This form is practiced when it is the dam's blood lines that are to be preserved and condensed. Both systems are necessarily limited to the lifetime of the individuals involved. Either system can of course be approximated by the use of granddaughter or grandson, which would by common consent be called inbreeding, but relationship more remote would generally be regarded merely as line breeding.

3. Breeding together of brother and sister,—a form of inbreeding which preserves the blood lines from both sire and dam in equal proportions. It is inferior to either of the others as a means of strengthening previously existing blood lines, but it is freely employed when the combination has proved exceptionally successful, virtually establishing a new type. It has all the dangers of the other two, and in a larger degree, because we have practically no acquaintance with the new combination, whereas in strengthening the proportion of one line of ancestry over another, whether it be that of the sire or that of the dam, we are dealing with previously existing blood lines known to be harmonious.

Among plants there are two forms of inbreeding, namely:

1. That in which the fertilization

is with pollen from another flower on the same plant.

2. That in which fertilization is by pollen of the same flower. This, being hermaphroditic, is the closest imaginable inbreeding, and exceeds anything that is possible with animals.

Advantages of Inbreeding.

Nobody claims advantages in inbreeding per se, but it is the acme of line breeding, and when superior individuals are at hand it is the most powerful method known of making the most of their excellence. It is the method by which the highest possible percentage of the blood of an exceptional individual or of a particularly fortunate "nick" can be preserved, fused into and ultimately made to characterize an entire line of descent on both sides.

If persisted in, the outside blood disappears by the same law that governs grading, and the pedigree is speedily enriched to here an almost unlimited extent by the blood of a single animal,—in practice, generally that of the sire. It is a method not so much of originating excellence as of making the most of it when it does appear, and it is not too much to say that a large proportion of the really great sires have been strongly inbred.

An inbred animal is of course enormously prepotent over everything else. Its half of the ancestry, being largely of identical blood, is almost certain to dominate the offspring. Inbreeding is, therefore, recognized as the strongest of all breeding, giving rise to the simplest of pedigrees,—an advantage quickly recognized when we recall the law of ancestral heredity. In this respect it is all that line breeding is and more.

A second advantage is that successful associations of characters are preserved intact and not shattered by the infusion of new strains. If the breeder were dealing with but a single character he could readily find its equal, and there would be little need for inbreeding; but even if breeding for but a single utilitarian character, he always has at least two others, vigor and fertility, which must be included in selection. In practice he has many more, and a single individual that contains all or most of them

in a high degree is a veritable bonanza; naturally the temptation is to make the most of an opportunity which is none too frequent in the breeding business.

All things considered, no other known method of breeding equals this for intensifying blood lines, doubling up existing combinations, and making the most of exceptional individuals or of unusually valuable strains.

Disadvantages of Inbreeding.

Clearly, however, this is not a gun to "hit the bear and miss the calf." This "doubling up" process, this intensifying of characters, increasing their prospects from possibility to probability and afterward to certainty, works exactly the same for one character as for another; it affects all characters of the individuals involved, bad as well as good; and so it is that this method, which is applicable to both plant and animal breeding, and which aims at making the greatest use possible of our most valuable possessions, has been followed alike by the most strikingly successful results and by the most stupendous disasters that ever overtook the breeding business. Plenty of examples of successes can be instanced, and every breeder is familiar with them. The failures have been many, but they are not to be counted here, for the blood lines involved are long since extinct.

Special Dangers From Inbreeding.

Tradition everywhere has it that inbreeding, if long continued, is practically certain to end in loss of vigor and of fertility, and plenty of instances are given to "prove" it.

Now a rational consideration of the principles of transmission has already led us to expect that bad characters as well as good will be intensified. We could not expect so powerful a method to work only to our advantage and to grant immunity from disadvantage in all cases.

What we want to know is whether, in respect to trouble, we are to look out for likelihood or for certainty; whether disaster is inevitable, or only extremely probable. This question has been much befogged by certain catchy statements such as, "Nature abhors incestuous breeding," all of which confuse an ethical and social question with the biological one in which only we are interested.

Inbreeding Not Necessarily Disastrous.

Our attention is constantly called to "nature's provisions for preventing inbreeding," and to "ingenious devices for inducing cross pollination by insect aid"; but we are not reminded that many species of plants are self-pollinated, nor is our attention called to the many famous sires that were strongly inbred, nor to the fact that in nature among gregarious animals the head of the herd is sire of practically all the young (so long as he remains master), many of whom are thus doubly his. Nor do we have it called to our attention that, while corn seems peculiarly sensitive to inbreeding, wheat is self-fertilizing to the closest possible degree, and that it is perhaps the most vigorous, prolific, and all-round cosmopolitan success among our domestic plants.

Lack of Vigor and Low Fertility the Two Most Common Defects.

If what has been said and shown has any meaning, it is that any character can be bred up or down, strengthened or weakened by this method of breeding. Why then its evil reputation with respect to vigor and fertility? Is there some inherent injury from close breeding, or is it merely that vigor and fertility are commonly defective characters and frequently find themselves on the losing side? Undoubtedly it is the latter. There are cases enough of the greatest vigor and fertility of inbred individuals, and of family lines and even of whole species to set aside all fear of inevitable injury from close breeding, but a little study will convince us that there is lurking weakness and infertility everywhere. It is said that one-third of our children die in infancy. A large proportion of animals and an apparently larger proportion of plants are relatively weak and easily succumb to disease or to the encroachments of their neighbors.

Few individuals are fully fertile,—that is, free and regular breeders,—and fewer yet are both fertile and vigorous. Shortcomings in these two respects may be called the distinguishing defects of both plants and animals under domestication. In nature they constitute the chief points of attack of natural selection, but in domesticated animals and plants we common-

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ly select for other points, even color, trusting to luck for vigor and fertility. Is it any wonder that these lurking evils have crept upon us until they often constitute an insurmountable bar to inbreeding, and have invaded even our most carefully outbred herds?

As inbreeding is the supreme test of a race, so it is of a character; if a character suffers by inbreeding it is a sign of natural defectiveness and should be accepted as such, and not laid up as an additional instance and a weapon with which to abuse a system with a history of laudable achievement in the past and rich with possibilities for the future.

When we select for vigor and fertility we shall hear less of the evils

of inbreeding. In the meantime we shall hear most about it where vitality and fertility are naturally lowest. Both are cardinal requisites,—one for life, the other for reproduction,—and both must be possessed in a high degree by any individual or family line that is to figure much in descent.

Noting, then, the remarkable instances of successful inbreeding, as well as its unexampled capacity for trouble, we arrive at the conclusion that the disaster from inbreeding is probable, but not inevitable. With that much gained, it is worth while to examine further into this disputed territory.

Note:—We are indebted to Davenport's Breeds and Breeding for this valuable data.—Ed.

Butter and Milk Tests at London Dairy Show.

Below is given the yields of the first prize cows or heifers of the various breeds competing in their respective breed classes at the London Dairy Show, England. In the milking trial the Shorthorns made the most points, with the Holsteins second. The Holstein had the edge in milk and fat, but the Shorthorn was higher in

solids not fat. Guernseys topped the list in solids not fat.

In the butter tests the Jersey scored highest, having a handicap over the Shorthorn of 137 more days in milk and was allowed 12 points for this. Following is the tabulated list giving 1st prize cows only.

Milking Trials.

	Days in Milk.	Average Daily Yield, lb.	Per Cent. Butter Fat.	Total Daily Fat.
Shorthorn	16	60.3	3.51	2.11
Shorthorn heifer	15	35.9	3.62	1.29
Lincoln cow	43	54.2	3.46	1.87
Lincoln heifer	34	64.6	3.26	2.10
Jersey cow	177	38.9	5.02	1.95
Guernsey cow	149	35.9	4.97	1.78
Red Poll cow	31	52.6	2.89	1.52
Holstein cow	17	61.3	3.55	2.17

Butter Test.

	Date Birth.	Days in Milk.	Milk Lbs.	Lbs. Butter.
Shorthorn	1910	40	48.31	2.96
Jerseys	1904	177	40.13	2.31
Other breeds	1907	94	30.81	1.82

THE FARM DAIRY

1. The milk scale has two indicators. One rests at zero when there is nothing on the scale. The other is to be set at zero when the empty pail is on the scale. This one records the weight of the milk directly.

2. Let the pail hang on the scale while recording the weight of the milk.

3. If there is not time to weigh the milk every day, weigh it for three successive days in the month or at intervals as the 5th, 15th and 25th, then to find the average production of each cow, divide the total amount of milk recorded from each cow by the number of days the milk is weighed. Multiply the result by the number of days in the month which will give approximately the total production for the month.

Taking the Sample.

1. The best time to take the sample to test is immediately after weighing the milk.

2. Always mix the milk well before taking the sample to thoroughly distribute the cream.

3. The best sample bottles are closed air tight to prevent evaporation which increases the test. Label each bottle with the name or number of the cows so the samples will not get mixed.

4. If a sample from a single milking is to be tested take half a pint. Where a composite sample is made from several milkings retain about two tablespoonfuls each time.

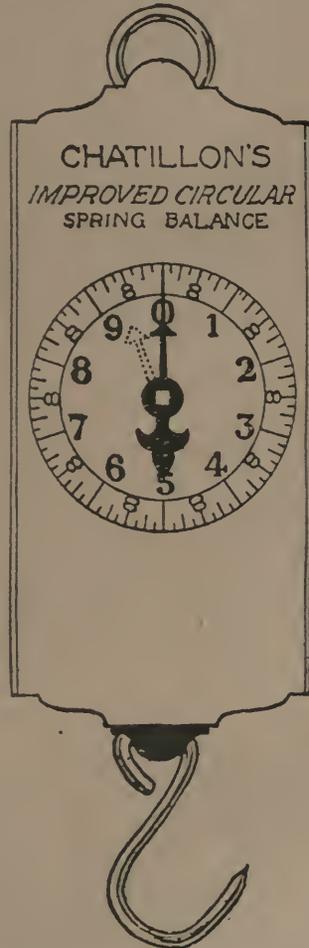
5. A composite sample is made up by taking two tablespoonfuls from several milkings and keeping until ready to test.

6. If the sample is held for a time, in warm weather, use a preservative tablet to keep the milk from souring. These tablets are poisonous and need to be handled with care.

Making the Babcock Test.

Any one can readily learn to make the Babcock test. A complete testing outfit, including tester, glassware,

and acid, with instructions, can be secured from the hardware store or any of the creamery supply houses for about \$5.00.



These scales will weigh 30-60 lbs. and have a loose pointer which by means of a thumb screw on the centre may be set anywhere on the dial, thus taking the tare of the milk pail. The price of these is given in test of dairy equipment.

INDIVIDUAL COW MILK RECORD.

For 30 days ending.....
 Name.....
 P.O.....
 Province.....

Name.		Breed.	No.	Age.	Date of last calv.	3 DAYS' WEIGHINGS OF MILK.						Total Pounds of Milk Calculated for 30 Days.		BUTTER FAT.	
						Dates.						Per cent.	Total pounds.		
			1			A M	16	16	15						
			2			P.M.	15½	14½	15						
			3			A M									
			4			P.M.									
			5			A M									
						P.M.									
						A M									
						P.M.									

This form may be extended to take records for more cows. Copies, ruled for 18 cows, may be obtained on application to the Dairy and Cold Storage Commissioner, Ottawa. State in your letter which milk record form is required; that for daily weights, or this one for 3 days per month.

It will assist in keeping correct records if the name of the cow is given as well as her number. The details of age, breed and date of calving need be given only once, but make certain of having these particulars of each cow. State whether grade or pure bred.

Each cow must keep her own number right through the season. If she goes dry, and freshens again during the year, she must appear on the record again under her original number.

If a cow is disposed of, state for what reason.

Milk Recording Chart as Supplied by the Dairy Commissioner at Ottawa.

To Make the Babcock Test.

1. Mix the sample of milk well by pouring from one beaker or bottle to another; then measure into a test bottle with a pipette 17.5 c.c. of the milk as marked on it.

2. Add to each bottle 17.5 c.c. of sulphuric acid (as marked on the measure) and mix well by rotary motion until all of the curd is thoroughly digested and a "coffee brown" color appears.

3. Put the bottles into the tester and whirl at full speed two to four minutes.

4. Add hot water to each bottle until the butter-fat rises up to the neck.

5. Whirl again at full speed two to four minutes.

6. Add hot water until the butter-fat rises half way up the neck of the bottle; then whirl one minute and read the test.

Reading the Test: Read from the extreme point of the top curve to the bottom of the fat column.

The test of the milk is marked in per cents on the neck of the test bot-

tle. If the milk test 33 per cent., it means that there are three pounds of butter-fat in each one hundred pounds of milk.

How to Keep Daily Records.

The Milk Sheet.

1. The milk sheet is made by ruling off space for each cow. Place the name or number of the cow at the top and record the weight of the milk for morning and evening in the space below. The same sheet may be used to cover a period of three days, a week or a month.

2. Place the record sheet in a convenient rack close to the milk scale and protect with a movable cover to keep it clean.

3. The best plan is to weigh the milk from each cow at every milking and record the weight on the sheet.

4. The daily milk record is the best as it serves both as a guide to the feeder and a check on the milkers.

5. A complete record serves as a basis of economy in the feeding of

Save Labor and Increase Your Profits

Get all that's coming to you from your cows, and at the same time make the work easier for the women folks.

The Massey-Harris Cream Separator skims close at all temperatures, is easy to fill, easy to turn and easy to clean, simple, safe and durable.

A new catalogue tells why.

See later page regarding engines

Massey-Harris Co., Limited

Head Offices—TORONTO, CANADA.

Branches at — Montreal, Moncton, Winnipeg, Regina, Saskatoon, Swift Current, Yorkton, Calgary, Edmonton. Agencies Everywhere.



individual cows. It requires comparatively little time, and is a complete index to the herd, to the feeder and to the milker.

Figuring Returns.

The net profits from the dairy herd is the difference between the income and the cost of maintenance.

The income includes the value of the butter-fat, the skim-milk, the calf and the manure.

"The annual cost of maintaining a cow comprises the following items: Cash sundries, cash feeds, farm feeds, labor (man and horse), general expenses, shelter, depreciation, machinery and equipment, herd bulls and interest on investment; the classification is somewhat arbitrary, as in some instances an item of cost might be charged to one class or another with equal correctness. Cash sundries comprise those items for which cash was paid—ropes, halters, veterinary services and medicine. Cash feeds are those purchased for cash,

farm feeds those produced on the farm. Labor includes both man and horse labor at the current rate of wages for the month and year, comprising all items of labor performed for and affecting the dairy. General expense comprises those items which are a charge to the entire farm, and is made up of cash and labor expenditures. The total for the farm is then apportioned to the productive enterprises of which the dairy is one.

Shelter is a fixed charge for the use of the building based on its cost, depreciation, repairs and the number of animals sheltered. Depreciation is based upon the productive life, death rate, original value of the cow for consumption.

Machinery and equipment charges are due to the use, depreciation, repairs and interest on the cost of the machinery and equipment of the dairy.

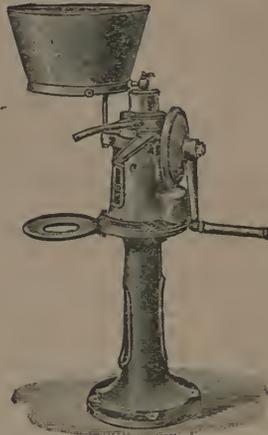
The charge for herd bulls is the cost of maintenance.

Interest on investment is interest at the rate of 5 or 6 per cent. on the

The Premier Cream Separator

Entirely
British-
made

Every
Machine
fully
Guaranteed



Easily
Understood

Easily
Operated

Easily
Cleaned

Tens of thousands in daily use throughout the British Empire.
Catalogue containing valuable information on request.

THE PREMIER CREAM SEPARATOR CO.

659-661 King St. West.

Toronto, Ont.

value of the cow at the beginning of the year. All items represent actual expenditures on the farms, excepting the charges of shelter and depreciation which are based on averages of all the farms for the entire period." From Bul. No. 124 Minnesota Experiment Station.

The hand power cream separator is the most reliable and best method of skimming milk at the farm.

Some of the advantages over the other methods are: (1) less loss of fat in the skim milk, (2) a better and more uniform quality of cream, and (3) the skim milk is in the best possible condition for feeding young stock. All the separators on the market will do efficient skimming if properly handled.

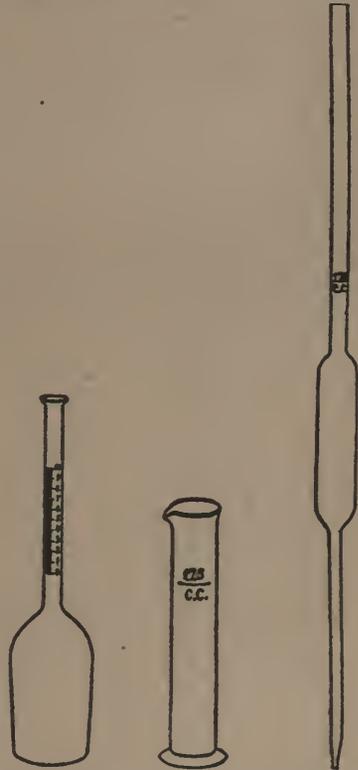
Handling and care of the Separator.—It is important that the separator run smoothly. Any trembling or shaking of the separator while skimming, will cause a loss of butter fat in the skim milk. Only special separator oil should be used, and it is well to make a run about once in three weeks, using kerosene oil on all the bearings.

In skimming, three things must be observed: (1) The speed of the separator must be maintained according to the directions sent with it. The only reliable way to do this, is to count the number of revolutions of the crank by the watch. A low speed means loss of fat in the skim milk. (2) The flow of the milk into the separator should be uniform. (3) The temperature of the milk should not be under 90 degrees and for that reason the best time to separate the milk is immediately after milking. A low temperature is also liable to cause loss of fat in the skim milk. The faster the milk passes through the separator, the less complete is the separation, and a thinner cream is given. Every separator has some device for changing the test of the cream. In most cases the adjustment is at the cream outlet. If so, by turning the cream screw in, the cream will be richer, and by turning it out, the cream will be thinner.

All the parts of the separator which come in contact with the milk or cream should be washed in lukewarm water, to which has been added a small quantity of sal soda or other

cleansing powder, and then thoroughly scalded with boiling water, each time the separator is used.

Location of Separator.—In some cases the separators are placed in the cow stables. This may be a convenient arrangement, but it is not by any means a proper place for separating milk, unless a special room, well ventilated and lighted, is partitioned off, to exclude the stable odours and dust.



From left to right: Graduated Bottle, Acid Measure and Pipette, used in Babcock Test.

This room should have a smooth cement floor, which can be easily cleaned.

Proper Temperature for Churning

Depends on—

Richness of the cream.

Length of time cows have been milking.

The breed of the cows.
The feed of the cows.

Conditions for Low Churning Temperatures (54° to 62°).

Very rich cream.
Cream from fresh cows.
Cream from cows on succulent food.
Cream from Jerseys and Guernseys.

Conditions for High Churning Temperatures (64 to 75).

Very thin cream.
Cream from cows a long time in milk.
Cream from cows on dry feed.

For Best Results in Farm Dairy Work.

Keep good cows.
Feed liberally.
Keep comfortable and clean.
Skim a rich cream.
Use clean pure water for washing butter, not more than three degrees warmer or cooler than the butter milk.
Keep cream cool.
Churn at a temperature that produces flaky granules.
Put butter up in neat attractive packages.
Keep everything in and about the dairy clean and attractive.

Composition of Milk Fat.

Fatty Acids.	Per cent.
Butyryn	3.85
Caproin	3.60
Caprylin . . . . .	.55
Caprin	1.90
Laurin	7.40
Myristin	20.40
Palmitin	25.70
Stearin	1.80
Olein	35.00

Plants That Affect Cows and Their

Product, If in the Pasture

Common Monk's Hood.
Pasque Flower.
Stinking Hellebore.
Garlic Mustard.
Wild Radish: Runch.
Fool's Parsley.
Hemlock.

Marsh Pennywort.
Pepper Saxifrage.
Wormwood.
Hawkweed.
Tansy.
Common Forget-Me-Not.
Lousewort.
Butterwort.
Corn Mint.
Spurge.
Crow Garlic.

Testing Cream.

Cream test-bottles are graduated to read as high as 30, 40 or 50 per cent. fat, and are made with a large neck. Use an 18 c.c. pipette for measuring cream. Rinse the pipette. After mixing the cream and acid, add the hot water before whirling, and whirl for five minutes. Place the bottles in hot water before reading. Each division of the scale reads one-half, or one per cent., according to the marking. The proper amount of cream, or milk, etc., for a test is 18 grams. The pipette is fairly accurate in delivering this weight, but in the case of very rich or greasy cream it is impossible to be sure that the volume measured will weigh 18 grams. For this reason, in many creameries, the test samples are weighed on scales manufactured for this purpose.

Testing Skim-Milk, Buttermilk, Whey.

Owing to the small percentage of fat in these products, to get accurate tests, double-nicked test-bottles should be used. The amount is taken in a 17.6 c.c. pipette and tested in the usual way. The milk has to be delivered slowly into the larger neck, or it bubbles out. The scale on the neck reads to one-hundredth of one per cent. On large division reads five-hundredths, or .05 per cent. fat.

Babcock Test for Butter.

1. Secure a representative sample of butter and place the vessel containing the butter in a tub of water at 100° F., and stir until the butter becomes a thin paste.
2. Weigh 4.5 grams or 9 grams into a cream bottle.
3. Add enough water at 70° F. to make 18 grams.

4. Add 17.5 Sulphuric Acid and mix thoroughly.

5. Continue the test the same as a test for cream.

6. Per cent. of fat = Reading \times 18.
No. of grams used.

Example. 4.5 grams butter taken.
Reading = 22.

Per cent. fat = $22 \times 18 \div 4.5 = 88$ per cent. fat.

Poor Fat Tests.

Burnt or cloudy readings may be caused by:

(a) Having the temperature of the milk or acid too high.

(b) Using acid which is too strong, or using too much acid.

(c) Allowing acid to drop directly on and through the milk.

(d) Allowing the milk and acid to stand too long before mixing.

Light or cloudy readings or floating particles of curd are usually caused by:

(a) Temperature of milk or acid too low.

(b) Using too weak an acid or not enough acid.

(c) Careless mixing, or insufficient shaking to unite the milk and acid thoroughly.

Qualities of Good Butter: How it is Judged.

It is well to know what a judge looks for in a No. 1 butter, and work up to his requirements. Judges now almost universally use a score card, and the marks are approximately as follows:

Flavor	50
Texture or Grain	20
Color	15
Salt	10
Package	5

Total 100

Theory of the Babcock Test.

A 17.6 c.c. pipette will deliver, practically, 17.5 c.c. of milk.

17.5 c.c. at an average specific gravity of 1.032 = $(17.5 \times 1.032) = 18.06$ grams.

18 grams is the weight of the milk required for a test.

The volume of the neck of the milk test bottle between zero and 10 is 2 c.c.

2 c.c. of melted fat, at a specific gravity of .9 = $(2 \times .9) = 1.8$ grams.

The relation of 1.8 is to 18, as 1 is to 10, or 10 per cent. of the original volume of the milk. This is why that weight or volume of milk is taken and why the neck of the bottle is divided into 10 equal parts.

Feeds That Injure Flavor of Milk.

- Turnips,
- Rape,
- Rye,
- Turnip Tops.
- Decayed Ensilage.
- Leaks.
- Onions.
- Apples in large quantities.

Causes of Tainted Cream.

Cows' udders and teats unclean at milking time.

Milking in unclean, ill-lighted stables.

Using unclean wooden, galvanized and rusty palls.

Separating the milk in the stables. Improperly cleaned separators.

Keeping the cream in cellars or other places where there are roots or vegetables.

Keeping the cream for several days at a temperature over 55 degrees.

Cows drinking water from stagnant ponds, or the leakage from barnyards.

Necessary Sanitary Conditions, Etc.

- Abundance of pure water.
- Free access to salt at all times.
- Cleanliness in stables at all times.
- Good ventilation and fresh air.
- Kindly treatment.
- Clean and pure food.
- Moderate temperature in stable.
- An abundance of tempered light.

Pasteurization.

Immediately after the cream is received it should be pasteurized. By pasteurizing we mean the heating of the cream to a temperature of 180° to 185° F., and then quickly cooling to ripening or churning temperature. No phase of our creamery work is so beneficial as pasteurization, and no phase of the work is so generally neglected. Why? Many creamery men say "it is too expensive," others say, "it is too much labor." Neither answer is correct. Our creameries are not pasteurizing for the same reason that our creamery patrons are not storing ice to cool their cream.

They do not know, or realize, the great benefit to be derived from it. The patron who neglects a supply of ice or other facilities for cooling his cream and the creamery man who neglects to pasteurize are both in the same canoe. Both are floating down instead of paddling up, the stream of progress, as they should, and as they would, did they once realize the benefits that would accrue from cooling and pasteurizing.

What Does Pasteurizing Do?

1st. It kills the greater number of bacteria in the cream. Some of these bacteria are disease producers; others injure the flavor of the butter.

2nd. It assists in making a more uniform product of butter.

3rd. It creates a clean seed-bed for the sowing of a pure lactic acid culture.

4th. It enhances the keeping quality of the butter.

Ripening.

By the term ripening, we mean the souring of cream. This is done by the addition of a pure, lactic acid culture to the cream immediately after pasteurizing and cooling. In most of our creameries the cream is

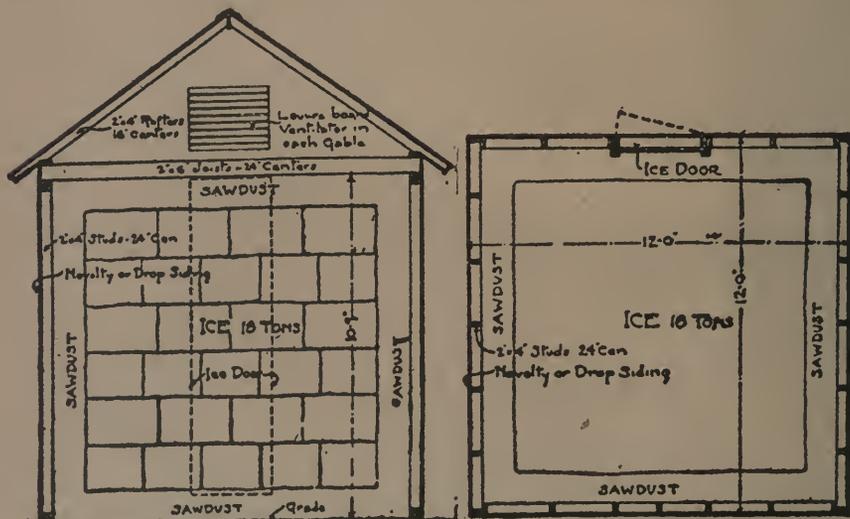
ripe enough before it reaches the creamery. The benefit of the culture in this kind of cream is the production of a desirable and uniform flavor in the butter.

Cool the cream to a temperature between 60° to 70° F. Use about 10 per cent. of good culture (more if the cream is very bad), and allow the cream to develop .4 to .5 per cent. acidity. When the proper percentage of acidity has developed, cool the cream to churning temperature, and churn as soon as possible. Pasteurization and a good culture will do more to improve the quality of Ontario butter than any other treatment which the cream can receive.

Churning and Working.

By churning we mean the gathering of the fat globules together into butter, by means of concussion. The question is often asked, "What is the proper churning temperature of cream?" No definite temperature can be given. The churning temperature is influenced by:

1. The character of the butter-fat.
 2. Acidity of the cream.
 3. Percentage of fat in the cream.
 4. The amount of cream in the churn.
1. The fat is influenced by the pro-



This illustration shows in detail the construction of small ice house on the farm. Note the capacity.

portion of soft and hard fats. Also by the period of lactation, and feed of the cows.

2. A ripened cream is more easily churned than an unripened cream.

3. The richer the cream (up to 35 per cent.) the more quickly it will churn, because, other conditions being equal, the fat globules are more numerous and come in contact more easily.

The churning temperature may range from 50° to 60° F., and even wider. Aim to have the cream churn in not less than 30 minutes and not more than 45. If cream is churned too quickly there will be a heavy loss of fat in the buttermilk; the butter will be soft and mushy; it will be hard to wash free of buttermilk; and will have poor keeping qualities. If the cream is churned too cold it will take much longer to churn, wasting time and power and the butter will tend to gather in hard, small granules, which will be difficult to work and salt. Avoid either extremes; try to have the cream churn in proper time. The butter should

be of a waxy texture, which will "knead" easily, when working in the salt.

Stop the churn when the granules of the butter are about the size of large grains of wheat. Draw off the buttermilk and wash well with water somewhere near the churning temperature of the cream. Use about the same amount of wash water as there was cream to start with. Nothing but pure water should be used. If the butter has been churned at the proper temperature, and the churning "stopped" at the right time, one washing should be sufficient. Where the butter is soft and mushy two washings are advisable. About 10 to 12 revolutions of the churn are sufficient for washing.

Milk Definitions.

Standard Milk is milk which conforms to certain requirements which usually specify the minimum per cent. of fat, and solids-not-fat, and sometimes the maximum number of bacteria per cubic centimetre allow-



Ormsby Jane Segis Aaggie, World's Champion 721.4 lbs. Milk and 44.426 lbs. Butter in 7 Days.

able in milk offered for sale. The amounts required or permitted differ in different countries.

Sanitary Milk, Guaranteed Milk, are terms applied to milk produced under conditions necessary to secure a pure, wholesome product.

Certified Milk is milk produced under ideal conditions,—healthy cows, especially adapted sanitary stables, healthy clean milkers. The milk is bottled, sealed, and shipped in refrigerator cars, and certified to by a commission.

Modified Milk, or Humanized Milk, is milk containing definite proportions of fat, sugar, casein, etc., put up usually according to the prescription of a physician, who indicates how much of these different constituents is required.

Clarified Milk is milk which has been run through a separator to remove some of the impurities. The skim-milk and cream are afterwards mixed.

Pasteurized Milk or Cream is milk or cream which has been heated below the boiling point, but sufficiently to kill most of the active organisms present, and immediately cooled to 50° or below. Pasteurizing temperatures range from 140° to 185°.

Sterilized Milk is milk that has been heated to the temperature of boiling water (212°) or higher for a

length of time sufficient to kill all organisms present.

Condensed or Evaporated Milk is milk from which a considerable portion of water has been evaporated.

Peptonized Milk is milk to which some pepsin has been added in order to make the milk more easily digested.

Malted Milk is milk that has been pasteurized to destroy the bacteria, then partly condensed, and a small quantity of malt added.

Milk Powder is obtained by evaporating the moisture from whole milk, partly skimmed milk, or skim-milk. The powder is used by confectioners, certain manufacturers, surveying parties, and in such countries as the basin of the Yukon.

Koumiss is the product made by the alcoholic fermentation of milk caused by adding yeast and sugar to it.

Food Value of Milk.

A man of average weight (147 pounds), when kept inactive, as when kept in bed, can live and sometimes put on flesh on three quarts of milk per day, this quantity containing 15 ounces of dry solids—fat, sugar and casein; but if the quantity is increased to four quarts a day the food consumed is sufficient to enable him to do a good day's work, according



An Up-to-date Barn in Province of Ontario.

to Professor Long of England. We at once admit that so large a quantity of fluid would not be suitable as diet for a healthy man. We simply show that the feeding matter consumed by an average man should be 3,500 calories, and such we find in 1 1-2 pounds of bread, one-half pound potatoes and 3-4 of a pound of boneless beef and 3 ounces of butter; but, excepting butter, there is in the other foods not only waste material which cannot be digested, but a large quantity of moisture. As four quarts of milk are equal in caloric value to this ration, for there is no waste, it follows that a man may attain as much nutrition from four quarts of milk as from the more substantial ration. Again, it has been shown that in a pint of milk with bread (10 ounces) there was more nutrition than in a restaurant meal consisting of soup, beef, some cabbage, bread and butter, with a cup of coffee containing milk and sugar, which costs just twice as much.

Double-Cream Cheese.

This cheese is exceptionally rich in fat; is of a very smooth texture; and is delicious, spread on crackers or eaten with bread.

The cream may be sweet or very slightly sour. Heat to a temperature of 60° to 65°. To 20 pounds (2 gallons) of cream add one dram of rennet (a teaspoonful) diluted in a little water. Stir well. In about four hours the cream will have coagulated. Pour it into dry cloths drain in a cool, draughty place. The cloths should be of close duck and placed over bowls. Then hang up to should be dry. It is advisable not to put very much curd in one cloth, as it is liable to develop too much acid before draining is complete.

In two or three hours open the cloth and scrape down the sides. Hang up again. Repeat the scraping at intervals of about three hours, till the cheese is firm enough to mould. The draining may be hastened by scraping down more frequently.

When the cheese is ready to mould it should be of a stiff, putty consistency, but not sticky. Salt is now added at the rate of one ounce of salt to four pounds of cheese. Work the

salt in with a knife or spatula, and the cheese is ready to mould. The tin or mould for cream cheese is usually oblong in shape—3½ x 1½ x 2 inches. Line the mould with waxed butter-paper and press the cheese in with a knife or spatula. When full, fold over the ends of the paper and shake out the mould of cheese.

The cheeses when moulded are ready for immediate use. If kept in a cool place they remain good for a week or two. Cream cheese contains about 31 per cent. water, 63 per cent. fat, 5 per cent. proteids, 1 per cent. ash.

Gervais Cheese.

This cheese resembles soft double-cream cheese but not so rich—similar to rich, smooth cottage cheese.

Take 3 pints of fresh morning's milk and 1½ pints of cream of about 20 per cent. fat. Heat it to 65°. Take eight drops of rennet, and if you have it, two drops of cheese color. Dilute these in a little cold water and stir very thoroughly into the milk. Cover over the dish and keep at as near 65° as possible.

In about four hours, or when a nice, firm coagulation has taken place, wet a heavy linen huckaback towel, place it over a dish, and carefully ladle out the curd. Gather up the four corners of the towel and tie rather loosely. Hang to drain. Two or three times during the day untie the towel and scrape down the curd to hasten the drainage. Next morning scrape down again and mix in a little salt. After a little while fill into a small mould, which has been lined with white blotting paper or writing paper. Use a thin-bladed knife to press the cheese in the mould. After it is filled, slip out the cheese and use the mould again until all the curd is moulded. The usual-sized mould is 2 inches in diameter by 2½ inches high. A round spice or baking-powder tin answers.

The cheeses are fit for eating as soon as finished. They will keep for a week or more in a cool place.

Cambridge Cheese.

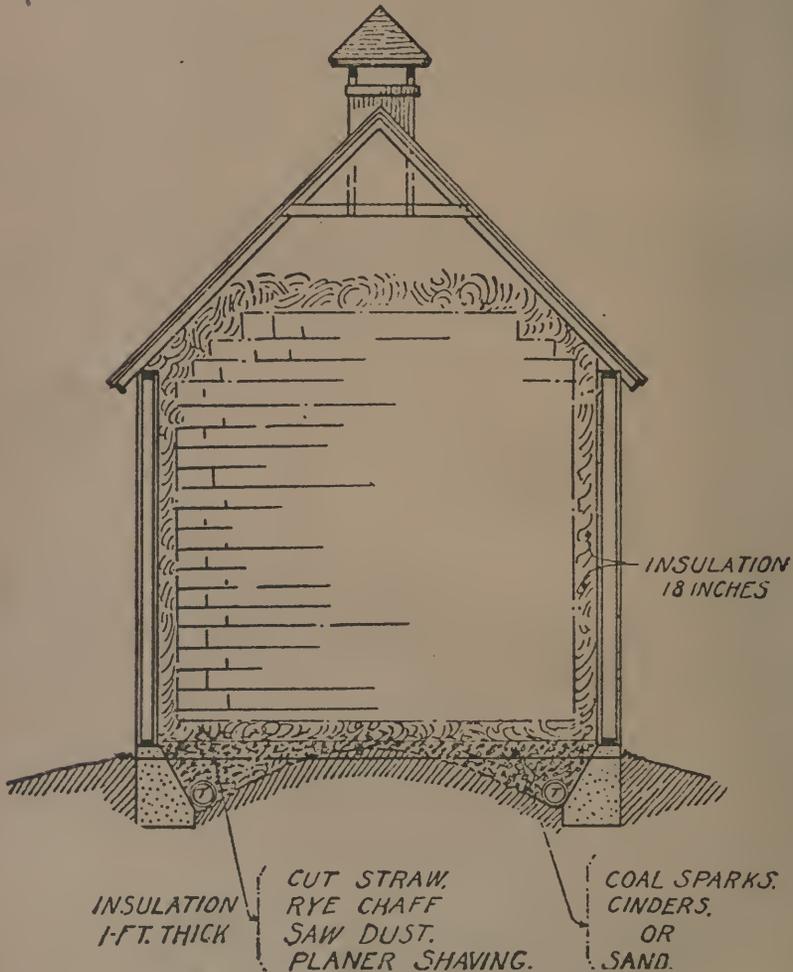
Heat 1 gallon of new milk in an enamelled pail or dish to 95°. Add

to it 3 drops of cheese color and 15 drops of rennet mixed in a little cold water. Stir for five minutes. Let stand for five minutes. Then stir the surface a little to prevent the cream from rising; cover the pail with a cloth and leave it undisturbed. At the end of an hour or an hour and a quarter, coagulation should be about as firm as a baked custard. Try it by inserting the finger and notice how the curd breaks off it.

Wooden moulds are usually used for these cheeses, but tin biscuit

boxes, with the bottoms removed, and with nail holes punched from the inside out, on the sides, to act as drains, might be used. The wooden moulds are 7 x 6 x 4 inches, with no bottom in them. Small holes, an inch apart, are bored in the sides. These moulds are scalded, placed on a mat made of straws sewed together, and put on a small board. The mat acts as a drain.

When the curd is sufficiently firm, carefully ladle out enough to cover the bottom, then add a little more at intervals of fifteen minutes, till all



Ice House With Proper Insulation at Base.

is ladled into the moulds. A gallon makes two cheeses. When they shrink from the sides and are comparatively firm and dry remove the moulds. They are now ready for use. It usually takes two days for them to drain in the moulds.

No salt is put on these cheeses, although some people prefer to sprinkle a little over them.

The manufacture of these cheeses is well adapted to farm dairying, and they should find ready sale on the market.

Bondon Cheese.

This cheese is made from a mixture of two-thirds sweet skim-milk and one-third good buttermilk. Mix together and keep at a temperature of about 80° until it thickens, then ladle into a huckaback towel. When well drained, open out and scrape down the curd. Tie up again and repeat the scraping occasionally until the curd is firm, then slightly salt and press into a bowl, or mould into small balls. A very cheap, highly nutritious food.

Reasons for Testing.

Cow testing enables one to find out the poorest cows, those not paying for their feed, so that they may be got rid of.

In many cases one-quarter of the cows in the herd have been discovered to be not worth keeping, in some cases half the herd and even as high as three-quarters have been turned out.

This means certainty in dairying, no more guess work as to individual performance.

Cow testing shows that many cows considered only average are really the best in the herd.

Cow testing points out definitely which cows are the best producers, both in milk and butter fat.

Cow testing proves that many cows considered the highest in test are really the lowest.

Cow testing saves good cows from being beefed, they are found to be profitable when actual yield and cost of feed are considered.

Cow testing shows that many fine looking cows do not bring in much

cash from the factory.

Cow testing helps to discover the great difference in persistency of flow.

Cow testing brings to notice the slightest variation in flow and urges one to seek for the cause of the shrinkage.

Cow testing helps to increase the total of milk and fat from the same number of cows.

Cow testing brings in larger returns from fewer cows.

Cow testing helps to build up a profitable herd quickly because heifers can be selected from the best cows.

Feed Influence.

Cow testing allows more discrimination in feeding, apportioning the grain according to the yield of fat.

Cow testing emphasizes the benefit of liberality in feeding succulent, digestible foodstuffs.

Cow testing abundantly proves that it pays handsomely to give dairy cows the best of care and kind treatment; this includes regularity as to milking, early stabling in the fall, protection from cold rains, spraying to protect from flies; and above all, particular attention to cleanliness, light and ventilation in the stable.

Cow testing demonstrates that many good cows can be kept at a smaller cost of feed. This is not stinginess, but economy.

The Dairyman Himself.

Keeping records makes one more observant of all those little details that go to make up success.

Because cow testing develops this faculty of observation and induces sociations are becoming far better dairymen.

There is a great stimulus received from comparing notes and results with other members.

The hired men take more interest in the cows, consequently they give them better attention and get more milk.

Neighboring farmers who originally scoffed at the idea of cow testing have become impressed with the results obtained by members.

A READY METHOD OF BALANCING A RATION FOR DAIRY COWS.

Low Protein Group	Medium Protein Group	High Protein Group
Less than 12% total protein.	12 to 25% total protein	More than 25% total protein
Corn	Wheat bran	Malt sprouts
10.3	15.4	26.3
Oats	Mixed wheat feed ..	Linseed oilmeal ...
11.4	16.3	33.9
Wheat	Standard wheat mids.	Cottonseed meal ...
11.9	16.9	45.3
Rye	Flour Wheat Mids ..	Gluten feed
11.3	19.2	25.0
Barley	Cottonseed feed ...	Brewers' dried grains.
12.0	20.0	25.0
Buckwheat	Buckwheat feed	Distillers' dried grains
10.8	(shuck in)	(corn)
Hominy chop	Pea meal	Buckwheat mids. (free
10.5	20.2	from shuck)
Dried beet pulp ...	Cuil beans	26.7
8.1	21.6	
Corn and cob meal..		
8.5		

The ordinary coarse foods in use are mixed hay, corn silage and corn-stalks or fodder. These are all very similar in composition as far as the balance between protein and carbohydrates is concerned.

The ration then is usually balanced on the grain food.

Ordinary grain foods may be conveniently divided into three groups: Low protein (less than 12%), medium protein (12 to 25%), and high protein (over 25%).

For the sake of variety it is desirable to use at least three grain foods.

If one low protein food, one medium protein food and one high protein food are mixed together, equal parts by weight, the mixture will make a well balanced ration to be used with ordinary mixed hay, silage or corn fodder.

If clover or alfalfa hay is largely used less high protein food is necessary.

In amount, in addition to what hay and silage she will readily eat, a cow in full milk, giving 4% milk or better, should have one pound of grain to 3 or 3½ pounds of milk daily; a cow giving milk with less than 4% of fat should have one pound of grain to 3½ or 4 pounds of milk. An ideal grain ration should weigh about one pound to the quart. To secure this, the mixture should contain at least one "light" food.

"Heavy" foods are in dark faced type; "light" foods in ordinary type.

FARM DAIRY EQUIPMENT FOR FROM FOUR TO EIGHT COWS.

1 No. 3 barrel churn	\$ 7.00
1 Floating thermometer .....	.25
1 Lever butter worker	4.50
2 Butter ladles .....	.30
1 Butter printer for lb. print	2.50
1 Large strainer dipper .....	.40
1 Large plain dipper .....	.25
1 Long handled dairy brush .....	.15
1 Small fibre brush .....	.20
1 5 gallon covered cream can .....	.75
1 Shotgun can .....	.60
1 Cream stirrer or ladle .....	.20
2 Large pails (14 qts. each) .....	.60
2 Shallow tin pans .....	.20
1 Bottle butter color .....	.25
5 Yards cheese cloth .....	.25
100 lbs. dairy salt .....	.50
1000 Printed parchment wrappers	2.50
240 lb. Union Scales	6.00
500 lb. Cream Separator	\$55.00 to 75.00
Four bottle tester complete	5.00
Tester for milk and cream	3.50

Prices will vary according to localities and differences in quality.

FARM POULTRY

Selection of a Breed.

Be sure that the male at the head of the flock is purebred.

The Mediterranean or egg breeds are: Leghorns, Minorcas, Spanish, Blue Andalusians, and Anconas.

The American or general-purpose breeds are: Plymouth Rocks, Wyandottes, Javas, Dominiques, Rhode Island Reds, and Buckeyes.

The Asiatic or meat breeds are: Brahmas, Cochins, and Langshans.

The English breeds are: Dorkings, Orpingtons, and Redcaps.

For farm use the American breeds are probably the best.

Purebred poultry means uniformity of products.

Uniformity of products means increased profits, if products are properly marketed.

Given the same care and feed, purebred fowls will make a greater profit than mongrels.

Artificial and Natural Incubation and Brooding.

Have everything ready beforehand

and start your hatching operations early in the year.

A well-ventilated cellar is the best place to operate the incubator.

The machine should be operated according to the manufacturer's directions.

See that the incubator is running steadily at the desired temperature before filling it with eggs. Do not add eggs to a machine during incubation.

Turn the eggs twice daily after the second and through the eighteenth day. Cool the eggs once daily, according to the weather, from the seventh through the eighteenth day.

Turn the eggs before caring for the lamp.

Attend to the machine carefully at regular hours.

Keep the lamp and wick clean.

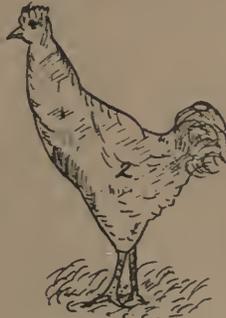
Test the eggs on the seventh and fourteenth days.

Do not open the machine after the eighteenth day until the chickens are hatched.

Eggs saved for hatching purposes



Fowl with well developed breast.



Fowl with very poor breast development.



Fowl flat in front and cut up behind.

If several hens are set in one room, it is desirable to confine them in good nests.

Straw and hay make good nesting material.

Broody hens should be moved to the permanent sitting nest at night.

Whole corn is a good feed for sitting hens. Water, grit, and dust baths should also be provided.

All eggs should be tested by the seventh day, which often makes it possible to reset some of the hens.

Toe-mark the chicks as soon as they are hatched. This enables one to tell their ages later.

Powder the chicks occasionally during the first eight weeks.

Start the brooder a day or two before putting in the chicks to see that the heating apparatus is working properly.



A Very Good Feeder.

Note the Short, Thick Neck.

Brooder lamps should be cleaned every day.

A record should be kept of each hatch, showing the date set, number and kind of eggs, number tested out, and the chickens hatched.

Chicks should not receive feed until they are 36 hours old.

In cool weather 10 to 13 chicks are sufficient for one hen, while in warmer weather 15 to 20 can be cared for successfully.

Never mix chicks of different ages.

Confine the hen until the chicks are weaned.

The coop for hen and chicks should be well ventilated, easy to clean, and of sufficient proportions to insure comfort.

The early hatched pullet is the one that begins to lay early in the fall, when eggs are high in price.



A Poorer Type of Feeder.

Note Crow-like Shape.

The cockerel that can be marketed as a broiler in March or April brings more money than the one marketed in June.



A Prize Winning Columbian Wyandotte.

Allow at least 2 square feet of floor space per bird.

Proper ventilation and sunlight mean a dry house and healthy birds.

The partial open-front house is conceded to be the best type for most sections.

The colony plan of housing poultry may be adopted to good advantage on many farms. This system does away with the danger of tainted soil.

The roosts should be built on the same level, 2 feet 6 inches from the floor, with a dropping board about 8 inches below them.

Good roosts may be made of 2 by 2 inch material with upper edges rounded.

The nests may be placed on the side walls or under the dropping boards. It is best to have them darkened, as the hens prefer a secluded place in which to lay.

Feeding.

In order to obtain eggs it is necessary to have healthy, vigorous stock, properly fed.



A "Cripple," or Bird "off feed." Note Eye.

A splendid mixture for laying hens is equal parts of cracked corn, wheat, and oats, which should be scattered in the litter.

Bran or middlings and beef scraps should be kept in receptacles to which the fowls have access at all times.

Plenty of exercise increases the egg yield.

Provide 4 or 5 inches of good, clean litter in which to scatter the grain.

Cabbages, mangels, potatoes, sprouted oats, etc., make excellent green feed.

When wet mashers are fed, be sure they are crumbly and not sticky.

For the first three days chicks may be fed a mixture of equal parts hard-boiled eggs and stale bread, or stale bread soaked in milk. When bread and milk are used, care should be exercised to squeeze all milk out of the bread. From the third or fourth day until the chicks can eat wheat and cracked corn, commercial chick feed is a good ration.

Plenty of pure, fresh water, grit, shell, and green feed should be available from the first day.

There is very little danger of over-feeding young stock.

Feed the chickens about five times daily and only what they will eat up clean in a few minutes, except at



Buff Plymouth Rock, English Type.

night, when they should receive all they want.

Egg Production.

Produce the infertile egg.

Infertile eggs are produced by hens having no male birds with them.

Removing the male bird has no

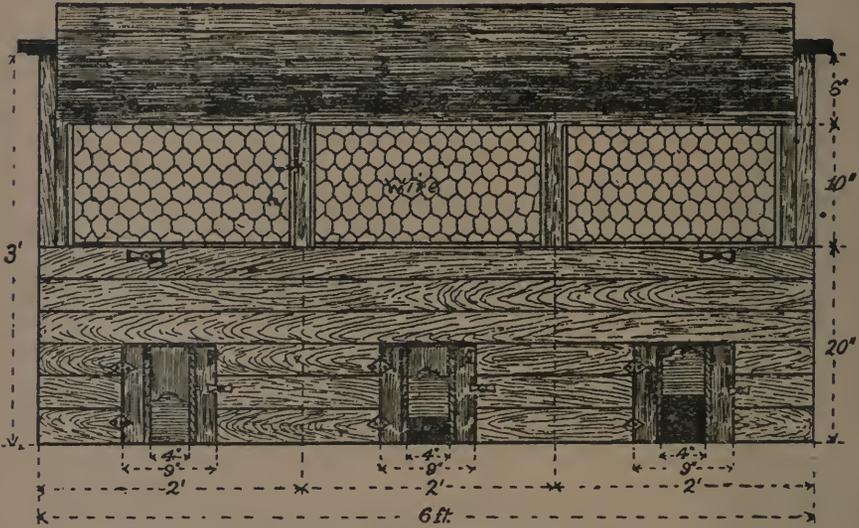
influence on the number of eggs laid by the hens.

The hen's greatest profit-producing period is the first and second years, and unless a hen is an exceptionally good breeder she should be disposed

of at the end of her second laying season and before starting to molt.

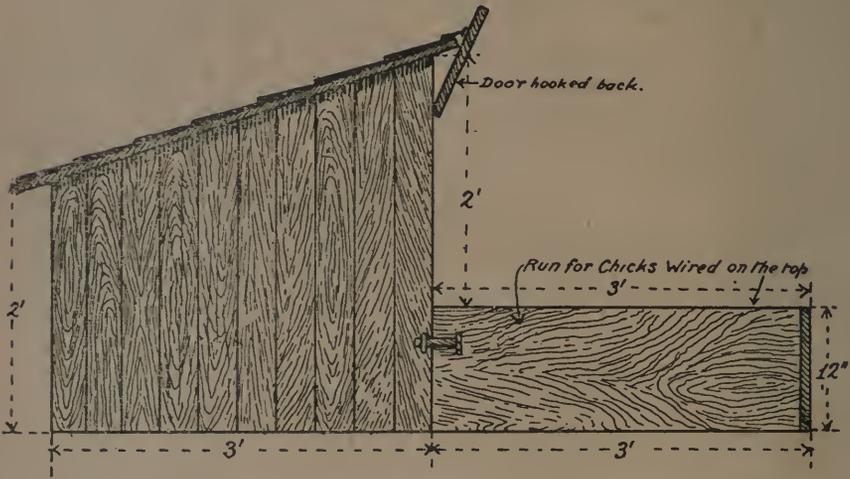
Few eggs can be expected until the pullets are matured.

If possible, mark the pullets that lay in the fall, and use them in the



— FRONT ELEVATION. —

Combination Hatching and Brooding Coop.



— SIDE ELEVATION. RUNS ATTACHED. —

Combination Hatching and Brooding Coop.

breeding pen for the following spring.

Soft-shelled eggs are often caused by fowls being confined, becoming overfat, and from lack of mineral matter.

Marketing.

Uniform products command the best prices. Purebred fowls produce uniform products.

Begin marketing the cockerels as soon as they weigh 1 1-2 pounds or attain a marketable weight.

Market white-shelled and brown-shelled eggs in separate packages.

When selling eggs to the country merchant or cash buyer, insist that the transaction be on a quality basis.

Ship or deliver eggs twice or three times weekly.

Small or dirty eggs should be used at home.

When taking eggs to market they should be protected from the sun's rays.

Infertile eggs will withstand marketing conditions much better than fertile eggs.

Lice and Mites.

The free use of an effective lice powder is always in order.

A dust bath is very essential in ridding the fowls of lice.

In applying powder hold the fowl by the feet, head down, and work the powder well down into the feathers.

Whitewash is very effective against vermin.

Common Diseases and Treatments.

All diseased birds should be isolated.

Colds and roup.—Disinfect the drinking water as follows: To each gallon of water add the amount of potassium permanganate that will remain on the surface of a dime.

Canker.—Sprinkle a little flowers of sulphur in the mouth and throat of the bird and put some chlorate of potash in the water. Also carefully remove the exudate with the aid of warm water.

Chicken pox.—Apply a touch of iodine and carbolated vaseline to each sore.

Gapes.—New ground and vigorous cultivation will often remedy this trouble.

Diarrhea in hens.—Low-grade wheat

flour or middlings is good for this trouble. Also give teaspoonful of castor oil containing five drops of oil of turpentine to each fowl.

Bowel trouble in chicks.—Well-boiled rice mixed with a little charcoal will often check this complaint. Dissolve 15 grains of crude catechu in each gallon of drinking water.

Rules.

All farmers and poultrymen should adhere strictly to the following rules in handling their poultry and eggs:

1. Keep the nests clean; provide one nest for every four hens.
2. Gather the eggs twice daily.
3. Keep the eggs in a cool, dry room or cellar.
4. Market the eggs at least twice a week.
5. Sell, kill, or confine, all male birds as soon as the hatching season is over.

As far as possible have your eggs of a uniform size and color. There is a premium due for uniformity and good size in eggs.

Candling Eggs.

Eggs are candled very easily. A new-laid egg when held between the eye and the light has a clear appearance, the yolk is practically invisible, and the air cell is about the size of a five-cent piece.

Unless the eggs are put in pickle or held in cold storage, the air cell gradually increases in size, and the yolk becomes visible.

Cold storage and pickled eggs may have small air cells, but the yolks are conspicuous.

The Egg Tester.

1. Egg-testing box.
 2. Hole through which the light shines and before which egg is held to be tested.
 3. Chimney.
 4. Bottle of water placed between light and No. 2.
 5. Reflector to be placed behind light.
- An ordinary lamp or electric light is placed in the box so that the light shines through No. 2.

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	Eggs	Feed	Egg Sales	Poultry Sales	Home Use	Eggs Set	Chicks Hatched
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Poultry Houses and Fixtures.

Select a location that has natural drainage away from the building.

A dry, porous soil such as sand or gravelly loam, is preferable to a clay soil.

In most localities the building should face the south, as this insures the greatest amount of sunlight during the winter.

RULES FOR POULTRY BUILDINGS.

Four to six square feet for every hen. Plymouth Rocks, Wyandottes, nine inches perch room; Leghorns and other light birds, about eight inches; roosts low and near ground.

Dropping boards low down of matched lumber, 20 inches wide for one roost and three feet for two perches. Roosts 2 inches by 2 inches rounded.

Nests 12 to 15 inches square.

Cement floors are the cleanest and best.

Ground floors are better than boards.

Keep only 25 to 30 birds in each flock.

Use matched boards dressed on one side, sheet back on inside, using building paper under the boards.

Specific Suggestions in Regard to the

Proper Care of Market Eggs.

To the Farmer.

Remove the male birds from the flock immediately after the breeding season and market no fertile eggs.

Provide roomy nests and plenty of clean nesting material, preferably dry shavings or cut hay.

Keep the nests clean and sanitary.

Collect the eggs regularly at least once, better twice, a day in moderate weather, and more frequently in very warm and very cold weather.

Remove at once in clean utensils to a cool, dry cellar.

Cover with clean cloth to prevent dust from settling upon them and also to prevent evaporation and fading.

Do not pack loose in a box when taking them to market, but rather secure a suitable egg case and thus avoid breakage.

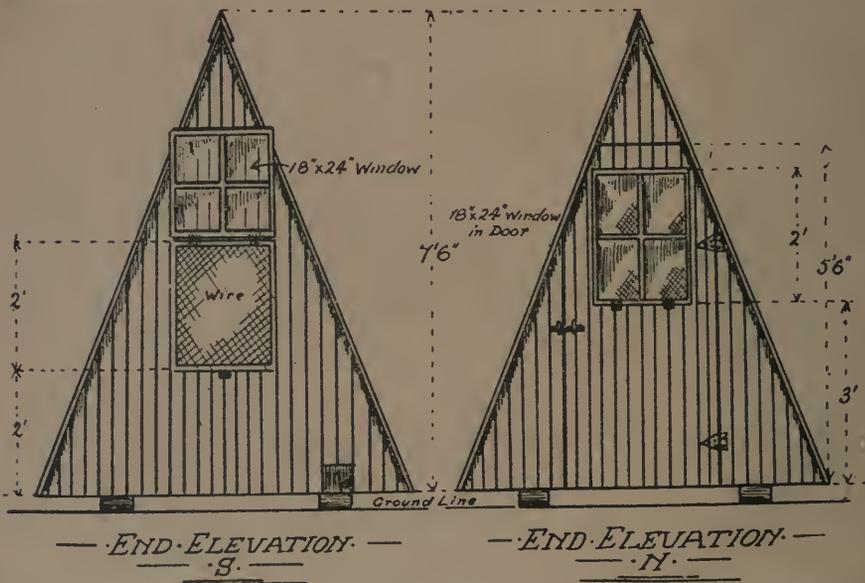
Market as frequently and as directly as possible.

To the Merchant

Buy on a loss-off basis, if possible, and encourage other merchants to do the same.

Insist that the farmers furnish first quality eggs only.

Keep in mind the perishable na-



Showing construction of colony house. It is not advisable to use this as a brooder house.

ture of the product and do not hold eggs on a rising market without proper facilities for storing them.

Realize that fresh eggs at any season of the year are much more valuable than stale eggs, when prices are higher.

When shipping, pack carefully in strong, clean cases and fillers.

To the Egg-Buyer.

If buying direct from the farmer, make regular and frequent collections.

Pay a premium for quality and do not hesitate to condemn bad, dirty, small and broken eggs.

Encourage the farmer to keep better poultry and more of it.

Be willing to pay a premium for good eggs.

Having purchased eggs do not overlook their perishable nature, and give them proper care.

Crate Fattening.

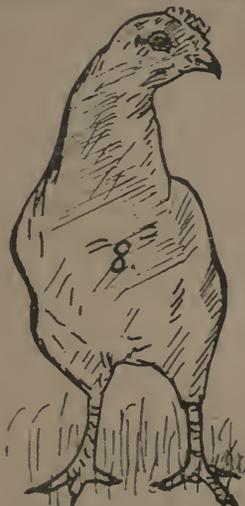
Practical experience has shown that crate feeding is not only a very satisfactory, but also an economical method of fattening poultry. The saving in the amount of feed required to produce one pound of gain is quite marked, and the feeder is enabled to observe to greater advantage the progress being made by individual birds. He can also, if necessary, curtail the



A long, narrow type poor feeder.

duration of the feeding period in the case of birds which have attained

their maximum weight and are ready to be placed in the finishing crate.



A very good fattening type.

Crate fattening cannot with success be carried on in a haphazard way. The feeder requires to understand the principles of what he is at, and to give the necessary attention to the details of his work. In order to teach the proper method of feeding poultry in crates the Live Stock Commissioner at Ottawa has had prepared a seasonable illustrated pamphlet on the subject, which explains clearly the construction of a fattening crate, the constituents and preparation of proper rations, the methods of feeding, killing and dressing birds, and information regarding packing for market.

Breed and Sitters.

Egg breeds of fowl are as a rule good sitters; meat breed as a rule, non-sitters, and general purpose make good mothers.

Hen Houses.

In this section will be found the plans of suitable hen-houses. The one house is twenty-four feet long and twelve feet wide, and is divided in the centre by a wire and board partition, making two pens, each twelve feet square. The two pens together will accommodate the maximum number of chickens (50) that should be under one roof. The dropping board is constructed of matched lumber, and

is placed at the back of the building, about three feet above the floor. The roosts are made of dressed scantling, 3 x 3 inch, about six inches above dropping board. A curtain is arranged to be let down on cold nights in front of the roosts. This house is practically open to the weather at the front, which faces the south. The ends of the house are simply matched lumber. This house may appear to be cold, but it has been found that too warm quarters for chickens are unhealthy and conducive to disease. There are canvas curtains that can be dropped as a protection during the cold nights.

This house is cheap of construction, and has given excellent results during the laying season. Do not keep hogs too near the hen-house. A cement foundation and a cement floor for the hen-house may seem like an unnecessary expenditure, but it is found to be worth it. The above plans are from Bulletin 189, Ontario Agricultural College.

Turkeys, except when very young, should not be cooped up or housed, but allowed wide range to forage.



A full breasted cross bred chick.



Son of fowl No. 1. Note resemblance

They will seek and find a great portion of their food. Roosting houses are considered unnecessary by many successful turkey raisers. If used, they must be well ventilated. Turkeys do not reach their full maturity until the third season. Birds should not be used for breeding purposes before their second year.

EFFICIENCY IN PRODUCTION.

For efficiency in poultry management, i.e., the production of eggs, etc.,

we must, first of all, have our hens bred to lay. Nothing can make a non-layer produce eggs if she is not bred for production. The keynote of efficiency on the poultry farm lies in culling out the poor layers. Layers going in in September lay in November—December. Cull out at that time. Again in midsummer after the heavy spring egg production is over. Then again in July. Then select for breeders for next season. Dispose of the poor layers all this time—they are no good for breeders.

Identifying the Poor Layers.

How to tell good from poor layers. Really the trap nests are the only absolutely sure way, yet there are other methods that are very certain indications. 1. Time of moulting. Color of ear lobes, and color of shank. The first applies to all kinds of hens. If raised and hatched under equal conditions, the hen moulting last is the best producer. 2. Applies to breed with white ear lobes and yellow shanks. "The Loughorns, single combed, are an example and are, I believe, the greatest egg machine in existence." We want eggs when they are high priced. Pullets laying in October lay well throughout fall, but may fall off during early winter. Layers can be picked out in the white ear lobed yellow shanked breed. The layers are the birds whose ear lobes have turned snow white to light yellow in color. Those hens whose ear lobes are bright yellow at that time are the poor layers. It is well known that hens lay the pigment into their eggs. 3. Color of shanks. This does not change so rapidly. Early August is what may be termed the second color period. The yellow shanked hens show some with bright yellow shanks, and others with light yellow shanks. The latter are the hens that have been laying.

Production in Season.

The problem is one of production; to sell the produce, especially eggs, is a comparatively simple matter. After the production idea comes the important business of time of hatching. Get eggs in October-November-December-January, when eggs are the highest priced. For a high average, pullets are largely used. "We have made a net profit of 90c. in December per head

on pullets against 4c on a yearling hen. Hatch the Rocks between 1st of April and 10th May; Leghorns, 20th April to 24th May—not earlier and not later than these dates. Early maturity gives good records from the trap nests, but if too early the birds mature too rapidly and lay heavy in August, moulting in October-November, and egg production ceases. If too late, pullets do not thrive well and the cold weather catches them and they will not start laying until late January. (December eggs pay best.)

Mating the Birds.

Better results are obtained by mating yearling hens to cockerels, than by mating pullets to cocks. The first is irreparably weakened through the pullet year and will never give maximum results. Don't breed too young. This applies equally well in poultry as in other branches of live stock. For setting purposes yearling hens are the producers.

Rations Recommended.

Dry mash, 200 lbs. bran, 100 lbs. feed or low grade flour, 100 lbs. cornmeal, 100 lbs. beef scrap, 100 lbs. St. Lawrence brand gluten meal, and 33 lbs. bone meal. For wet mash use the same ration. Grain is fed in litter at 3 o'clock in the afternoon and one-half in litter when birds are on the roost. Moist mash at noon. Grain food at 11 o'clock. The most suitable house in Mr. Clark's experience for laying hens is a shanty roof affair, 7 feet in front, 5 feet at back, and 16 feet by 17½ feet in area. This accommodates about 75 Rocks. The front is glass and canvas. Twenty-seven square feet of canvas or opening to 100 hens. The sides and ends are tar papered, battened, and boarded, leaving an air space between the studding.—L. N. CLARK.

Standard Varieties of Turkeys.

There are six varieties of turkeys raised in Canada. They are as follows: Bronze Narragansett. Buff, Slate, White and Black. A non-standard variety is the Bourbon Reds. Turkeys originated in America, and were imported into Europe by the Mexicans. Are hard to raise, a peculiarity being that one copulation at beginning of season renders fertile all the eggs in the ovarium. Hens weigh 10 to 12 pounds; cocks, 15 to 25 pounds. This is average; many times

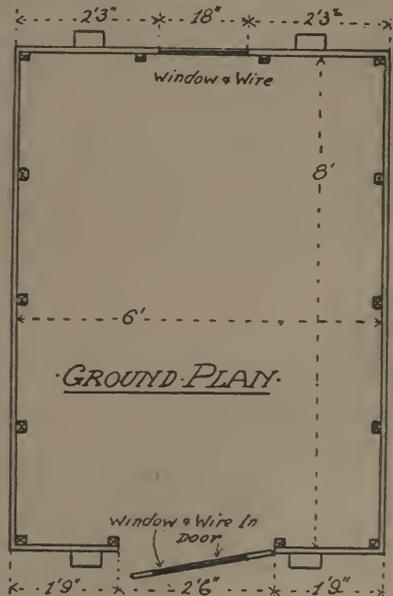
they are grown many pounds over these weights.

Standard Varieties of Ducks.

There are twelve standard varieties of ducks raised in Canada, some of them on a small scale, as follows: The White Pekin, White Aylesbury, Colored Rouen, Black Cayuga, Colored Muscovy, White Muscovy, Indian Runner, Gray Call, White Call, Black East India, Crested White, and Blue Swedish. Of these varieties, the first seven are considered profitable to raise; the two varieties of Calls and the Black East India are Bantams, and are bred more for the showroom; the Crested White may be considered as almost purely ornamental while at present but little is known of the Blue Swedish in this country and the United States.

White Pekin Ducks.—Very large, and excellent layers, averaging from 100 to 150 eggs in a season. Non-sitters, easily raised, and mature early. The standard weight of the adult drake is 9 pounds; adult duck, 8 pounds; young drake, 8 pounds, and young duck, 7 pounds.

Colored Rouen Ducks.—Profitable on the farm, hardy, prolific. Eggs not so large as the Pekin, diverse in color.



Ground plan of Colony House for growing stock.

The standard weight of the adult duck is 8 pounds; adult drake, 9 pounds; young drake, 8 pounds; and young duck, 7 pounds.

Black Cayuga Ducks.—Originated in America; produce from 80 to 90 eggs in the spring, and sometimes lay again in the autumn. Standard weight of adult drake, is 8 pounds; adult duck, 7 pounds; young drake, 7 pounds, and young duck, 6 pounds.

Colored and White Muscovy Ducks.—The standard weight of this variety of the adult drake is 10 pounds; adult duck, 7 pounds; young drake, 8 pounds, and young duck, 6 pounds.

Indian Runner Ducks.—Have been credited with records of more than 200 eggs each in flocks of ten, and of 192 eggs each in flocks of 100. The standard weight of the drake is 4½ pounds, and of the duck 4 pounds.

Menu for the Chickens

Day	Morning	Noon	Night
Sunday ...	2 gal. wheat scattered in litter 2 gal. water to drink	8 lbs. mangels 2 gal. milk or water	2 gal. barley scattered in the litter
Monday ...	2 gal. wheat and barley, half and half 2 gal. milk	6 lbs. wet mash, fork full of alfalfa or clover hay 2 gal. milk, meat if available or cut green bone	2 gal. wheat
Tuesday ..	2 gal. barley in litter 2 gal. water 8 lbs. cabbage	2 gal. water Any meat food available	2 gal. wheat and barley, half and half, in litter
Wednesday	2 gal. wheat in litter 2 gal. milk	6 lbs. wet mash Alfalfa or clover hay 2 gal. milk	2 gal. barley in litter
Thursday .	2 gal. wheat and barley, half and half in litter 2 gal. water; 8 lb. mangels	2 gal. water Any meat food available	2 gal. wheat in litter
Friday	2 gal. barley in litter 2 gal. milk	6 lbs. wet mash 2 gal. milk Alfalfa or clover hay	2 gal. wheat and barley, half and half, in litter
Saturday ..	2 gal. wheat in litter 2 gal. water 8 lbs. cabbage	2 gal. water Meat food if available, butchering offal	2 gal. barley in litter

Note.—Crushed oats to be in self feeding hopper all week, available at any time for the hens. Or if preferred, they can be fed in a trough at noon at the rate of about 8 pounds a day.

Black East India.—Very shy in habit, given to long flights, hard to confine. Good sitters. There is no standard size, but the smaller the size the higher they rank for exhibition purposes.

Crested White Ducks.—Medium-sized bird, merely ornamental, the adult drake weighing 7 pounds, and the adult duck weighing 6 pounds.

Blue Swedish Ducks.—Very scarce in Canada. Standard weight of adult drake is 8 pounds, and adult duck is 7 pounds.

Standard Varieties of Geese.

Gray Toulouse Geese.—Termed a Christmas goose; a good layer, averaging about 400 eggs in a season. The standard weight of adult gander is 20 pounds; adult goose, 18 pounds; young gander, 18 pounds, and young goose, 15 pounds.

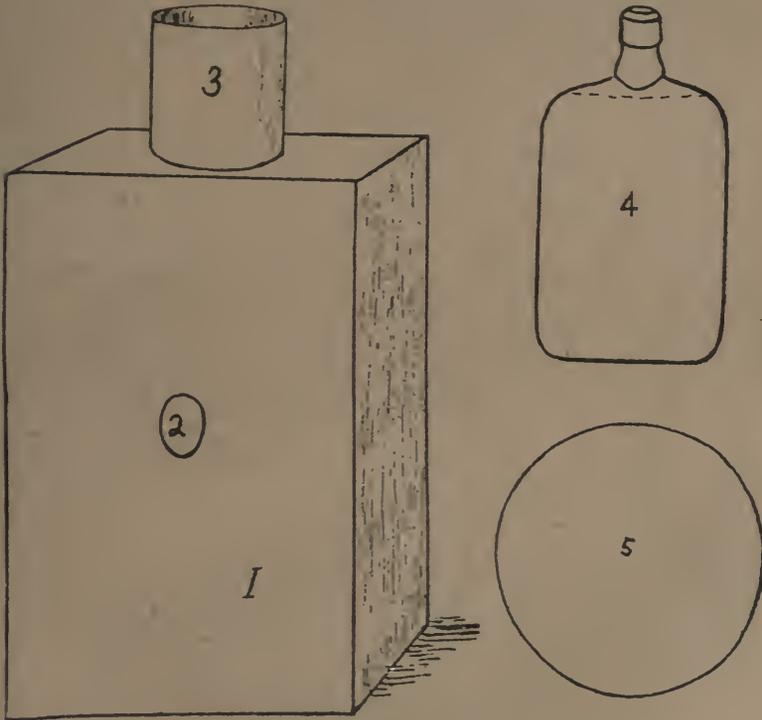
White Embden Geese.—Lay about

200 eggs in a season; very large eyes. Standard weight of adult gander is 20 pounds, and adult goose is 18 pounds.

Gray African Geese.—Considered one of the most profitable to raise. Are ready for market in ten weeks, weighing at that age between 8 and 10 pounds. Very suitable for market and table; weight of adult gander, 20 pounds, and adult goose, about 18 pounds.

Brown and White Chinese Geese.—Very light; are the most prolific of geese, averaging from 50 to 60 eggs a year. Standard weight of adult gander is 12 pounds, and adult goose, 10 pounds.

Gray Wild Geese.—Good layers; highly prized for table use; are hardy and easy to rear. The standard weight of adult gander is 12 pounds, and adult goose, 10 pounds.

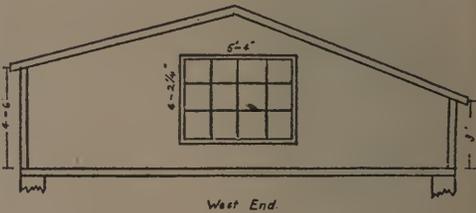
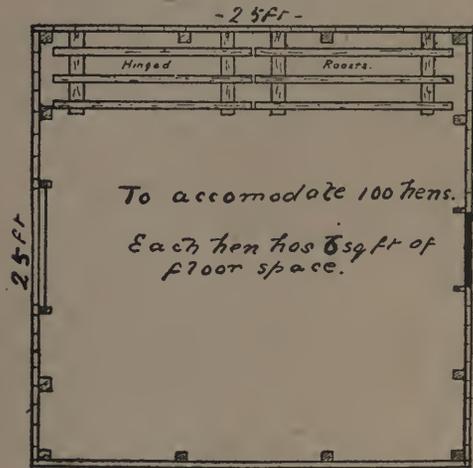
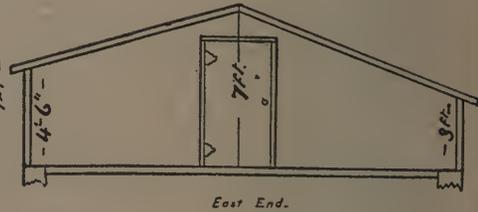
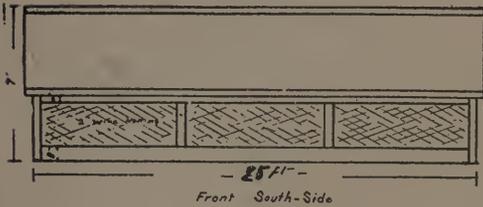


A Handy Home-made Egg Tester.

1. Egg testing box; 2. Hole through which light shines, and before which egg is held; 3. Chimney; 4. Bottle of water placed between light and egg hole; 5. piece of glass placed behind lamp or reflector.

This house is inexpensive and has given excellent results as a pen for the average farm. The hens lay well, thrive well and make good weight.

Avoidance of draughts, high site for building, cleanliness, good natural drainage and lots of light are of course necessary accompanying factors.



DETAILS OF PLAN.

The accompanying plan is adaptable on the average farm for the housing of about 100 hens. It allows about six square feet of floor space for every bird. As will be noticed the front is open and wired and is three feet in depth from sill to plate. The back is four feet six in depth from sill to plate; height from peak to plate is seven feet. The house is twenty-five feet square, and has two sets of roosts, about two feet six

from floor. A window is fixed in the west end and the door in the east end. The house faces south and is very comfortable all the year round. The back should be two thicknesses of boards with tar paper between. Curtains of cheese cloth can be attached to be used when the weather is exceptionally cold; these can be stretched on laths and hinged to the plate in front and fastened securely with a thumb screw.

HOUSEHOLD

The Kitchen.

While the kitchen is the center and workshop of the home, its work also extends more or less to other parts of the house. In planning or building a home, it is of greatest importance that the relation of the kitchen to the other rooms be considered. The kitchen work is most closely associated with the pantry, dining room, and the store room, cellar, or woodshed. These should be located as near and conveniently as possible to the kitchen so that the journeys which must be made so often between these rooms will be as short as possible, thus saving many steps and a great amount of energy.

Other parts of the house which are closely related to the kitchen, although to a less extent, are the entry, or other place where wraps are left;

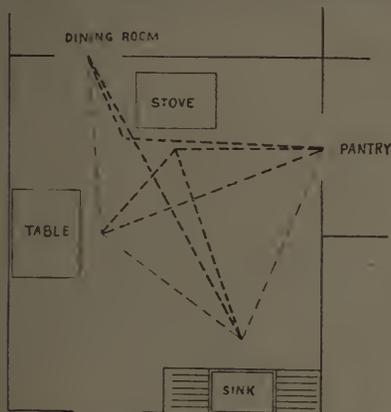
the storage of food, food supplies, china, table linen, etc. If it is narrow in proportion to its length and located lengthwise between the two rooms, it does not very appreciably increase the distance which must be traveled from the kitchen to the dining room. Two pantries are sometimes desirable, especially when there is an abundance of help in the kitchen. One of these is generally used for the preparation of food and storage of food and supplies, while the other is used as a serving pantry and contains counter space, shelves, and drawers for the storage of dishes and table linen, and a sink for washing the dishes. In this case, the sink in the kitchen would be used for washing and cleaning meat, vegetables, and cooking utensils.

Floors, Walls, and Ceilings.

All surfaces in the kitchen, whether on floors, walls, or ceilings, should as far as possible be plain and free from cracks, ridges, moldings, and raised forms of ornamentation, for such places not only collect dust and dirt and thus increase the difficulty of keeping a room clean, but also may harbor ants, roaches, and other pests. The materials used in the kitchen, on either walls or floor, should be non-absorbent and easy to keep clean.

Floors.

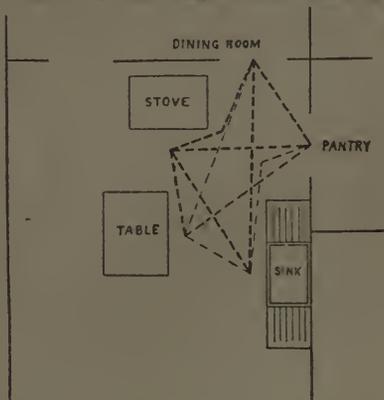
Unfinished wooden floors can be



1.—The arrangement of the kitchen and equipment here is inconvenient, and means many unnecessary steps.

the toilet, where hands are washed; the laundry; the living room; and the bed rooms, where children must frequently be cared for. Wherever possible these rooms should be located within easy access of the kitchen.

The pantry should be so located that it is convenient to both kitchen and dining room, which means that it must be near or adjacent to both. To meet the latter condition, it is often located between the dining room and the kitchen, and is then designed to be used both for preparation of food and for



2.—Kitchen shown in illustration No. 1 re-arranged. Convenience and step-saving are its obvious advantages.

kept clean only by frequent scrubbing. Even hard wood floors are likely to show spots and stains in spite of such scrubbing, and the softer woods become rough and splintered. The roughening of soft woods can be prevented to a certain extent by the application of paint, and hard woods can be made less absorbent by the application of oil and special commercial preparations. Hard woods, for instance Georgia pine, are, therefore, to be considered among the more desirable floor coverings. Unless well seasoned before being put down, any kind of board will shrink, leaving large cracks. These may be filled with putty or with one of the commercial preparations for this purpose.

Floor coverings, such as carpets and matting, which hold dust and dirt, are unsuited to the kitchen. Oilcloth is cheap and easily cleaned, but wears out quickly. Linoleum, a material made of cork or wood pulp pressed in linseed oil, although the first cost is large, as compared with oilcloth or paint, is relatively durable, comfortable for the feet, and easily kept clean. Another advantage is that a single piece may be cut to fit the floor, thus avoiding crevices. It may be protected by placing small mats where the most wear comes.

Walls and Ceilings.

The commonest and most generally satisfactory material for walls and ceiling of the farm kitchen is plaster. The lime used should be properly slaked to prevent the development of cracks and blisters and injury to the surface finish. For the same reason, freshly plastered walls should be allowed to dry thoroughly before the finishing surface is applied. Instead of plaster, some of the various composition boards may be used. They may be left unfinished or they may be painted or papered and varnished. The joints between the boards should be covered by narrow battens, making tight joints. Steel wall and ceiling coverings, although durable, should be kept well painted to prevent rusting by steam. The woodwork should be shellacked or painted. A better surface results when a coat is applied every year or two than when several coats are applied at once. A final coat of enamel paint or outside varnish is desirable for such portions of the woodwork as need cleaning most frequently.

The most desirable finish for walls



A fireplace in the house adds brightness and finish besides reducing the fuel bill.

and ceiling is one that will not peep off or crack and that can be easily washed or very cheaply and readily renewed. For walls a good paint gives general satisfaction. For the ceiling the most satisfactory finish is a coat of whitewash or one of the good commercial substitutes for it, which should be renewed annually or biennially. Such finish used on walls can be easily renewed.

Wall paper, unless varnished, is very easily loosened by the steam from kettles. A wall covering resembling oilcloth is somewhat more expensive, but it is more durable, and has a smooth washable surface. A damp cloth on a broom or a large sponge in a mop holder will serve, with an occasional washing, to keep this or a painted surface clean. Tiles and vitrified brick, well glazed and matched, afford an excellent wall surface, but they are costly. Metal tiles are cheaper and nearly as satisfactory.

HOW TO MIX PAINT FOR TINTS.

Red and black makes brown; lake and white makes rose; white and brown makes chestnut; white, blue and lake makes purple; blue and lead color makes pearl; white and carmine makes pink; indigo and lamp-black makes silver gray; white and lamp-black makes lead color; black and Venetian red makes chocolate; white and green makes bright green; purple and white makes French white; light green and black makes dark green; white and green makes pea green; white and emerald green makes brilliant green; red and yellow makes orange; white and yellow makes straw color; white, blue and black makes pearl grey; white, lake and vermillion makes flesh color; umber, white and Venetian red makes drab; white, yellow and Venetian red makes cream; yellow, white and a little Venetian red makes buff; red, blue and black makes olive.

LAUNDRY.

- 1 qt. warm water.
- 1 can of Gillett's lye (10c. size).
- 1-2 cup household ammonia.
- 4 teaspoonfuls borax.
- 2 tomato tins of caustic

Mix water, lye, ammonia and borax together. When dissolved, stir in the

grease (melted and warm—not too hot), and keep stirring until the thickness of thick cream. Pour into a large baking tin and make into squares before too hard to cut.

A Good Washing Fluid.

- 1 lb. of sal soda.
- 1-2 lb. unslaked lime.
- 1 gallon of water.

Boil twenty minutes; let stand till cool; then drain off and put in a small jug or jar. To one boilerful of clothes, which have been soaked and soaped, add a teacup of washing fluid. The clothes must be well covered with water before adding the fluid, and must boil about half an hour. Wash in suds and rinse. This receipt is an invaluable saver of time.

Soap Jelly for Washing Flannels.

Save the small pieces of laundry, toilet and bath soap until you have a teacup full. Put them into a quart of hot water with a tablespoonful of kerosene. Let simmer until dissolved. Make warm suds with this soap jelly. Set your flannels in the usual way. They will come out clean and soft.

White Clothes That Have Turned Yellow.

Can be beautifully bleached by soaking in buttermilk. If necessary, you can leave them in buttermilk twenty-four hours.

Your iron will not stick if you do one of two things:—

- (1) Add 1 tablespoonful of salt to 1-2 gallon of starch; or
- (2) 1 tablespoonful of kerosene oil put into the cold starch.

These give a pretty gloss.

Colored Cottons.

Put a small quantity of Maypole Soap into the rinsing water, and your cotton gowns will always look fresh and new.

Black and Navy Blue Linens.

Wash and peel two potatoes. Grate them into soft tepid water. Add 1 teaspoonful of ammonia. Wash goods in this and rinse in cold blue-

water. Dry, and iron on the wrong side.

An infusion of hay will preserve buff linens.

An infusion of bran will preserve brown linens.

Tussore and Raw Silks.—Should not be ironed until quite dry.

Blankets.

Use a little soap in the last rinsing water. After they have been hung on the line and are thoroughly dry, beat with a carpet-beater. They will become soft and light, and the wool like new.

To Wash Muslins and Gingham.

Dissolve a piece of alum the size of a nut to every pt. of starch. The color will keep bright a long time. This hint is useful when dresses must be often washed.

Types of Washers.

No housework is harder than that of keeping the family supplied with fresh, clean clothes. But because the health as well as the comfort of the body demands clean clothes, there must be

some way of supplying this demand. On the average farm this task must be performed by the housewife, and for the same reason that her husband buys the sulky instead of the walking plow, she should insist on the purchase of a power washer instead of a hand machine.

There are many types of power washers on the market and the housewife should make a careful investigation of their relative merits before purchasing. The platform upon which the washer stands should be taken into consideration, also. Such investigation can be made by examining the makes carried in stock by the local dealer and by writing for printed matter and particulars covering other types.

Where electricity is available, electric washers are the cheapest, and because of their simplicity of operation are the most satisfactory. A good electric machine can be obtained for fifty-five dollars. But on the farm the gasoline engine must be substituted for the electric motor, and the price of engine and washer with wringer attached, will not be less than sixty-five



“CROWN BRAND” CORN SYRUP IN “PERFECT SEAL” JARS

These glass jars—the finest Preserving Jars made—make “Crown Brand” Corn Syrup more attractive than ever. Every good housewife should save the jars for preserving—they hold a full quart of fruit or pickles.

“Crown Brand” Corn Syrup is not only a delicious table syrup, to be enjoyed on griddle cakes, hot biscuits and bread; it is also the best sweetener for cakes, pies, gingerbread and cookies, and makes delicious home-made candies.

AT ALL DEALERS

In 3 lbs. glass jars, and in 2, 5, 10 and 20 pound tins.

dollars. These prices may seem a little high to the conservative woman, but she should consider the saving of her time, labor, and strength, as worthy of the price.

With the power washer soft water will give the best results, and because soft water is just as desirable for cleansing the body as for cleansing the clothes, every house should have a cistern with the pump in the kitchen. With soft water, plenty of good soap, and a good machine, the week's washing can be done with as little effort as can many of the other household duties.

To insure safety in drying the clothes the line should be more substantial than the one fastened to the corner of the house and a nearby telephone pole. A desirable clothes line arrangement is three posts set in line a reasonable distance apart, with cross-pieces at the top of the posts to which two wires may be attached, instead of one. Then, to lessen the number of steps to be taken in hanging up the

clothes, the basket should be placed upon a little express wagon or a platform on wheels. In this way the clothes may be taken along down the line, obviating the necessity for the one hanging the clothes going back and forth to the basket.

For ironing, a good solid table and an electric, gasoline or alcohol iron are indispensable. The home-made ironing board is a good substitute for the table when ironing skirts and one-piece dresses. This can be made of red cedar and should be five feet long and sixteen inches wide. One end should be tapered so as to be narrow enough to slip the garment over it without stretching. A hole can be bored through the other end for the purpose of hanging up the board when not in use. Table matting makes an excellent padding for the board, but old blankets or sheets can be used instead. Two covers should be made for it and these should be so made that they can be easily removed for laundering when they become soiled. A

THE PERFECTION POWER WASHING MACHINE.

The most up-to-date way and the most popular way to do the washing is by "The Perfection" Electric or Gasoline Power Washer.

One lever sets the Washing Machine in operation; another lever starts, stops or reverses the Wringer. These two levers are all the machinery you have to look after, and they are very simple and conveniently arranged.

With the Perfection Electric or Power Washer, the washing which usually took all day is now a matter only of a few hours. Contrast the old-fashioned way of washing with all the hard work, to washing with a Perfection Power Washer, where the Gasoline engine does the washing and wringing—quickly and thoroughly. It just means that when the clothes are in the Washer, you throw in the lever to start the machine, and you are free to do anything else (clear up the breakfast dishes, for instance) until the batch of clothes in the machine is ready to be put through the wringer—when all you have to do then, is to feed the clothes into the rollers.

This means wash-day comfort, that will delight and satisfy you.

Write to-day for illustrated circular.

J. H. CONNOR & SON, Limited
OTTAWA, ONT.

Established in 1881.



convenient method is to fasten tape on both sides of the cover for tying it on the board. A sleeve board can be secured for a reasonable price and it is a great help in ironing infants' clothes and sleeves.

THE RURAL TELEPHONE.

Rural Canada needs to be nearer to its market, its neighbor, its church, its newspaper, and it cannot move its homes and farms to attain this. Railroads are being built, rural mail deliveries extended, and good roads constructed, but these do not meet the requirements of the whole of any community, let alone of the whole country. And all of these things involve the investment of many thousands of dollars and many months of work.

Rural Canada needs adequate communication now, however, when distances are greater than they will seem fifty years hence, when farms and villages are more isolated than they will be even five years hence.

The one thing that puts every farm in close touch with every other farm, every farmer's family near every other farmer's family, and near the doctor and the minister and the vete-

rinary, the grain dealer, the implement house, the railway station and the telegraph office, is the rural telephone, that efficient hired hand that is never too tired, never too sleepy, never overworked, never too busy, but always ready day or night. It is easily installed. Any farmer who can build a fence can build a telephone line and install the instruments. That solves the item of principal cost because he and his neighbors can get together, and do the work when the farm work is not pressing.

The best telephone on the market, together with a good lightning arrester, two batteries, and the necessary inside wire and ground rod, can be bought for about \$16.50. And the wire, brackets, insulators, etc., for a ten mile line can be bought for about \$235.00. That means that in the parts of the country where native poles can be cut and supplied by the farmers, and they do the work themselves, ten of them living one mile apart, can build a line and install their telephones at a cash outlay of about \$40.00 each.

One word of caution about rural

SEAFOAM POWER DRIVEN WASHER AND WRINGER



A boon to every farm house.

Will thoroughly wash and wring clothes with no other labor than putting in and taking out.

Will wash or wring at the same time or separately.

Runs from a gas, gasoline, steam engine or windmill.

Cover lifts without removing belt.

We can furnish a small powerful electric motor, which converts the machine shown into an "electric" that will run from an ordinary light socket.

— MADE BY —

CUMMER-DOWSWELL, LIMITED
HAMILTON, ONTARIO

telephone lines, and that is, don't buy where you can buy cheapest. Buy quality! It is cheaper in the long run. You all know it—you buy pedigreed proven herd-bulls or stallions, seed-wheat or corn, apple trees or potatoes. So don't buy fence wire from a local dealer because it is a few cents cheaper, than the regular double galvanized telephone wire specially made for that purpose. Insist upon proper lightning arresters mounted on non-combustible bases, and the best telephone instrument you can buy. And remember that there are made in Canada just as good telephones as there are made anywhere else in the world.

HOW TO TAKE CARE OF AN ORGAN.

A reed organ is susceptible to heat, cold, and especially dampness. A little common sense will suggest that the instrument is made principally of wood; extreme heat causes wood to contract or shrink while exposure to dampness will cause it to swell, in which case the working parts or the action will be liable to stick. An organ should not be made a receptacle for odds and ends, something likely to fall into it and make trouble. It should be kept clean, and dust may be kept out of the interior by covering with a cloth during the process of sweeping. An organ, unlike a piano, does not require tuning, but possibly the reeds may require cleaning. Do not attempt this yourself, unless you know how; neither is it well to trust it to the first man who comes along saying he is a "repair man." The better plan is to describe your trouble in a letter to the maker, and ask his advice; a lot of trouble is avoided in this way.

HOW TO TAKE CARE OF A PIANO.

A piano must be kept under proper conditions, otherwise it will get out of order. Many times lack of knowledge or care causes trouble for which the maker is often unjustly blamed. Dampness and excessive dryness are two great enemies, yet both can be avoided, if a little care be exercised. The careful house-keeper would not think of allowing a cold draft to blow through an open window on tender houseplants, yet some never think of its harming the piano; on a damp day too, the breeze laden with moisture

NEWCOMBE PIANOS

For the Farm Home where music is loved. The leading Canadian Piano. The only Piano with Howard's Patent Straining Rods.

Nearly half a century's experience in building Pianos.

Has received more medals and awards than any other Canadian Piano.

Newcombe Piano Players have a human expression of touch. Every detail is found perfect. Permanent tone and life-long service guaranteed.

Call at our nearest showroom or write us. Special prices and attention given mail orders.

NEWCOMBE PIANO CO. LIMITED

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TORONTO, ONT.

A Williams Piano

was ordered for
and used in
Windsor Castle
by Her Majesty
Queen Victoria.



CANADA'S MOST HONORED PIANO

NO purchase, no investment is so closely entwined with human sentiment, pride and affection as is the selection and possession of a good piano.

A good piano in the household means new joy and life in the home. The children become happier and the older folks brighter. Nothing adds to the refinement and culture of a child as does music from a good piano.

Could you select a better piano than the

Williams Piano

New Scale

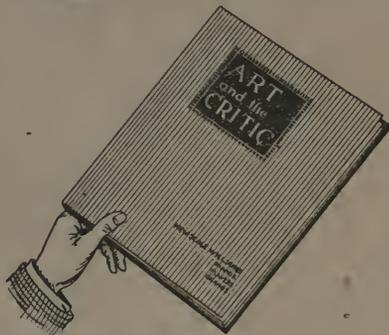
ENDORSED BY GREAT MUSICIANS

A Williams piano mellows with age. It is constructed to last a lifetime. It possesses a clear, sweet singing tone—is beautiful in finish and artistic in design. It is the perfect piano for the farm home and you have the supreme satisfaction of knowing that YOUR piano is

**Canada's Most Important
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Write To Day!

Don't wait until another time. Send for our beautiful album, "Art and the Critic." It will tell you how a piano is made and also the autobiography of the world's great musicians. It is absolutely free. Send for it to-day.



The Williams Piano Company, Ltd.
OSHAWA. - ONTARIO

blowing into the room will injuriously affect the instrument—it will cause the highly seasoned wood of the casing and interior to swell, and the metal parts to rust. The ivory on the keys will keep whiter if the lid is kept open permitting exposure to the light; but in sweeping or dusting the lid should be closed and the piano covered with a cloth, to exclude dust. Don't load the top of a piano with bric-a-brac, some of which may rattle and give the impression something is loose in-

side. Pins, coins and other articles are sometimes unconsciously allowed to drop into it; these too are sources of trouble. A piano is kept in best condition if a tuner is employed to go over it in the fall after the furnace fire is lighted, and again in the spring when it is time to let the fires out and open up the house. Entrust such work only to a man you know to be competent, but if you cannot find such, it would be better to write the maker of the instrument.

Hot-air Heating

Some of the best engineering skill of modern days has been applied to the problem of the application of the second great principle of heating—that of supplying heat to a number of rooms from a centralized plant. The first application of this principle was probably the hot-air furnace. This consists essentially of the furnace itself, which is inclosed almost entirely in a sheet-iron case, with sheet-iron ducts leading therefrom to the various rooms to be heated; to fill the place of the air that is forced through these pipes by convection currents, cold air is brought into the case through a large sheet-iron duct, called the cold-air duct.

Hot-air furnaces are all quite similar, differing only in the design and arrangement of the parts; they are all the same in consisting of a steel or cast-iron case, with firebox, grate, and ashpit. Some are fed through a door in the side, the fuel being thrown directly into the firebox; others have special arrangements so that the fuel, which is comparatively small in size, is supplied from below; those possessing this feature are known as under-feed furnaces. The fuel used in hot-air furnaces is almost always coal, either bituminous or anthracite.

Two distinct types of pipes are used for conducting the heated air to the rooms: first, those which are nearly horizontal and lead from the top of the furnace casing—these are usually round and made of a single thickness of bright tin wrapped with two or more thicknesses of asbestos to prevent loss of heat, and are called leaders; they should, if possible, be erected with an ascending pitch of one inch to one foot; second, rectangular

vertical pipes or raisers, termed stacks, made in such sizes as will fit in the partitions of buildings and to which the leaders connect. At the bottom of the stack is an enlarged section called the boot, which is provided with a collar for connection to the leader. At the top of the stack is a rectangular chamber into which the register box fitted. To lessen fire risk, these boxes should be made with double walls. Each leader should have a damper near the furnace, so that when necessary or desirable it may be closed; the nearer the damper is to the furnace end of the leader, the less will be the danger of overheating.

Provision should be made for evaporating water in the air chamber, to moisten the air forced through the house; most furnaces are equipped with a pan for this very purpose, which is an important one, since warm air requires more moisture than cold to maintain a comfortable degree of saturation. It is a generally accepted but mistaken belief that heat supplied by a hot-air furnace is necessarily a dry heat; all that is necessary is to pass the heated air over water.

The hot-air furnace system of heating possesses certain advantages, principal among which is the readiness with which the temperature can be raised. In cost it is much below that of steam or hot-water heating, two systems with which it is comparable, and it requires no care to prevent bursting of pipes or boiler from freezing. Unless the construction is good, and the erection has been carefully made, combustion gases are likely to be delivered to the rooms,



Attractive entrance to a Canadian farm home.

which is, to say the least, annoying; but this objection can be overcome, and cannot be justly considered a disadvantage. The disadvantages of the hot-air system lie in the comparative high cost of operation, in the rapidity with which it loses heat when the fire becomes low, and in the difficulty of even heating on windy days.

The question of the ventilation provided by a hot-air furnace is an important one. The system presupposes a very generous supply of air, which, in properly erected systems, is fresh when brought to the furnaces, is then heated and distributed to the rooms. When so constructed that the air brought to the furnace is taken from the interior of the house itself, the furnace is a source of danger, for the air will become so de-vitalized that it will be absolutely unfit to breathe. The air that is brought in to the furnace from out of doors is likely to lose a great deal of its supply of oxygen, unless care is taken to prevent the furnace from becoming too hot.

Steam Heating.

Heating by means of steam came perhaps first as a development of a method of heating to overcome the disadvantages of hot-air heating. The essentials of the system consist of the boiler with the furnace beneath, a system of distributing pipes for the steam, and radiators through which the heat of the steam is liberated into the rooms. The theory concerned in the operation is quite simple: the water in the boiler is heated, and steam is generated which rises through the pipes to the radiators, some condensation will result, and this is either brought back to the boiler or disposed of in some other way.

There are two general systems of heating, in the first of which, known as the Gravity Circulation System, the water of condensation from the radiators flows by its own weight into the boiler at a point below the water line; in the second, the water of condensation does not flow directly back to the boiler, but is returned by special machinery or in some cases wasted. The latter system is sometimes called the High Pressure System, because steam of any pressure can be generated in the boiler, part of which can be used for power purposes. High-pres-

sure steam, however, is seldom used for heating, but is reduced to not more than 10 pounds by throttling from the boiler or by passing through reducing valves; sometimes the exhaust steam from engines and pumps is used.

The boiler for house heating with either steam or hot water should be chosen very carefully. It should be large enough to contain a sufficient amount of water; the firebox should be deep and spacious; it should be easily accessible for cleaning; it should have no joints exposed to the direct action of the fire; a sectional boiler is the better, since no general explosion can occur, should one section give out; the construction should be durable and good, the very best gauges, safety valves, and other fixtures should be used, and it should be capable of working to its full capacity with the highest economy.

The systems of piping ordinarily employed provide for either a partial or a complete circulating system, each consisting of main and distributing pipes and returns. Three systems of piping are in common use.

In this system the main pipe is led to the highest part of the building, usually the attic, from whence distributing pipes are run to the various return risers, which extend to the basement and discharge into the main return. The supply for the radiators is all taken from the return risers, and in some cases the entire return circulation passes through the radiators.

In this system a large steam main, elevated close to the ceiling of the basement, runs around to a point where the last radiator is taken off, and is then connected into a return main to the boiler. All the water of condensation returns through the same pipe. This system requires only one connection to each radiator.

Hot-water Heating.

Heating by means of hot water is accomplished by means of circulating hot water in the radiators instead of steam. The entire system, radiators, circulating pipes, and boilers, are filled with water; this water is heated in the boiler. The hot water in the boiler is light, and has a constant tendency to rise, while the water which has lost its heat through the radiators is heavy, and has a corresponding ten-

dency to fall; consequently, a circulation occurs and is maintained as long as the temperature within the boiler is a few degrees higher than that of the house.

Almost any boiler that can be used for steam heating is suitable for hot-water heating, there being but a slight difference in the interior design to improve the circulation. In an efficient heater the water is separated into small portions so that it may heat quickly, and as little resistance as possible is offered to free circulation. Efficiency in point of fuel consumption is an important feature, as is facility and convenience in cleaning fire surfaces; for a thin coating of soot will materially decrease the efficiency.

Piping systems for hot water are quite similar to those for steam heating, and, as in steam heating, there are three systems in vogue:

(1) The overhead system, exactly similar to the Mills system with the exception that two connections are always made to the radiator, one for the inlet and the other for the outlet of the water.

(2) The two-pipe system, the one most commonly used, has separate mains and returns.

(3) The one-pipe system has a single pipe running around the basement as in the corresponding steam system, except that the main hot-water pipe rises from the boiler; the flow pipes are taken from the top of the main, and the water after passing through the radiators is returned by a separate pipe which is connected with the bottom of the main.

Hot-water apparatus should be kept full of water during the summer months, and only enough supplied during winter to keep it at a safe level. This excludes the air and prevents oxidation or corrosion of the pipes, besides reducing to a minimum the incrustation, which might become serious if allowed to accumulate from several fillings.

Hot-water heating plants are highly satisfactory when properly designed and installed. Hot-water radiators do not reduce the humidity to so great an extent. The heat can be kept quite uniform, the system being easily controlled, and any radiators can be shut off without resulting in the snapping or gurgling noises common with

steam. The first cost is somewhat higher than of a steam installation, because of the greater radiating surface, larger piping, and more expensive fittings. Unless care is taken when the house is vacant, the water in the system is likely to freeze and seriously damage the plant. On the whole, however, it would appear that for average residences hot-water heating is the most satisfactory.

MODERN BEDDING FOR THE FARM

The steel bed is to be preferred to the wood bed, particularly from the sanitary standpoint. The hard, bright enamel surface is cleaner and can be kept cleaner than wood. It, also, possesses greater convenience, being easier for the housewife to move about, or take apart and set up during times of house-cleaning.

There are two kinds of steel beds according to construction:

(1) "Cast" beds—These are beds which have in their construction cast iron "chills." The "chills" are the rosettes or fancy floral parts of the design of the bed. Cast beds frequently contain in the make up scrolls and bends of various kinds, and usually have brass trimmings of some kind, such as caps, knobs or spindles.

(2) "Chill-less" beds. These are beds which in their design have no cast iron chills. Usually such beds are plain and straight in style, having no scrolls or fancy bends. In chill-less beds the rods and tubing are inserted and fastened into one another and much of the work on them is done by hand.

Chill-less steel beds can now be purchased at very reasonable prices and seem to be particularly suited for the farm home. Steel beds do not need much care, but sometimes they are marked, and the enamel chipped, by what is merely carelessness. While they will stand hard knocks, probably better than any other kind of beds, still to keep them looking in good condition care should be taken not to knock chairs, the sweeper, or other things against them. For the guest room, or the better room a brass bed may be bought, and here a few words may be said about the care of brass beds. (1) Never use brass polish, soap and water, or anything of that kind on a brass bed. That spoils your

bed at once, and it cannot be repaired except by the factory, and at much expense. All brass beds of to-day are lacquered, and it is this lacquering process which gives them the finish, which is to be seen in the filmy sheen on the surface. The use of polish or soap and water cuts through this surface or finish and exposes the raw brass surface which as everyone knows tarnishes very rapidly in the atmosphere. (2) Never rub a brass bed with any rough surface. It is not wise to lean against the foot of a brass bed. Friction of this kind if persisted in will gradually wear through the finish, giving the surface a scratched appearance. It is unwise to throw the bedclothes over the foot of a brass bed. Better to lift them right off the bed and throw over a chair. (3) In the care of brass beds it is best to rub them as little as possible. Dusting off lightly with a piece of soft chamois cloth is recommended.

Springs.

For the same reasons that the steel bed is to be preferred so the steel frame spring is to be recommended. The wood frame spring, because of its unsanitary characteristics should be taboo in every farm home. This is all the more the case in view of the fact that steel frame springs can be bought at prices very slightly in advance of the ordinary cheap wood frame spring.

In addition to being "Steel frame," or "Wood frame," springs are of several different kinds. While certain kinds have certain advantages, it is largely a matter of choice what kind of spring you use. (1) Woven wire fabric. These springs consist of a fabric woven of very fine wire, the fabric then stretched very taut and fastened to the frame. This style of spring is probably most widely known at the present time, but is gradually giving place to other styles because of certain defects.

The woven wire spring cannot (except, perhaps, the very most expensive) be guaranteed not to sag. Because the fabric is stretched so taut if it does sag it lacks any elastic powers to pull itself back to the original state. Again, if the fabric gives way, has a hole punched in it, or is in any way damaged, the spring becomes practically useless, because repairs can be made only on the machines of

the factory. (2) Link fabrics. These springs have a fabric made of heavier wire usually about 13 gauge, which as the name implies, is formed into links so that the whole fabric presents a chain work appearance. Attachment to the frame is made by means of helical springs. Helical springs can be described as like the spring of window blind, but in the case of bed springs they are much shorter and made of heavier wire. The wire of the fabric usually is tinned or coppered, while the helicals are usually black japanned.

The advantages claimed for link fabric springs are: (1) They can be guaranteed not to sag. The helical springs have great elastic powers and after a strain on the fabric, draw it back to the original level position. (2) The link fabric is more resilient and shapes itself more completely to the contour of the body. (3) They are less liable to injury because of the flexibility of the fabric and, if damaged in moving about can usually be repaired by means of a few new links which can be attached very simply and by almost anyone. (4) Because of the open nature of the fabric, such springs are considered more sanitary. For that reason the link fabric is being widely used in hospitals, and institutions of various kinds. (5) Coil springs (or spiral springs). These springs consist of rows of coil springs (such as those used in sofas and chairs) set on and fastened to a steel framework. Generally speaking, such springs are very flexible and frequently are preferred by persons who like a soft bed. In past years some people have had unpleasant experiences with coil springs due to the separate springs moving out of place, but in present day springs of that type, such trouble has been overcome. The separate springs are so securely fastened into position that they cannot move out of place. (6) Upholstered box springs. These are a modification of the coil spring type. The rows of coil springs are attached to a wood framework, and securely interfastened. A covering of felt is put on and a case of ticking is put over the whole spring, tacked down to the wood framework at the sides and upholstered much after the same manner as a couch or sofa. One point should be borne in mind in

connection with upholstered box springs. They make the bed high, in fact, sometimes objection is taken to them because they make the bed too high. You should bear this in mind when purchasing because the furniture dealer cannot be expected to exchange a spring like this for you. Some people object to them also because of their bulk and weight. Though a box spring may be used without a mattress, it is always advisable to use one. It may, however, be a thin (three inches say) "overlay" pad. As to the care of springs little need be said except that dampness should be avoided. If they are not in use do not store them in the cellar. Better in a dry attic, or upstairs room.

Mattress.

Felt mattresses. The best known and most satisfactory mattresses of to-day belong to this class. They are filled entirely with cotton felt in layers, tufted and stitched down to give firmness, along with a springiness. Felt mattresses vary considerably according to the various grades of felt used. Felt is made from cotton and

the longer the thread or "staple" of the cotton the better the felt resulting and the greater the life of the mattress.

DISH-MOP DUSTER.

When dusting or cleaning floors there are always some places where even the finest mop will not clean, especially in corners and under some pieces of furniture and under and around radiators, where much dust collects. To clean these places one of the dish mops, to be found at any ten-cent store, works like a charm.

BEFORE VARNISHING.

Before varnishing furniture rub the wood with fine sand-paper to give it a smooth surface. See that brushes used are soft and of good quality, or varnish will dry streaky.

THINGS WORTH KNOWING.

As much depends on baking as on making. Biscuit and gingerbread require a quick oven. Flour bread a slower one.

Fruit cake requires more cooking

"The All-Purpose Sugar"

A product that has obtained the confidence of thousands of housewives in the short period of a year, certainly must have something to commend it.

Read what some housewives have to say about

LANTIC SUGAR

"Your sugar is the cleanest and purest I have ever used."

"My preserves, with the use of Lantic Sugar, are the best yet."

"Wouldn't be without it."

"I keep one sugar for every household use and it's Lantic."

"Its fine granulation is delightful to look at and economical to use."

"I use less Lantic because it seems sweeter than other sugars I've tried."

ATLANTIC SUGAR REFINERIES, Limited
MONTREAL

than a plain sugar cake, and should be baked slowly.

Cookies want a quick oven and close attention or they will burn.

Brown bread a hot oven at first, and a slow, steady fire after the bread is heated all through.

Apple pies should be baked slowly, so that the apples may be cooked through.

In frying doughnuts the lard should be hot enough to cook them quickly or they will soak fat.

To beat the whites of eggs quickly, put in a pinch of salt. The cooler the eggs, the quicker they will froth.

In boiling eggs hard, put them in boiling water ten minutes and then put them in cold water. This will prevent the yolks turning black.

Old potatoes may be freshened by plunging into cold water before cooking.

Rub your griddle with fine salt before you grease it, and your cakes will not stick.

Take out the little balls in the head of cloves before using, as that is what discolors your fruit.

To cut hard butter into squares, fold a piece of waxed paper in which the butter was wrapped around the knife. You can then make a perfectly smooth cut.

In preparing chicken or turkey for roasting, try rubbing the inside with a piece of lemon. It will whiten the flesh and make it more tender.

TIME FOR BAKING.

Loaf Bread	40 to 60 minutes
Rolls and Biscuit	10 to 20 "
Graham Gems	30 "
Gingerbread	20 to 30 "
Sponge Cake	45 to 60 "
Plain Cake	30 to 40 "
Fruit Cake	2 to 3 hours.
Cookies	10 to 15 minutes
Bread Pudding	1 hour.
Rice and Tapioca	1 hour.
Indian Pudding	2 to 3 hours.
Steamed Pudding	1 to 3 hours.
Steamed Brown Bread	3 hours.
Custards	15 to 20 minutes
Pie Crust	about 30 "
Plum Pudding	2 to 3 hours.

This applies to young and fresh vegetables.

TIME FOR MEATS.

Beef, underdone, per pound	9 to 10 min.
Beef, fillet of	20 to 40 min.
Mutton, leg, per pound	10 to 12 min.
Mutton, stuffed shoulder per pound	18 min.
Veal, loin of, plain, per pound	15 to 18 min.
Veal, stuffed	20 min.
Pork, spare rib, per pound	15 to 20 min.
Pork, loin or shoulder, per pound	20 to 30 min.
Liver, baked or braised.	1 to 1½ hrs.
Corned beef, per pound.	25 to 30 min.
Boiled (simmered) Beef, per pound	20 to 30 min.
Ham, after water or cider begins to boil	15 to 20 min.
Bacon, per pound	15 min.
Chickens, baked, three to four pounds	1 to 2 hrs.
Turkey, ten pounds	3 hrs.
Goose, eight pounds	3 hrs.
Duck, tame	40 to 60 min.
Duck, wild	30 to 40 min.
Grouse, Pigeons and other large birds	30 min.
Small birds	10 to 15 min.
Venison, per pound	15 min.

MEASURES OF CAPACITY.

Four even teaspoonfuls liquid, equal one even tablespoonful.

Three even teaspoonfuls, dry material, equal one even tablespoonful.

Sixteen even tablespoonfuls, liquid, equal one cupful.

Twelve tablespoonfuls, dry material, equal one cupful.

Two cupfuls, equal one pint.

Four liquid cupfuls, equal one quart.

Four cupfuls flour equal one quart or one pound.

Two cupfuls solid butter, equal one pound.

Two cupfuls granulated sugar, equal one pound.

Two and a half cupfuls powdered sugar, equal one pound.

One pint of milk or water, equals one pound.

One pint chopped meat, packed, makes a pound.

One cup rice equals one-half pound.

One cup stemmed raisins, makes 6 ounces.

TABLE OF PROPORTION.

One quart of flour requires one pint of butter, or butter and lard mixed for pastry.

One quart of flour requires one heaping tablespoon of butter for biscuit.

One quart of flour requires one cup of butter for cup cakes.

One quart of flour requires one-half level teaspoon of salt.

One quart of flour requires four teaspoons of baking powder.

One quart of flour requires one pint of milk for muffins, gems, etc.

One quart of flour requires one scant quart of milk for batters of all kinds.

FOR OLD PAINT STAINS.

Paint stains that are dry and old may be removed from cotton or woollen goods with chloroform. It is a good plan to first cover the spots with olive oil or butter.

TO PREVENT APPENDICITIS.

Olive oil is excellent for the health. A tablespoonful of it three times a day is recommended by many physicians as a means of warding off appendicitis.

TO "SET" THE COLOR.

To "set" the color in light shades of pink and blue, soak the goods in salt water with a small lump of alum added. Use the alum alone for the different shades of lilac and violet. After the color has been "set," wash the garments in warm borax suds, which will help to keep the color in the goods.

A GOOD SOUP STOCK.

Save the water in which fresh green peas have been boiled. It makes an excellent foundation for soup stock or gravies. So delicate is its flavor that some people like it served in bouillon cups with salt, pepper and a bit of butter.

TO CLEAN LEATHER FURNITURE.

Add a little vinegar to some warm water and wash the leather, using a clean cloth or sponge. Wipe with a dry cloth. Then, to restore the polish, put two teaspoonfuls of turpentine with the whites of two eggs; beat a little and apply with a clean flannel

cloth. Dry with another cloth. All the cloths used should be soft and absolutely clean.

TO STOP BLEEDING.

A heaping teaspoonful of powdered alum in a cup of water will stop the flow of blood in any ordinary wound where no large artery has been severed. Snuffing a similar solution will stop bleeding of the nose.

GRINDING BREAD CRUMBS.

If a quart fruit-jar is slipped over the outlet of the grinder as far as possible and held there while grinding with the other hand, all crumbs will be caught, instead of a lot of them flying around the room, causing unnecessary disorder.

FOR EARACHE.

An onion poultice will often relieve the worst earache.

CAMPHOR FOR SILVER.

A lump of camphor kept near silver when not in use will prevent it tarnishing.

WHEN MEAT IS TOUGH.

Add a tablespoonful of vinegar to the water or gravy in which the meat is cooking and let simmer slowly.

TO PREVENT FLIES.

Two ounces of borax sprinkled over a garbage can or refuse pile will effectually prevent flies from breeding.

POTATO MUD REMOVER.

All traces of mud can be removed from skirts and gentlemen's black garments by rubbing the stains with a raw cut potato.

TO FRESHEN CAKE.

To freshen stale cake, dip it for a second or two in cold milk and then rebake it in a rather cool oven. It will taste almost like new again.

FOR TAR STAINS.

Tar stains may be removed from cotton fabrics by covering the spots with butter and allowing it to remain for a few hours before washing.

FOR BURNS AND SCALDS.

Apply glycerine and flour, the latter heaped on the affected part to keep off

PURITY—the guaranteed Flour



SO confident are we of the ability of Purity Flour to please you better than any other flour you have ever used, that we have authorized your grocer to sell it with a straight money-back guarantee.

Go to your grocer and buy a sack—a small sack if you like—of Purity Flour. Test it by actual baking results. When you find, as we say, that it makes “more bread and better bread” than any other flour; that it makes lighter, tastier biscuits and cakes; that the pastry is more digestible than can be made with any other flour—you will know the reason for the guarantee given. If Purity was not such a clean, pure flour, with everything combining to make it as nearly a perfect flour as possible, you may be sure we could not afford to give it such an absolute guarantee.

WESTERN CANADA FLOUR MILLS CO., LIMITED

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GODERICH. BRANDON, ST. JOHN, N.B.

the air. On this put a good pad of cotton wool and bandage.

FOR A CINDER IN THE EYE.

To remove a cinder or other foreign substance, lay over the eye a cloth on which has been spread the beaten white of an egg, with a little sugar and pulverized alum added.

FOR MACHINE GREASE STAINS.

Cold rain water and good soap will usually remove these troublesome stains.

TO CLEAN JEWELRY.

Silver or gold jewelry may be satisfactorily cleaned by adding a teaspoonful of ammonia to a cup of water and applying with a rag.

USEFUL HINTS.

A soft rag, moistened with lemon juice and then dipped in silver whitening will be found excellent for cleaning piano keys.

A mixture of olive oil and ink in equal parts is excellent for removing the rusty appearance from swede shoes or slippers.

Keep small squares of coarse sand paper near the kitchen sink. There is nothing better for removing scorch or food stuffs from pots or pans.

A plain cloth dipped in hot water and then in a saucer of bran, will clean white paint and not injure it. The bran acts like a soap on the paint.

Often a machine needle, which has a turned or blunted point may be made as good as ever by rubbing it back and forth a few times on a whetstone.

In cleaning woollen clothes in winter time, take them out of doors, throw dry snow over them and then brush it off. This not only removes dust but lint.

If a strong brine of salt and water is thrown over the coals, less soot will collect in the flues and chimneys. The fire, too, will burn clear and bright.

To remove hot water marks from japanned trays use sweet oil. Rub it in well till all marks disappear,



Good Butter Goes Hand in Hand with Good Salt

The Farmer's Year

1916 promises to go down in history as one of the record years for Canadian farmers and dairymen—not only for the excellent prices obtainable—but also for the high quality of farm and dairy products.

WINDSOR

DAIRY
SALT

CHEESE
SALT

have done their full share in making this possible. Of course YOU use Windsor Salt.

then polish the tray with dry flour and a soft cloth.

Leather can be cleaned very well with milk. Dust the leather thoroughly with a soft cloth, then use another cloth dipped in sweet milk and the spots will be easily removed.

Kerosene rubbed on with a soft cloth will clean zinc perfectly. Kerosene or gasoline applied with a cloth will also remove all grease spots from porcelain basins and bath tubs. Rinse well with very hot water.

If a pan in which milk is cooked is rinsed out in cold water, the milk will not be so apt to stick.

If one burns the food in a new white enamel dish, put into the dish a tablespoonful of sal soda, fill with water and boil.

If one has not access to a hot water bag when it is needed, a good substitute is a flannel bag filled with hot sand or salt. A good idea is to keep a half dozen little ones filled and ready.

Get a nickel's worth of stick glue at your druggist's and put three or four pieces at intervals in the soil around your fern. Do this three or four times a year and you will notice a marked improvement in the plant.

If new enameled saucepans are placed in a pan of warm water, allowed to come to a boil and then cooled, they will be found to last much longer before either cracking or burning.

White spots on furniture will disappear if a hot plate from the stove be held over them.

SUSTENANCE FOR THE SICK.

Beef Tea.—Mince one pound of good lean beef and put into a jar with one teacupful cold water; cork closely and set in a boiler or steamer to cook. It will require three or four hours. Strain and season.

Beef Essence.—Put one pound of lean beef, minced fine, into a jar, without any water whatever, cover the jar tightly and set it in a pot or kettle of cold water, bringing the water slowly to a boil and allowing the jar containing the meat to so remain simmering until the juice of the meat is all extracted and the fibre becomes colorless. Season to taste and skim when cold.

Barley Water.—Put two ounces of pearl barley into half a pint boiling water and let it simmer a few minutes. Drain off and add two quarts of boiling water with a few figs and stoned raisins cut fine. Boil slowly until reduced about one-half and strain. Sweeten to taste, adding the juice of a lemon and nutmeg if desired.

Toast Water.—Brown nicely, but do not burn, the slices of bread, and pour upon them sufficient boiling water to cover. Let them steep until cold, keeping the bowl or dish containing the toast closely covered. Strain off the water and sweeten to taste, putting a piece of ice into it as drank.

Flaxseed Lemonade.—Pour on four tablespoonfuls of whole flaxseed one quart of boiling water and add the juice of two lemons. Let it steep for three hours, keeping it closely covered. Sweeten to taste. Excellent for colds.

Slippery-Elm Bark Tea.—Pour boiling water over the bark, first breaking it into bits; cover the pitcher containing it and let it stand until cold; add lemon juice if desired and sweeten to taste.

Mulled Buttermilk.—The well-beaten yolk of an egg added to boiling butter-milk and allowed to boil up; or add to the boiling butter-milk a little thickening of flour and cold buttermilk.

Baked Milk.—Put the milk in a jar, covering the opening with white paper, and bake in a moderate oven until thick as cream. May be taken by the most delicate stomach.

Onion Gruel.—Boil a few sliced onions in a pint of fresh milk, stirring in a very little oatmeal and a pinch of salt; boil until the onions become tender and take at once just before going to bed. Excellent for a cold.

Arrowroot.—Use milk or water as preferred. Put a heaping teaspoonful of ground arrowroot into a cup and mix with a little cold milk. Stir into a pan containing a pint of either cream or water that has been brought to a boil, adding a little salt. Let it simmer for a few minutes and then pour out. May be sweetened or flavored with nutmeg if desired.



Sickness.



Fire.



Thugs.



Shrewd Buyers.



Dissatisfied Help.



Wife's Loneliness.

These have you at their Mercy

Sickness, fire or tramps have no pity on the unprotected farm home. Isolation is their great ally—for always and everywhere they work against time. And unless the farmer's home can get help quickly its fight is a losing one. Shrewd buyers can outwit you, dissatisfied help leave you in the lurch.

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a sudden emergency may find you helpless. With the telephone every neighbor is "next door"—the doctor, the mill, the employment agency—every member of your community is practically at your elbow.

Write to-day for the most interesting booklet ever issued on the subject of farm protection—125,000 Canadian farmers helped to write it.

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Send me, without cost or obligation, your booklet, "How the Telephone Helps the Farmer," and other data regarding Rural Telephones.

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FARM BUILDINGS AND EQUIPMENT

General Principles of Farm Building Location

To begin with, the home site should be selected so that any part of the farm can be reached without any difficulty or great inconvenience. Many times, in order to avoid small inconveniences, the buildings are located so that part of the fields are more or less inaccessible, or so far away that much time is wasted in going to and from the fields at busy times of the year.

When an approximate location has been decided upon, place the house in the best place available. Try to obtain the most attractive view possible, and build the house so that the view may be advantageously used. The house is by far the most important of farm buildings, though to observe many farms, one would think the exact opposite to be true. At least half of his life the farmer spends in his house, and his wife spends much the greater part of her time there. The farmer's wife is entitled to have a well-built and well-located workshop, in which she manages and contrives to make and keep a happy home, so essential to true success.

If the drainage of the home site is not perfect, this must be attended to, so that good sanitation may be obtained. Plenty of good air and quick drainage of soil are essential. This can be secured by a location on a fairly dry soil, slightly elevated. Of course, any protection against cold north winds should be taken advantage of, but it is a question whether a windbreak on the west is desirable; cool and refreshing winds should not be deflected during the heated season.

The house should not be located too near the highway, nor is it necessary to have the front of the house toward the highway. Unless because of some special condition the distance between highway and house should not be less than 200 feet, and if the most desirable location for the house be twice or thrice that distance, perhaps so much the better. A park-like entrance drive, the road end of which should be in plain view from the house, should be laid out up to the house-yard gate in a graceful curve; it should be bordered by trees, which should be so

arranged as not to interfere with the view. The barn should be located so the prevailing winds will not carry the stable odors toward the house, and the general slope of the land should be from the house toward the barn, rather than the opposite. The barn and any adjacent pens should not be placed in near proximity to the drive, but should preferably be reached by a branch of the main drive. If it is necessary and can be so arranged, another drive should be provided which will not pass near the house, to be used for hauling, etc. The exact position and arrangement of other buildings will be governed by their use; for economy and convenience they should be few and rather compact, though not so close as to increase fire risk. Pens, sheds, and stacks should occupy inconspicuous positions.

Machine Shed.

The width of the building governs to a large extent the method of roof framing. Machine sheds adapt themselves readily to certain widths, 18 feet and 26 feet being perhaps the widths that can be most economically utilized. The floor plans following illustrate possible arrangements of machines within the buildings. If only an 18-foot width is used for the structure, the rafters themselves, with perhaps a collar beam or cross tie, are sufficient to support the roof. If a greater width is employed, a simple truss, like the one in figure 56, must be built up, and placed at intervals of 9 or 10 feet. Ofttimes the collar beams and cross ties are used to support poles, lumber, and odds and ends that accumulate, and the weight of these things will give the roof a tendency to rack or sag. If the intention is to use the collar beams and ties for this purpose, the framing should be made extra strong to resist the additional strain.

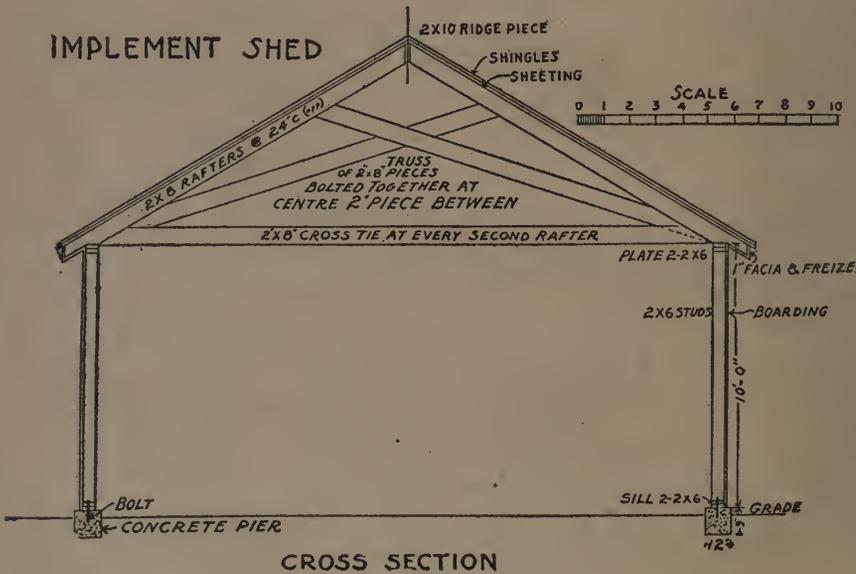
The floor of the shed should not be very high, and the approaches to the door should be quite gradual, for otherwise it will be very difficult to run some of the heavier machines into the shed. Some builders advocate the use

of two-story structures, but this is impracticable for the ordinary farm, and the added expense for the necessary hoist and the trouble of operating it would make it undesirable. However, this idea may be well worked out if the shed is built on the slope of a steep hill, so that natural approaches may be had on two sides, and a hoist will be unnecessary.

In preparing the design of a machine shed, the first consideration is the number of machines to be housed, and whether or not a farm shop is to be included in the building. Then comes the arranging of the machines with the view of getting them into such locations as to enable the user to get them out and in with the least amount of trouble. For instance, a binder, being used just once a year, may well occupy a farther corner, leaving the space near the door for the mower and the plow, implements which are used oftener and for longer periods than the binder. The wagons, buggies, and manure spreaders are used so much throughout the year that they should be especially accessible.

Modern Stable Equipment

Few jobs on the farm require as much constant attention as stable cleaning. It is a job which cannot be neglected. The barn must be cleaned not only thoroughly, but regularly, and this must be done not six days of the week only, but seven. Lifting wheelbarrow loads of cow manure and wheeling them through the yard to the pile is heavy work, for the yard is usually very muddy or covered with slush or snow. It is very necessary to get the manure a good distance from the barn, so that the fumes will not rot the wood work, injure the harness and implements, affect the health of the cows or taint the milk. These many needs made the introduction of a labor saving device for stable cleaning very welcome to Canadian farmers. The manure carrier has within the past eight years become almost as popular as the binder. In many sections you will not find a farmer who has not his manure carrier outfit. As it runs on a level overhead track, there is no heavy weight to be lifted. It



CROSS SECTION

can be run into any part of the stable and by means of a swing pole can be pushed out to be dumped in the yard. It takes more than four times the load a wheelbarrow will carry, and, if desired can be dumped directly into the wagon or spreader. The water tight bucket preserves all the liquid manure and prevents slopping over or dripping on the way to the pile.

Many farmers extend the manure carrier track to run up the feed passage and use a feed carrier for feeding. This will handle ensilage, grain, roots, and in fact any kind of feed. One load can be made to do for the whole herd, so steps backward and forward are saved, and, as well, can be made to save almost as much work as the manure carrier, because, for every pound of manure, from five to ten pounds of feed have to be handled.

If there is a good cement floor in the barn, a floor feed truck is another excellent device for feeding with.

Sanitary Steel Stalls.

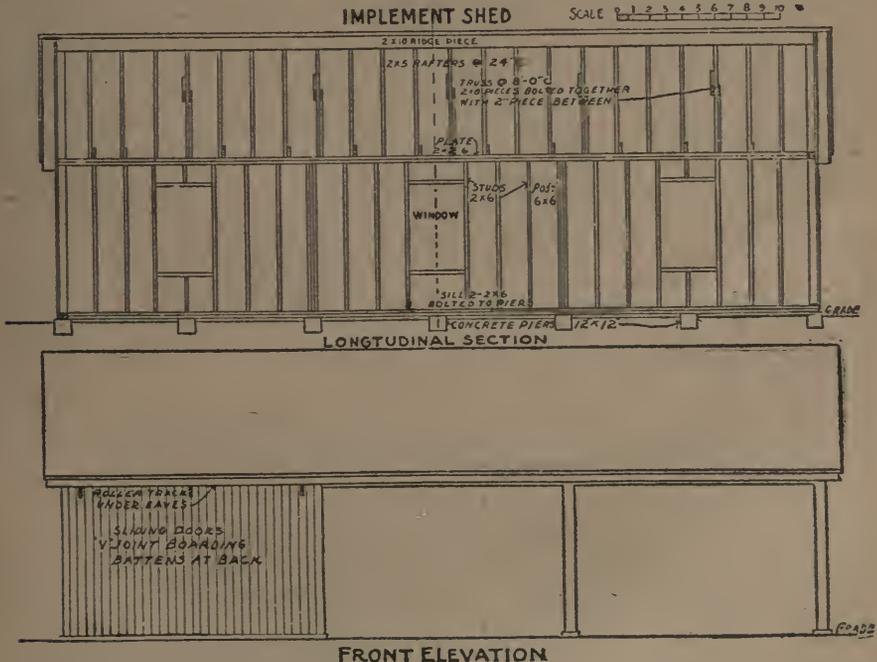
Galvanized Steel Stalls are great labour savers, too, for they are very easy to keep clean. The small round surface scarcely collects any dust or

dirt, and there is no place for vermin to lodge.

The stalls are very sanitary. They do not soak up manure. Sunlight can flow through the open construction of the steel, and as it is the best disinfectant in the world, it destroys germs of disease in the stable. These two points make the stalls a valuable ally in fighting tuberculosis. They are very durable, as they will not rot. A stable job in which steel stalls and the cement floors are used is practically everlasting. Not even force can destroy it.

In building this modern steel equipment the comfort of the cow has been one of the most important considerations kept in view. As the dairy industry has developed in recent years, it has been found that proper treatment has about as much to do with the welfare of the dairy cow and with the quantity of milk she gives, as the method of feeding her.

Swinging steel stanchions give her as much freedom within the limits of her stall as she would have out in the field, except in one very important way. The best stanchions keep the



cow lined up over the gutter so she can't dung on her stand. BUT the great point is that she is free to turn her head as she pleases, card her flanks, lie down on either side, and there is no chafing, no weight on her neck, no tug or pull on her head.

The Steel Stalls are a great convenience for the owner in other ways. For instance the steel partitions prevent the animals crowding when being milked, and they protect the milker from the next cow. The Steel Stanchions are very simple to close and can be opened even when the animal is lunging or pulling back with all its might. This has in more than one instance been found an invaluable feature in releasing cows from a burning stable. Had chain ties been in use, it would have been almost impossible to save the animals.

Certainly they soon pay back cost, many times. The most modern styles are being galvanized to prevent rusting through contact with moist bedding and no extra charge is made for this splendid finish. The stable always looks very fine and the owner will always be extremely proud of it.

Steel pens for the calves, and for the bull, and maternity pens for the

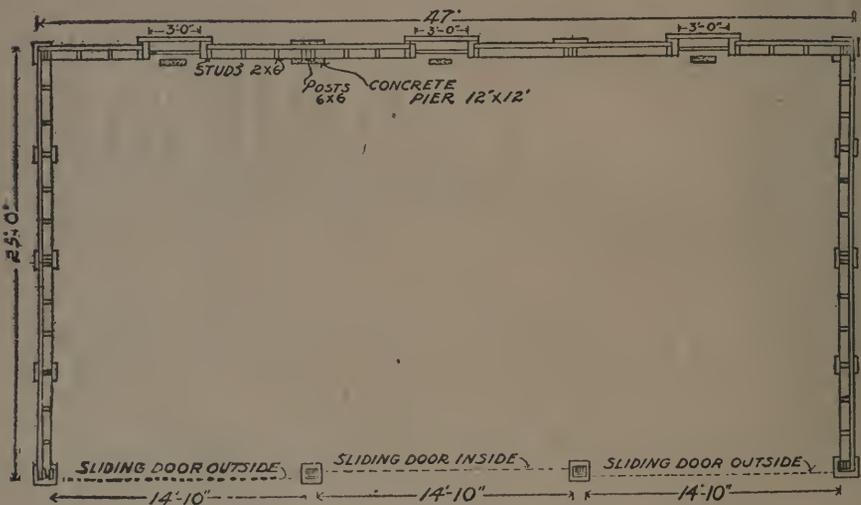
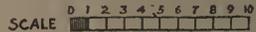
cows have the advantage outlined.

The fronts of calf pens consist of a whole row of stanchions which can be opened and closed altogether with a lever or at one time. Individual stanchions which can be opened and closed altogether with a lever, or one at a time. Individual stanchions permit one to feed each calf separately so that no bully can get the big share at the expense of the others. The latest type of calf pen equipment is illustrated by the small photo on this page. There is an individual pen for each calf, but when desired, the panels between any number of pens can be removed combining the pens to form larger ones.

METAL SHINGLES.

The important point to get at is the quality of the metal, the galvanizing and the lock used on the shingle to fasten it to those on every side of it. It should be secure against all water, snow and wind, and if proof against the above, it will also be lightning proof if the roof is connected to the ground by wires. The lightning bolt striking a metal roof becomes scattered on the iron and instead of concentrating its force at any particular

IMPLEMENT SHED





Barn of E. L. Roddy, Pickering, Ont.

THIS BARN HAS

“EASTLAKE” SHINGLE ROOF

Fire-proof—Storm-proof—Wear-proof.

“EMPIRE” CORRUGATED IRON SIDES

Strong—Neat—Weather-tight—Durable.

“HALITUS” VENTILATORS

Efficient—Economical—Easily Attached.

“EMPIRE” SILO ROOF

Strong—Serviceable—Big Opening for Filling.

We make a complete line of “Quality First” Metallic Roofing and Siding, also beautiful patterns of Metallic Ceiling and Wall Coverings for inside use.

The Metallic Roofing Co. LIMITED

“Quality First”

Manufacturers.

“Quality First”

WINNIPEG and TORONTO.

point sufficient to penetrate the roof it loses force and reaches the earth without damage by means of cables attached to the corners of the metal roof and extending into the ground.

Pay strict attention to where the locks on the shingles are folded as here if anywhere the defects in the metal will show up.

If the material seems to have bent without cracking the iron or the galvanizing, then it is pretty safe to buy this shingle for this is a greater test than the roof will ever likely be called upon to stand.

It is wise to note the appearance of the shingle as it costs no more to have a neat looking roof than it does for a humped loose lock and unsightly pattern and particular attention should be given to the provision for nailing to the roof.

SHEET METAL FOR BUILDINGS.

Sheet metal is fireproof. Here lies perhaps its greatest virtue, and one that can hardly be over-valued. It is also lightning-proof. When a metal roof is properly "grounded," lightning may strike it with no more effect than if it struck out in a lake.

Sheet metal is comparatively light in weight, imposing no strain on the structure, and permitting the safe employment of light and inexpensive supports.

It is practically immune from affection by extremes of heat and cold. It will not snap with frost and ice, nor will it curl up, warp and twist under the summer sun. It does not retain, on into the night, the heat infused into it by day, but will cool off quickly, making sleeping quarters much more comfortable. This latter feature applies more particularly, perhaps, to terne plates than to any of the other metals.

Sheet metal roofing presents a smooth surface, free from cracks and crevices. It thus affords no grip for snow, but permits same to slide off freely without freezing, and the consequent "back-watering" and leaking. Its smooth hard surface also permits of its being walked on without damage. It also admits of a secure and watertight junction at valleys and hips. The joints of a sheet metal roof are invariably close and snug fitting. For this reason, it is rarely disturbed by violent winds and cyclones—the

wind can get no purchase under it.

The big item of cost in a sheet metal roof is material. The small item is labor. The purchaser thus has the satisfaction of knowing that the bulk of his money is actually entering into the life and service of his roof—it is not being paid merely for laying it. This rapidity and ease of laying is also of advantage in another way, in that it admits of the buyer laying the roof himself, or with unskilled help only, if it is not convenient to hire it done. This last clause applies in particular to the more simple, but none the less excellent, forms of galvanized shingles, tiles, etc.

Sheet metal roofing is durable. (Bear in mind that we are speaking of reliable materials only.) Plenty of metal roofs are in evidence to-day which were laid 30, 50 and 60 years ago, and which, by all appearances, are still good for many years' service. How many times they have saved their respective buildings from destruction by fire or lightning can only be a matter of conjecture.

Much harm has undoubtedly been done to the good name of metal roofing by the use in some localities of cheap material, which has proven short-lived. This should in no wise be held against the products of which this article treats, as if good material is used, there is ample evidence to prove that it will give generations of satisfactory service.

For rural districts, sheet metal has an added advantage, in that it sheds clean rain water—and more of it. None can soak in, so it all flows off. It further has the property of condensing and shedding the dew, a fair area of roof often shedding a quarter or half-barrel in a single night in an otherwise dry season.

In point of appearance sheet metal roofing can satisfy the most exacting tastes. It is made in a range of styles and patterns suitable for every conceivable sort of building. The plain severe lines of the standing seam and similar styles look neat and serviceable for industrial buildings, while the numerous patterns of embossed shingles and tiles afford the home-owner a chance to select something to accord with any style of architecture.

Sheet metal can be painted very quickly and very cheaply. The paint

does not need to be brushed in, and, as there is no absorption, a little goes a long way.

From the standpoint of economy, sheet metal roofing should appeal strongly to the thoughtful buyer. Its first cost is very moderate, and figured by "year-cost," it is decidedly economical. True economy consists not in buying the cheapest product, but in buying that which is best value in the end.

THE SLED CORN HARVESTER.

The platform is made by nailing together three 10-inch boards 6 feet long. Two 2 by 2 runners 2 feet long are nailed to the front of the platform on each side of it. The rear end of the platform can rest on the ground; this gives the harvester an upward slope.

A 4 by 4 two feet and ten inches long is bolted on the rear end of the platform with two six-inch bolts. Next, a second piece of 4 by 4, three feet and four inches long, is bolted on the platform two feet from the rear end of the platform, with two six-inch bolts. This piece should extend ten inches over the right side of sled to which the guard is fastened. The under side of it should be sloped to almost a point so that it will pass over the stubble. A 2 by 4 guard five feet long is then fastened to the right hand corner of the 4 by 4 on rear end of sled with a seven-inch bolt. This

guard is then bolted to the end of the second 4 by 4 with a five-inch bolt.

A heavy blade from a common brush or brier scythe can be used for the blade. The blade is fastened to the second 4 by 4 and to the guard. The back of the blade is fastened to the 4 by 4 with a hook bolt. This bolt can be made by taking a half-inch rod seven inches long and make a hook to fit the back of the blade, and cutting threads on the other end. The point of the blade is made fast to the under side of the guard by bolting it between the guard and a short piece of 2 by 4 with two four-inch bolts. The blade should have a slight upward slope.

The corn is cut by drawing the sled between rows of corn. A man should stand on the sled and catch the corn in his right arm as it is cut; when he gets his arm full of corn he can put it in a shock or lay it in piles on the ground.

The following material will be necessary to make a sled harvester:

3 10-inch boards, 6 feet long for the platform.

1 piece 2x2 inches by 4 feet long for the runners.

1 piece 2x4 inches by 5 feet long for the guard.

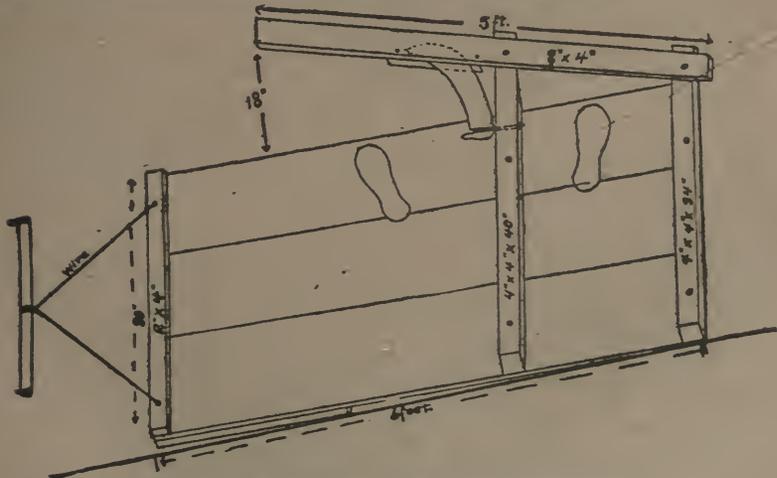
1 brier scythe blade.

4 4-inch bolts.

1 5-inch bolt.

4 6-inch bolts.

1 7-inch hook bolt.



Sled corn harvesters. (See information above.)

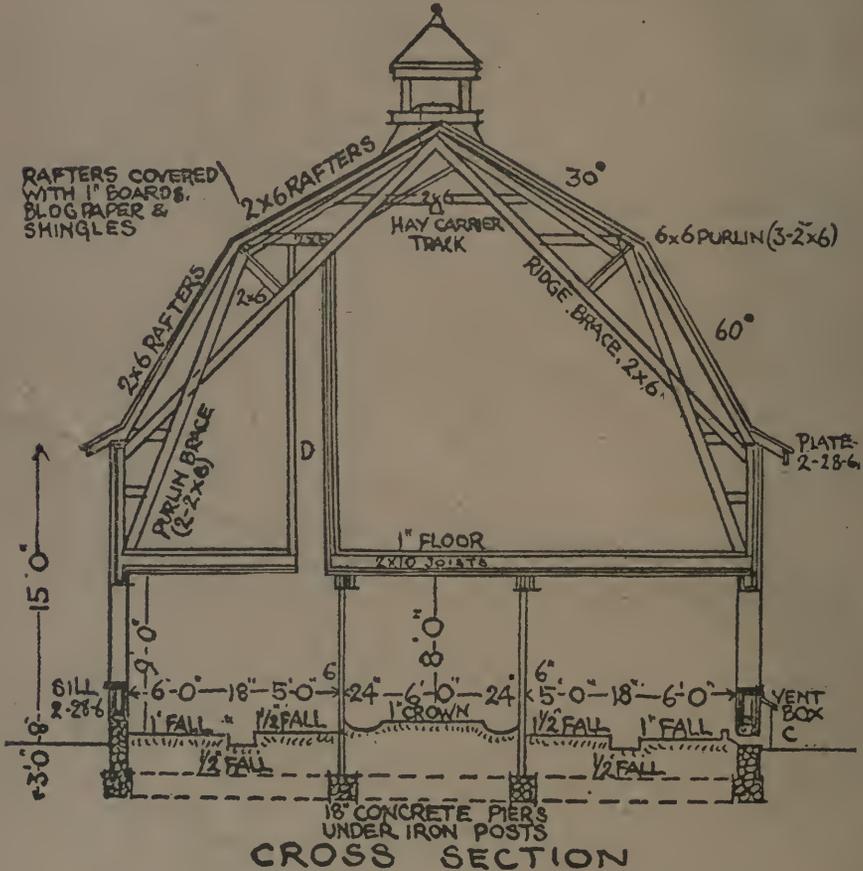
Sheep Barns and Their Arrangement.

It is well known that sheep will not bear close and constant confinement like cattle. They must have not only exercise, but plenty of air. Their natural habitat is in mountain regions, where the air is bracing. In the care of sheep this must always be kept in mind. Hence, sheep-barns must have an abundance of ventilation, with large yards attached for exercise when the weather is favorable. In fact, their fleeces amply protect them from extreme cold when not exposed to storms. In all mild climates they thrive better under open, protected sheds. The mutton breeds, and especially the long-wooled breeds, and more especially the Leicester, require better protection

than the hardy American Merino.

A GOOD BARN PLAN.

The plan accompanying was designed by the architect of the Experimental Farm, Ottawa, to meet the requirements of a small farm where four or five horses and fifteen to twenty cattle are kept. No part is below ground as light and freedom from dampness are considered essential to the health of animals. The dimensions given and the arrangement of timbers as shown in cross section will enable a builder to carry out the design. In the cattle stable the hay chutes are indicated by the letter A; meal chutes B; fresh air inlet C; foul air outlet D; manger E; grain bins G; meal bins H.



A barn plan for small farm.

Round and Rectangular Barns Compared.

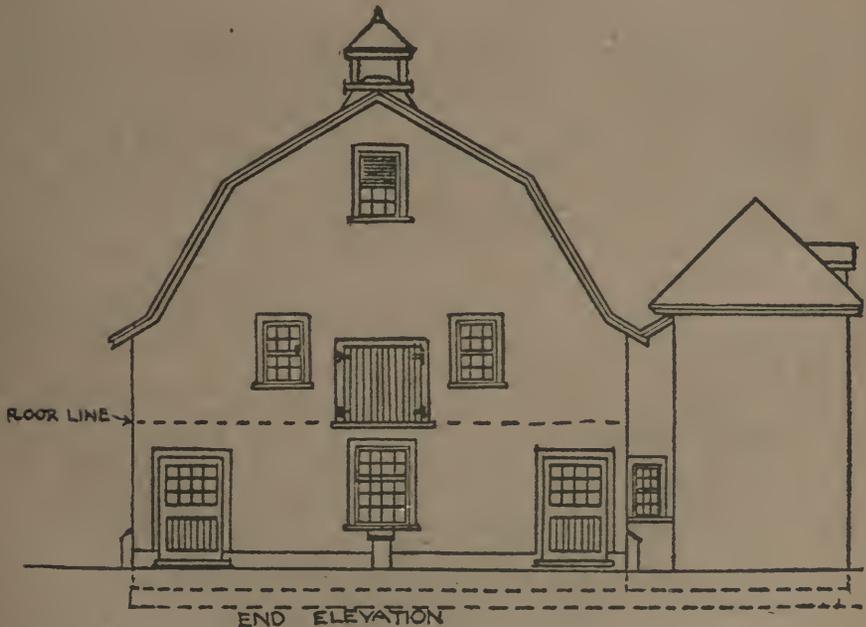
In comparing the 60 foot round barn with a rectangular barn of the same area, the two barns should afford the cows the same amount of space on the platform. Allowing each cow in the 60 foot round barn 3 feet 6 inches in width at the rear of the platform, it will accommodate 40 cows and leave space for two passage ways. But in a rectangular barn, only 3 feet 4 inches of platform space need be allowed for each cow, and the 78½ foot barn, with two 3-foot passage ways across it for convenience in feeding, will accommodate 42 cows. While the rectangular barn has stall room for two more cows, the round barn contains space in the center for a silo 18 feet in diameter.

The floor space and cubical content of the round barn 60 feet in diameter, and the rectangular barn compared with it in these tables, are practically the same, and the barns are therefore directly comparable. This being true, the percentages which

were figured from the complete bills of material for these barns show the exact saving in lumber on the 60 foot round barn over the plank and mortise frame, rectangular barns 36 x 78½ feet. The lumber bills of the rectangular barns show an increase in cost of 28 per cent. for the plank frame and 54 per cent. for the mortise frame, rectangular barns 36 x in diameter, contains 188½, and the rectangular barn 225 lineal feet of wall. The rectangular barn has, therefore, 22 per cent. more lineal feet of outside barn wall, requiring a proportional increase in both paint and foundation.

The 176¼ foot rectangular barn would hold 100 cows, allowing each cow 3 feet 4 inches in width and providing for 3 passage ways of 3 feet each across the barn.

The 90 foot round barn would hold 100 cows in two rows headed together, 65 of which would be in the outer circle, and have 3 feet 6 inches each in width at the gutter. This leaves sufficient room for feed alleys and walks, and two passage ways, one 3 feet and the other 7 feet wide for



End elevation of barn. (See page 226.)

the manure and feed carriers. All of this is outside of a central space for a silo 20 feet in diameter and 71 feet high, with a capacity for 620 tons of silage, and in the mow there would still be an excess, above the capacity of the rectangular barn, of 33,000 cubic feet, which would hold 66 tons of hay, or as much as the entire mow of a barn 32 x 36 feet with 20 foot posts.

The square feet of floor space in the round barn 90 feet in diameter and rectangular barn 36 x 176 $\frac{3}{4}$ feet are the same, but the cubical content of the former is more than that of the latter. The increase in the lumber bill is 23 per cent. in the plank frame and 53 per cent. in the mortise frame barn. The round barn 90 feet in diameter contains 283 and the rectangular barn 426 lineal feet of wall. The rectangular barn has, therefore, 50 per cent. more lineal feet of outside barn wall, requiring a proportional increase in both paint and foundation.

The smaller surface on the outside wall of the round barn requires less paint and makes a proportional saving in keeping the round barn painted in after years.

Conclusions.

The advantages of the round barn are convenience, strength and cheapness.

The round barn is more convenient, because of the unobstructed mow, which reduces the labor required in

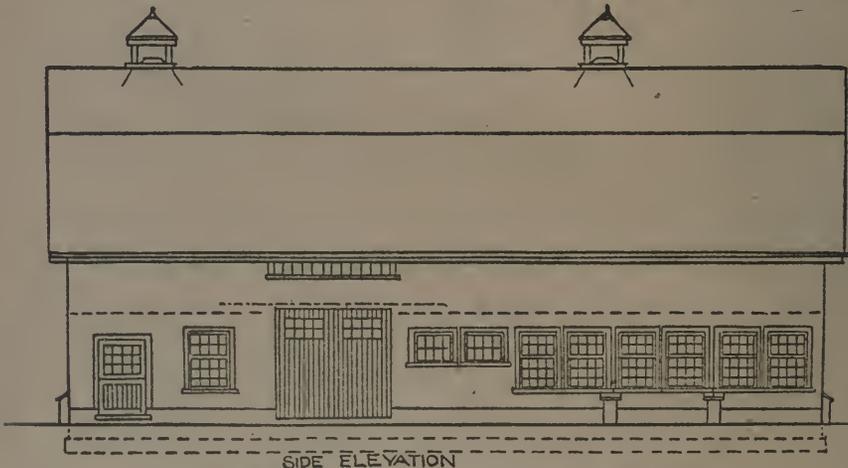
mowing hay, and because of the greater care and fewer steps with which the feed can be gotten to the cows, owing to the central location of the supply.

The circular construction is the strongest because advantage is taken of the lineal strength of the lumber. All exposed surfaces are circular, and withstand greater wind pressure, as the wind can get no direct hold, as on the sides or gable ends of a rectangular barn.

In round numbers, rectangular barns require, according to their construction, from 34 to 58 per cent. more in cost of material than round barns with the same floor area and built of the same grade of material.

Roofing.

Shingles as roof covering are used far more than any other type for residences, farm buildings, sheds, etc. The best shingles are made from cypress, redwood, or cedar, in the order given. Cypress shingles are usually 18 inches long and are supposed to be 7-16 of an inch thick at the butt, while other kinds are but 16 inches long and about 5-16 of an inch thick at the butt. The width of shingles varies from 2 1-2 to 14 and even 16 inches. They are sold in bundles, usually four to a thousand, a "thousand" meaning the equivalent of 1,000 shingles 4 inches wide. When shingles are to be used for special designs, they are sawed to a uniform width, either 4,



Side elevation of barn described on page 226.

5, or 6 inches, and are known as dimension shingles.

Slate shingles are used where fire-proofing and permanency are of importance. A good slate should be hard, tough, and uniform in quality and color. The color of slates varies from blue-black, dark-blue, and purple to gray and green, and in some quarries, red. The size of slates is also subject to variation, from 6x12 inches to 14x24 inches. They are sold by the "square," which means a sufficient number of slates to cover 100 square feet of roof with a 3-inch lap over the course below.

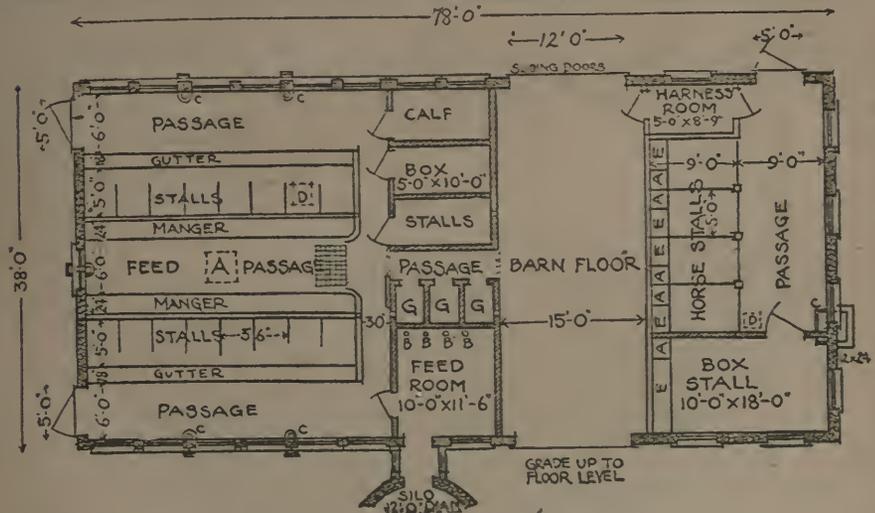
Roofing tile is a term applied to exterior roof covering, made from clay, with overlapping edges. Their comparatively high cost has prevented the wide use of tile in America, though in better classes of residences their use is common because of their adaptability in lending themselves to fancy treatment in architectural details. They compare favorably with slates in cost. Tile manufactured from sheet metal heavily tinned or galvanized, or painted, are coming into quite common use.

Tin roofing is made with the use of sheets of steel coated with tin or a mixture of lead and tin, called terne. Where the roof pitch is less than one third, the plates are united with flat seams, and are fastened by means of

one-inch tinned and barbed roofing nails over which the seams are well hammered down, and then soldered. For steep roofs, standing seams should be used composed of two "upstands" with a cleat holding them in place, as shown in Figure 14. Nails should be driven into the cleats only. A tin roof properly made and kept well painted should last thirty or forty years.

Gravel roofing is used on very low-pitched roofs. It is formed ordinarily by covering the surface of the roof with dry felt paper, and over this laying three, four, or five layers of tarred or asphalted felt, the layers overlapping each other, so that only from 6 to 10 inches of the 30-inch width of paper is exposed. This is then covered with a uniform coat of pitch into which, while hot, gravel or slag is imbedded. A responsible roofer will usually guarantee his work for five years, although a good roof of this kind should last from fifteen to twenty years.

"Ready roofing," made by cementing together two or more layers of saturated felt or felt and burlap, and then coated with either a hard solution of the same cementing material, or with hot pitch or asphalt in which is imbedded sand or fine gravel, is quite widely used. It is usually sold in rolls 36 inches wide. When made by a re-



Ground plan of barn. See page 226.

liable manufacturer, it provides an economical and durable roof, and for some buildings it is to be preferred to any other form of roofing.

Paints and Painting.

For new exterior work, at least three coats are necessary for a satisfactory paint surface. The first, or priming, coat is largely absorbed by the wood. Residences are usually painted with a white lead base, which is sold as a paste containing 10 per cent. of oil. White zinc is also an important base. Each has its defects, the white lead having a tendency to powder, and the white zinc becoming hard and scaly; by mixing the two together in the proportions of 1-3 white zinc to 2-3 white lead, a product is formed superior to each of its components.

Painting may be facilitated if the trim is painted first, leaving the body color to be laid on neatly against it. The paint should be brushed on with the grain, and each coat should be allowed a week in which to harden before the succeeding coats are applied. The priming coat will require about a gallon of paint for each 300 square feet of surface, the second and third coats being much thinner, a gallon of paint covering about 500 or 600 square feet. The paint for roofs should contain a large proportion of oil and little or no drier.

The treatment of shingles may result in especially beautiful effects if properly done. Special shingle stains of almost every conceivable color and tints and shades of color are made, which consist of a pigment suspended in creosote or some similar liquid, the creosote having a definite preserving effect. Objection is sometimes made to the odor of the creosote, but this soon passes away; should the rain water collected from the roofs be used for household purposes, it is better that it be diverted from the cistern for a time, until two or three good rains have washed the roof. Creosote is not poisonous, but it is more or less disagreeable in odor.

Interior Painting.

Doors and window frames are given a priming coat before they leave the mill, the priming being omitted on those surfaces which will later be varnished or stained. As mentioned before, all resinous knots should be shel-

lacked before any paint is applied. Following the priming coat should come the puttying, which is done more satisfactorily with a wooden spatula than with a steel putty knife, which cannot be used without marring the surface. The paint for the second coat should have a vehicle which is half turpentine so that it will dry with a dull, or "flat" surface, to which the next coat will adhere readily. The third coat is usually the final one, and may be an ordinary paint, drying with a gloss that may be removed by a light rubbing with pumice stone and water.

Enamel paint, a harder and more expensive paint than oil paint, is made with varnish as a vehicle. It is commonly applied over oil paint which has been slightly roughened with sandpaper when quite dry. When the first enamel coat has hardened, it should be sandpapered or cut with curled hair, and then covered with the final coat, which may be left glossy or rubbed flat as desired.

Varnish.

Varnishes are of two kinds, spirit varnishes, made by dissolving a resin in a volatile oil, of which type shellac is a familiar example, and oil varnishes, in which the resin is mixed with linseed oil and this compound dissolved in turpentine or benzine.

The gums principally used in making oil varnishes are amber, anime and copal, the last of which is used the most extensively. It is not as durable as amber, and not so expensive. Coach varnish is made from the paler kinds of this gum. Of the softer gums, mastic, gammar, and resin are dissolved in the best grade of turpentine, and make a light, quick-drying varnish, which, however, is not very tough nor durable. The softest gums, lac, sandarac, etc., are dissolved in alcohol to make a quick-drying varnish harder and more glossy than the turpentine varnishes, but not nearly so durable nor so resistant to exposure.

Applying Varnish.

The wood to be varnished first receives a coat of paste filler, which is strongly rubbed in along the grain with a stiff brush, and which, after a half hour's drying, is rubbed off with burlap or excelsior across the grain. Following this, any necessary puttying is done, and in two days the first coat of varnish is applied; after five

days it is cut with curled hair or sandpaper to remove the gloss, so the next coat will adhere well; then two or three coats of varnish five days apart, each coat well rubbed except the last, which may be left glossy, or given a flat tone by rubbing with pumice stone and water.

Shingling a Roof.

More persons fail in shingling a roof than in other rough building work, yet it is really very simple, if you begin at the top of the roof to shingle, you will not be the first man who has done so. **BUT DON'T!** Always begin at the bottom. Break the joints by laying the center of a shingle over the cracks of two others, or a wide shingle to cover the cracks of narrow shingles. The rafters should be laid level; the shingles laid with not more than one-quarter of their length exposed to the weather, and nailed above the lap. Very wide shingles have three nails, the average two, and very narrow shingles one nail each.

Each line of shingles must be laid true to the line, one with the others, the lower course being laid about two inches over the edge of the lower-sheathing board. The details of shingling are as follows: Stretch a line at the proper distance beyond the lower roof-board, lay the butts of the first course of shingles to this line, narrow and wide, just as they come, discarding such as are shaky, wormy or rotten. This course laid, stretch the rechalked line along the row of shingles the proper number of inches above the lower edge, draw it tight, snap it, and you have the mark for the next course. Nail on this course, always having a shingle cover a crack by at least one inch. So proceed course by course, moving your foot-rest up the roof when you can no longer nail from the scaffold on the side. When you have reached the peak, saw the last shingles square with the slope of the other roof. Shingle the other side, saw these off fair, cover the peak with two strips, nicely jointed together, and the roof will be as good as the best.

Care of Implements.

All farm implements should be kept under cover and cared for when not in use. The mowing machine, reaper, plows and all other imple-

ments having bright surfaces, should have these covered with a mixture of kerosene and lampblack, when put away. It is easily rubbed off when they are wanted again, and the surfaces thus retain their polish. When left in the field over night they should be rubbed with an oiled cloth. Only pure oil, unsalted, should be used. A pint will last long and save many dollars.

You will be surprised, on trial, how small a space is really required to store all tools, and small farm implements from the weather. An open shed will do for wagons, sleds, harrows, and that class of machinery; but a closed room is necessary for plows and other implements having bright surfaces. If they are exposed under an unenclosed roof the moisture of the atmosphere is apt to rust them in damp weather, to say nothing of injury from dust and the danger that they will be stolen by night prowlers while the farmer is asleep.

Ventilation.

For many years, the ventilation of stock barns was under careful experiment. Many recommended and suggested systems were put into operation in horse stables, cattle stables and hog pens, and the results were carefully compared. The object was to determine what system would produce the most uniform results in securing purity and dryness of atmosphere without draughts and with the least amount of attention. The results of these investigations have been very profitable, inasmuch as a highly satisfactory system has been arrived at, and one that is not protected by patent rights. It is simple in principle and inexpensive to install. It is automatic in action and only slightly influenced by the rate or direction of the wind.

The system was invented and put into operation by Dr. J. G. Rutherford, for a number of years Dominion Veterinary Director General and Live Stock Commissioner, and is known as the "Rutherford" system. The principle upon which it works is that of an ordinary stove—the stable corresponding to the stove, the animals to the fire, the inlets to the front damper and the outlets for the foul air to the stove pipe or chimney. So long as the walls, windows and doors are fairly close, the animals raise the

temperature and cause the ventilators to work, and this in proportion to the requirements. The greater the number of animals and the closer the stable, the more rapidly will the system operate. And this is what is needed, not only for purity of air, but for uniformity of temperature as well. In a close stable, the degree of foulness of atmosphere corresponds with the temperature, as both are directly influenced by the radiation and breath from the stock. The air warmed by the stock naturally rises and seeks an outlet. The outlet is necessarily at the ceiling and consists of a flue which passes through the roof. At the Experimental Farm, the flues pass through an upper story. These should extend well above the building for the same reason that a chimney must do so in order to draw well.

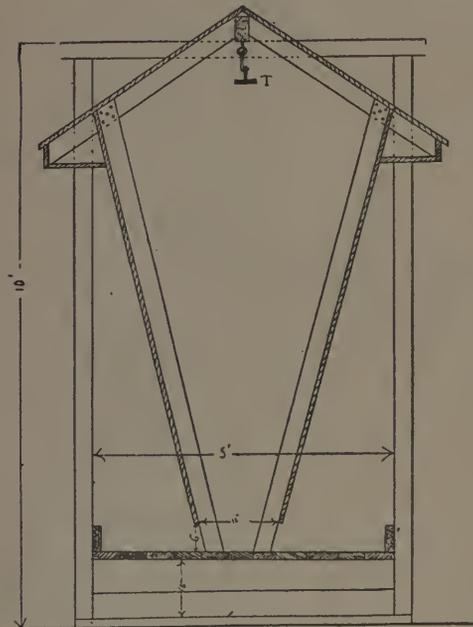
The inlets enter the stable at the floor level. The inlet pipe is U-shaped and passes beneath the foundation wall. If the fresh air is taken from a covered shed, the mouth outside may be near the ground level, and be protected by a grating. If

however, the air has to be drawn from outside, more especially in districts subject to snow fall, the pipe should extend 4 or 5 feet above ground and the opening should be roofed so as to avoid the entrance of snow or rain, or undue influence from the wind. The roofed pipe is built against the wall, and the air enters through slots in the sides close against the building. The size of these openings corresponds with the capacity of the pipe inside.

The ventilator works by virtue of the natural tendency of warm air to rise. As the air warms, it becomes foul, rises and escapes by the outlets. As nature abhors a vacuum, the escape of the warm air creates a suction of fresh air by way of the inlet pipes. Since the animals are constantly giving off warmth and expelling carbonic acid gas, the warm, foul air is constantly escaping and cold, fresh air is at the same time entering the stable, thus keeping up a gentle, almost imperceptible, system of ventilation. To regulate the ventilation, a damper is provided in the outlet flue. The closing of this also stops a large extent the inflow of fresh air, as the draught ceases, stopping the suction. By the original system, the inlet pipe enters at the floor level. This is to facilitate a steady, unobstructed, almost imperceptible flow of air through the stable towards the outlets. To guard against chaff, and dust falling into the opening, Mr. Grisdale, in the main cattle barn at the Farm raised the openings about four inches above the floor level.

The amount of ventilation necessary for a barn depends upon the number of animals to be housed. Sufficient is needed to maintain in cold weather a temperature of from 40 to 45 degrees Fahrenheit. A well-built stable, stocked to a reasonable capacity, should have the air changed every 30 to 45 minutes. Air removed at this rate will carry off the foul air as it is expelled from the stock; it will also remove the vapour which, if allowed to remain, would condense on the walls and ceilings.

The intake and outlet flues should be about the same in capacity that is, provided the stable is tightly constructed. Because more or less air is sure to enter around windows and doors, the intakes may be slightly



Dehorning Stall For Cattle.



Post anchor for hollow places.



Leaving end to wrap and staple.



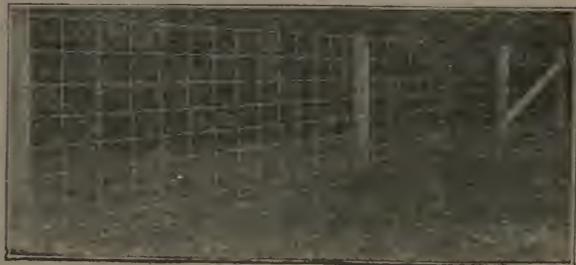
Wrapping wire around own member.



Stretcher in action.



Wood end post fitted with anchors.

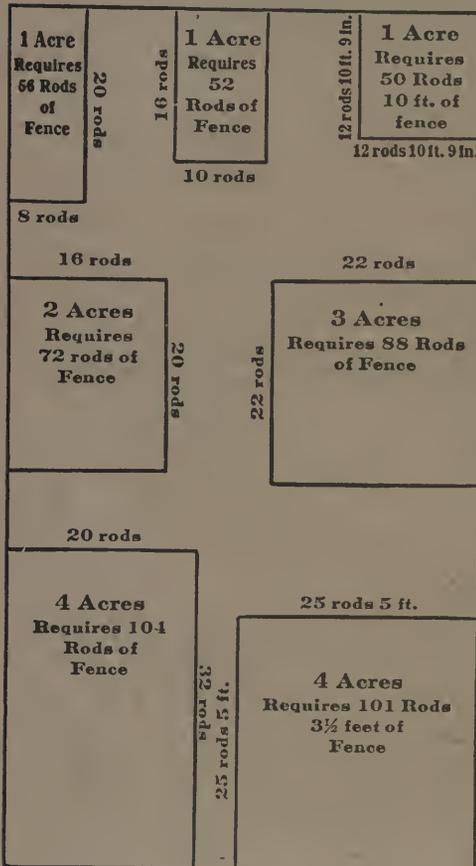


The completed fence.

smaller than the outlets. At the Experimental Farm, this system is in operation in the main cattle barn in which the milking herds are housed, a bull barn, a barn for fattening cattle, a horse stable and the piggery. The main cattle barn 120 feet by 50 feet accommodates one hundred head. It has three outlets for foul air each 2 feet by 4 feet, and nine inlets for fresh air, each 3 feet by 10 inches. The fattening barn, 100 feet by 30 feet, which accommodates 50 head of steers, has two outlets, each 2 feet square, and three outlets each 3 feet

by 20 inches. The bull barn, 100 feet by 30 feet, has three outlets about 3 feet square and three inlets about 3 feet by 20 inches. The bull barn outlets, although considered too large, are stated to work satisfactorily under average conditions. The horse barn which accommodates 25 horses, has two outlets, each about 2 feet square and three inlets each about 3 feet by 18 inches. In all these stables the ventilation is good under all conditions of weather.

Dimensions of 1, 2, 3 and 4-Acre Lots and fence required to enclose them.



The Fence on the Farm.

No matter how up to date the buildings and how well bred the cattle on the farm acres, there can be no satisfactory execution of the work unless the farm has good fences. The old snake fence, the old stake and rider fence, and the picturesque stone fence have no place in modern farming. The wire fence is the fence of the modern age and its classification should come under the head of Farm Buildings.

First class posts and the proper stretching of the wire fence are two prime factors in the building of such. The best fence that can be made will give poor service if not adequately stretched upon sound, rigid posts. It is a good thing to stretch fence until it appears to be tight and then stretch it again.

The illustrations accompanying this information will explain more than words can do the method of fence building. (Page 233.)

Figure 1. Shows an end wood post properly anchored, and Figure 2, the correct method of anchoring. Figure 3 shows wood and wire braces, and the other illustrations explain themselves.

As the anchoring of the end posts is very important the following information is in order: The anchors may be made of any solid pieces of wood, with a bearing equivalent of two inches by six inches by twenty-four inches long. The posts should be placed so that the top anchor will bear against the ground in the direction the fence is to be pulled, as shown in Figure 2. Tamp every particle of earth in filling the holes, so that the posts will be as solid as a tree. The second or brace post, also anchored, should be set about eleven

Dimensions given are exact, so that in buying fence, sufficient allowance should be made to cover fence taken up in wrapping around end and corner posts.

feet from the end post to permit the use of a wooden brace, four by four by twelve, or its equivalent, twelve feet long, placed diagonally to make sure the brace is stiff enough to stand the pressure without buckling. This brace should be set flat against the post, about ten inches from the ground at the second post; and the same distance from the top of the end post. On the second post flatten the post just enough to allow the brace to have a solid bearing surface. Do not mortise so as to weaken the post, spike both ends of brace securely. The brace now having been set diagonally between the two posts, use No. 8 (or larger) soft galvanized wire for a counter brace, winding and stapling it around the bottom of the end post, close to the ground, and round the end of second post, about six inches from the top, using a wire stretcher to draw the wire tight as possible. The rest of the work of building a fence is familiar to most farmers, except perhaps the method of posting in hollows. Posts in hollows should be anchored as shown in Figure 6, so that the fence shall not pull the posts out of the ground.

LIGHTNING RODS.

From the days of Franklin to the present time the value of lightning rods has been an undetermined quantity, physicists of course holding that they must be highly beneficial, the greater mass of the people, however, retaining an open mind, while some accepting the teachings of science rod their buildings; and still others counted absurd the idea that rods and points could have any worth in preventing damage to buildings by lightning. From time to time practical data have appeared giving one side of a comparison, but lacking the other—e.g., "A certain insurance company over a period of years has never paid a dollar of insurance on a rod building damaged by lightning," but they were unable to tell what percentage of their risks were rod, so no definite comparison could be made.

Now, however, the Ontario Department of Agriculture is pleased to present the data herein contained, giving complete comparisons, which prove unmistakably that lightning rods pro-

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perly installed are almost absolute protection against lightning.

These practical results the farmers of Canada can appreciate better than scientific statements, and with these at hand the Department can safely recommend the rodding of farm buildings in accordance with directions above given.

The writer has omitted drawings purporting to show how to rod buildings. The proper method can only be decided after a close examination of each building in question, for then alone can one intelligently apply the principles already dealt with.

For convenient reference the directions for proper rodding are repeated without any of the explanations.

1. Kind of rods. Material—Copper, aluminum or galvanized iron, preferably the first because of durability. Aluminum may prove equally durable. Combinations are not advised, because not as durable as single-metal rods. Weight—Copper—At least 3 ounces per foot. Aluminum—At least 2 1-4 ounces per foot. Steel (iron)—At least 4 1-2 ounces per foot. Form—Any form that will give durability and convenience of installation.

2. Ground connections. Depth—Down to perpetual moisture. At least 8 feet deep. Number—On an oblong building, at least two; on an L- or T-shaped building, at least three; on a U-shaped building, at least four. Location—Preferably at opposite corners, though this may be modified to avoid manure, or to go down near conductor-pipe or other metallic portion of the structure. If conductor-pipe is on the side of the building the ground rods should be at the corners as above stated, the eave-troughs connected to it, and then the conductor pipe also grounded. Ground-rods should not be bunched, but should be distributed as well as possible. Method—In deep soil drill a hole at least eight feet deep and run cable down. In shallow soil, attach cable to metallic ground-plate, which is put down as deep in soil as possible; or run it into a well or a stream or a crevice in the rock. If none of these are feasible, put cable as deep as possible and lay large, flat stone over it. Caution—Be present,

and see that ground-connections are properly made. The rest of the system may be inspected at any time, but the groundings only when they are being put down.

3. Systems. Run cable from ground up corner to eave, thence to ridge, along ridge to other end, thence down to eave, thence to other ground, making a complete circuit. All cables should be connected in one system. No stubs or dead ends should be left ungrounded. Caution—Cables should be protected from ground six or eight feet up by nailing boards around them.

4. Attachment. Fasten cable to barn with nails, staples, clips or metal "dispersers." Caution—Do not use insulators.

5. Points. Number—20 to 30 feet apart. Location—On ridge, first ones not over five feet from end; on or beside chimneys or cupolas; on dormers; also on silos. Height—Four to five feet, except those on or beside chimneys, cupolas or similar prominences; these must extend at least eighteen inches above the highest part. Form—Strong tubes, of same weight and material as rods.

6. Metallic Portions of Structure. Roof-gutters—Top connected to rod, and bottom grounded. Eave-troughs and conductor-pipes—Free end of eave-troughs connected to rod, and conductor pipe grounded. Hay-fork track—Both ends connected to rod. Tanks—Connected to rod above, grounded below. Windmill—Connected to rod above, shaft grounded below. Metallic roof—Grounded at two or four corners, not from peak under any consideration. Points should be used on the ridge and other prominences.

7. Wire fences. In field—A grounding at least every twenty rods. In yards—At the four corners. At building—Ground at first post from building. Weight of groundings—Equal to three No. 12 or one No. 9 wire. How made—Stapled on posts in contact with all wires of fence, and extending at least three feet in the ground, and projecting above fence.

8. Shade trees—Protect where feasible.

—Bull. 220, Ont. Dept. Agrl.

HOW TO MAKE AN OIL WATER-PROOF CONCRETE.

In making watering troughs, cisterns, silos, basement walls and floors, a waterproof cement is desirable. This has been solved by mixing a little mineral oil in the concrete. The United States Department of Agriculture has found that one-tenth as much oil as cement can be used without lessening the strength of the cement and, at the same time, make the concrete waterproof at a small water pressure such as in a watering trough or in a basement wall or floor. Five per cent. oil is usually found to be enough, or about 2 1-2 quarts to each sack of cement. To make oil concrete, says a bulletin issued by the North Dakota Experimental station, first lay down a layer of sand and on it the cement. Mix thoroughly, dry, and then add water and mix to a mushy mess. Add the oil and mix till the oil disappears. Then add the gravel which should be wet, and mix thoroughly.

CONCRETE SEPTIC TANK.

The principle upon which the concrete septic tank operates is extremely interesting. It consists of a long, water-tight cistern, through which sewage passes very slowly and evenly. Located underground, it is warm and dark, thus affording perfect conditions for the development of the bacteria or germs which clarify and render harmless the sewage. After passing through the septic tank, the sewage is practically free from all suspended matter and has the appearance of water. From the septic tank this clear effluent is discharged into three lines of ordinary farm drain tile.

Size and Location of Tank.

While the odor from a septic tank is scarcely noticeable, it is nevertheless best to locate it at some distance from the house. Choose a spot easy to excavate so that the top of the tank can be sunk 6 inches below ground level and where the lines of drain tile will have sufficient fall to carry off the discharged fluid. The tank should be large enough to hold the entire sewage for one day. For a family of eight to ten people occupying a house having two bathrooms fitted with the customary appliances in the way of tubs

and stationary washstands and downstairs the kitchen sink, a concrete tank having two compartments, each 4 feet long by 4 feet wide by 4 feet high, will be required. Since the top and bottom are each 4 inches thick and the top of the tank is 6 inches below ground level, dig the pit 5 feet 2 inches in depth. The walls of the tank are 8 inches thick and the partition between the two compartments 6 inches. Therefore, the length of the pit should be 9 feet 10 inches and the width 5 feet 4 inches.

Making and Placing Concrete.

If the earthen walls of the pit stand firm only inside forms will be needed. These inside forms are merely boxes made of 1-inch boards. Two boxes will be required to make two compartments. The outside dimensions of the boxes should be 4 feet square by 4 feet high. The boxes or forms will be placed on the freshly-laid concrete floor. Holes for taking 6-inch pipe should be made in the boxes. The holes should be 4 inches from the top of the box form, measuring from the top of the hole. The concrete should be mixed in the proportion of 1 part Portland cement, 2 parts sand and 4 parts crushed rock or gravel. Place a 4-inch thickness of concrete in the bottom of the pit to form the floor of the tank. On top of this concrete set the box forms, which should be ready for immediate use. Place the forms so that there is a space of 6 inches between them and an 8-inch space between them and the earthen walls of the pit. Then commence depositing the concrete for the walls and partitions. As soon as the level of the concrete reaches the holes in the forms place in the holes 6-inch pipes as illustrated. Then continue the concreting until even with the top of the forms.

Reinforced Top and Manholes.

Two ordinary iron manhole frames and covers may be obtained from a local dealer in building supplies. The manhole covers should fit tightly and should not be perforated. The manhole frames should be 10 inches high so that when placed on top of the forms the upper edge will be even with ground level. If the manhole frame is of less height than this, it should rest on a circular piece of 1-inch board, which is nailed to the top of the form.

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Since the concrete roof is to be self-supporting, it will be necessary to reinforce it with a few lengths of 3-8-inch round steel rod. There will be needed 4 pieces of 3-8-inch rods, 9 feet 6 inches long, and 8 pieces 5 feet long. The roof is now ready to be placed. Place the manhole frames in proper position on top of the form, and deposit the concrete to a depth of 1 inch and on the concrete lay the long and short bars. When the bars are placed, deposit the balance of the concrete so as to bring the roof to a total thickness of 4 inches. As it will be covered with earth it is not necessary to give this top surface a smooth finish, merely level the surface by striking off with a straight piece of board. The tank should now be allowed to rest undisturbed for at least 2 weeks. At the expiration of this time, saw away wooden top of the forms inside of the manhole frames. Then enter the tank and remove the wooden forms, passing the lumber out of the manhole opening. While in the tank make certain that the pipes are all unobstructed and not even partially clogged with dirt or lumber. The inlet pipe is then connected to the pipe from the house and the outlet pipe joined to three lines of 3-inch concrete drain tile. The drain tile will be laid about 12 inches below the surface of the ground and the joints left open, that is to say, no mortar must be used in the joints. This permits the discharged fluids to be absorbed by the surrounding soil. The drain tile lines should be laid in the form of the letter "Y" and sufficiently extended to cover a large area of ground. Average conditions require that each arm be about 100 feet long. After this is done, cover the tank with earth to the level of the manhole covers. It is now ready for use.

It is sometimes the custom to plant a few shrubs around the manhole openings, thus effectually hiding all evidence of the tank.

Materials Necessary.

A tank of the size specified will require about 4 cubic yards of crushed rock, 2 cubic yards of sand and 7 barrels of Portland cement. There will also be needed 78 feet of 3-8-inch round steel rods, which can be obtained from the local blacksmith or hardware dealer. The tank can be built without skilled labor. It requires but few tools

and construction methods are so simple that one man can easily build it.

Capacity of Silos.

The accompanying table gives the capacities of silos required to supply silage to herds of different sizes, fed either for 180 or 240 days; the corresponding correct diameter is also included. Though diameters of 22 feet are given, 20 feet should be the maximum, since any greater diameter means an excess of labor in removing the silage.

No. of Dairy Cows	Feed for 180 days	Feed for 240 days	Diam. of Silo
8	29 tons	40 tons	8 ft.
10	36 tons	48 tons	10 ft.
15	54 tons	72 tons	10 ft.
20	72 tons	96 tons	12 ft.
25	90 tons	120 tons	14 ft.
30	108 tons	144 tons	16 ft.
35	126 tons	168 tons	16 ft.
40	144 tons	192 tons	18 ft.
45	162 tons	216 tons	18 ft.
50	180 tons	240 tons	20 ft.
60	216 tons	288 tons	22 ft.
70	252 tons	336 tons	22 ft.
80	288 tons	384 tons	22 ft.
90	324 tons	432 tons	22 ft.
100	360 tons	480 tons	22 ft.

COST DATA FOR FARM BUILDINGS AND OPERATIONS.

What will it cost to equip and run my farm?

Perhaps no other question depends for its answer more upon local and temporary condition than this, yet average figures upon which to base estimates may be if reliable, prove invaluable. As such the following results of careful, extended investiga-



10 15 20

years from now the Bissell Silo will be giving good service. It is built of selected timber, treated with wood preservatives that prevent decay. It has strong, rigid walls, air-tight doors, and hoops of heavy steel. Therefore it lasts simply because it can't very well do anything else. Our Folder explains more fully. Write Dept. K.

T. E. Bissell Company, Ltd., Elora, Ont.

tion, mostly compiled by Roger Cox, are presented as the question touches the average farm in the Middle West of the United States. The figures are based on investigation in the United States, but there will be found many useful hints to the Canadian Farmer. We are indebted to Garden and Farm Almanac for this information.

Painting. To estimate the amount of paint needed for a building (exterior) and the length of the front, back and two sides, multiply by the height (average) and divide by 250. The result will be the number of gallons needed for two coats.

Farm Building Costs.

Allow floor space per head as follows:

Horses—88 sq. ft.

Cattle—84 sq. ft.

Sheep—12 sq. ft.

Swine—20 sq. ft.

Poultry—4.5 sq. ft.

The average barn, 32 ft. high will cost 2 1-2 cents per cu. ft.

Wagon sheds will cost 1-2 cent per cu. ft.

Silos cost \$1.50 to \$2 per ton capacity (approximately 50 cu. ft.)

Poultry house (earth floor) 15 to 20 cents per sq. ft.

Poultry house (cement floor) 20 to 25 cents per sq. ft.

Poultry house roofing 2 1-2 to 3 cents per sq. ft. laid complete.

Incubator house (3 room, ceiled) 50 cents per sq. ft.

Ice house with fruit storage space (type shown in Farmer's Bulletin 475) \$10 per ton capacity (13 to 15 per cu. ft.) Without fruit storage space, \$7 per ton capacity.

Greenhouses (2 bench, 9 ft. 4 in. wide or one bench, 6 ft. 8 in. wide) including heating outfit will cost \$2.70 to \$3 per sq. ft.

Hotbed sash, glass (3 x 6 ft.), cost 10 cents a sq. ft.; cloth covered (to make) 3 cents a sq. ft.

Water Supply Costs.

Dug well, 3 to 4 ft. diameter, 25 to 40 ft. deep will cost \$1 to \$1.25 per ft.

Hand lift pump for same \$5 to \$10 more.

Drilled well, with casing (up to 150 ft.) \$1 per ft.

Pump, piping, etc., for same \$15 to \$25 additional.

Cistern, 30 bbls. or less, 50 cents per bbl. Capacity 150 bbls. or more, 25 cents per bbl.

Allow for daily use per adult 25 gals., per horse, 11 gals., per cow 6 gals. as a minimum.

Tanks for feed lots; wood (10 to 50 bbls. capacity) \$10 upward; concrete (20 to 80 bbls.) \$15 to \$40.

Windmills, 25 to 30 ft. high, \$60 to \$70.

Gasoline Engine, 2 to 3 horsepower, \$75 to \$150.

Farm Operation Costs.

Irrigation. One acre covered with 4 inches of water in a 10-hour day requires a flow of 180 gallons per minute during that time. This flow can be lifted 20 feet by a gasoline engine of 1 1-3 horsepower, at a fuel cost of 14 cents per irrigation, or, for six applications per season, 84 cents per acre. If coal costs less per ton than 24 times the price of gasoline, a steam engine will involve lower fuel cost, but probably a higher labor expense.

Drainage. Tile costs per rod (16 pieces) from 14 cents for the 2 1-2 inch to \$1 for the 10-inch size. To lay a rod foot of tile up to 5 inches in diameter will cost 6 to 10 cents. For larger tile the cost will be from 12 to 15 cents. A "rod foot" is a rod of trench, one foot deep, wide enough to take the tile. The total cost of tile drainage will vary from \$15 to \$30 or more per acre depending upon conditions as regards hills, stones, etc.

Fencing.

For the average wire fence posts should stand one rod apart. The wired pickets type will require a post every 12 feet.

Allow 10 to 20 per cent. annual depreciation.

Spraying.

Spraying. Apply per tree 8 to 25 gallons according to size and foliage. Supply apparatus capable of covering the entire orchard within two weeks.

Small power outfits will cover 90 trees per day at 8 cents each.

Large power outfits will cover 150 trees per day at 5 cents each.

Hand pumps will cover 25 to 50 trees per day at 12 to 17 cents each.

Farm machinery. The cost of using machinery is too often lost sight of. In the following average data the annual cost includes depreciation, repair, and

interest on the average value of the machine:

Machine	First Cost	Annual Cost
Plow, walking	\$ 14	\$1.93
Plow, riding	47	5.51
Harrow, spike	13	1.47
Harrow, springtooth ...	17	1.88
Harrow, disc	27	2.97
Roller	23	1.71
Manure spreader	112	16.99
Cultivator, 1 horse	5	.52
Cultivator, 2 or 3 horse.	25	2.86
Corn planter	36	4.07
Corn binder	105	14.22
Corn shocker	121	18.78
Corn shredder	474	65.71
Corn sheller	10	.81
Grain binder	117	13.54
Grain drill	60	5.58
Mowing machine	42	5.14
Hay rake	19	2.12
Hay tedder	32	3.33
Ensilage cutter	111	11.87
Wagon	63	6.55

Cost of Labor.

Note:—Canadian prices will vary from the preceding, but the same relation will exist between first and annual cost. If you are paying your help \$25 per month, the cost will be 25-35ths of the following:

Farm operations.	Cost per acre based upon wages of \$35 a month (board included):
Plowing	\$1.14
Dragging .....	.35
Discing .....	.30
Planting .....	.26
Cultivating	1.34
Cutting grain .....	.37
Cutting corn .....	.58
Mowing, raking hay .....	.50
Cocking, spreading .....	.25
Wheel hoeing	1.42
Hand hoeing	7.20
Manuring (labor)	1.49

Horse labor averages 7 cents per hour per head.

Average cost of crops—including labor, machinery cost, and land rental, per acre:

Barley (spring plowing	\$ 7.52
Corn (cut, shocked, hauled in)..	11.02
Corn (also siloed)	13.21
Mangels	34.08
Oats	7.71
Rye	3.09
Wheat	6.66
Potatoes (garden cultivation) ..	26.95

VENTILATION TABLES.

In order to ventilate a barn properly there must be a certain amount of air space for each head of stock accommodated, for no system of ventilation could be devised which would work successfully in a barn where there was only 200 or 300 cubic foot of air space for a cow. It has been found in actual practice that every cow should have at least 600 cubic feet. Horses require more and smaller stock less.

Air space for stock in a stable: Horses, 800 to 1000 cubic feet each; cows, 600 to 800 cubic feet each; hogs, 300 cubic feet each; sheep, 200 cubic feet each.

Now this 300 cubic feet of air space for each cow has to be changed constantly; that is you will understand every hour this 300 cubic feet has to be changed four or five times.

Cows must have 4,000 cubic feet per cow per day; horses, 5,000; pigs, 1,500; sheep, 1,000.

With these requirements in mind it has been found that for every cow in the stable there must be at least 8 square inches of inlet area. Of course, instead of making an aperture in the wall for each cow, it is customary to put in one big ventilator which will admit sufficient air for half a dozen. The total inlet of the galvanized ventilator mentioned is 48 square inches, and it is intended for 6 cows.

1 galvanized ventilator for 5 horses; 1 galvanized ventilator for 6 cows; 1 galvanized ventilator for 12 hogs; 1 galvanized ventilator for 16 sheep.

The same ideas govern the size of the outlets. Theoretically the total area of the outlets should be equal to that of the inlets. In practice it is customary to provide almost twice as much outlet area as inlet, for air comes through windows and doors, and cracks sometimes, during part of the day. A safe figure to go by is 15 square inches of outlet area for every cow. It is not thought advisable to have an outlet less than 18 inches in diameter. 18x16 is the minimum. Make them 18x18 if you can, and if this is too large control with a damper. You can figure on having one outlet 18x18 for every 20 cows in the stable.

Weigh Scales Tips.

Scales are of many types and makes, and, as we might expect, some offer a greater opportunity of being falsified by unscrupulous dealers than others. Since the Weights and Measures Act was adopted the use of many of these scales has been made unlawful. The Roberval Balance is an instance of a good scale which has been eliminated because of the ease with which the dishonest dealer could make it serve his own ends. This scale could, in one minute, with a common screwdriver, be so altered that it would weigh heavy or light to the extent of one ounce in the pound according as the weights were placed on one side or the other of the pan, or if the weights were placed in the centre of the pan it would weigh accurately.

Platform Scales.

At the present time there is perhaps no type of scale that offers greater opportunity to the dishonest dealer than the platform scale. Such scales as a general rule, are installed by railroads, produce dealers, and municipalities, and are used by stock buyers and others. The fact that the scale is used by several individuals makes it extremely difficult to discover the party who has "doctored" the scale. This being the case, it is all important that the scales be constructed in such a manner as to make it extremely difficult for unscrupulous buyers to manipulate the same so as to give a false weight. Aside from inaccuracies in such scales resulting through failure on the part of the railroads or those responsible to keep the scales in proper repair there are many ways in which stock buyers can juggle the scale to their own advantage.

One of the simplest methods is by "loading" the sliding poise. A poise may be loaded by dropping a lead slug into the opening beneath the beam or by inserting the same into holes drilled in the bottom of the poise.

Scales with a beam that tapers toward the trig loop are very readily susceptible to this treatment. As the poise is moved toward the end of the beam the opening gradually increases so that a lead slug can readily be inserted, thus making the scale easily

weigh from 25 to 50 pounds heavy when loaded to 1000 pounds. The sliding poise on many stock scales has one or more holes in the bottom of the poise into which an unscrupulous buyer can readily insert a lead plug. The type of beams and poises mentioned above should not be permitted on stock scales where there has been any evidence of dishonest work. Such scales should be provided with beams of uniform thickness and with sliding poises that contain no opening beneath the beam or holes in the bottom of the poise. Only beams and poises of modern design should be used on such scales.

Farmers selling stock or produce in localities where buyers have been suspected of taking excessive weight should closely examine the scales and be present when the stock is weighed. A dishonest buyer can readily read a scale that weighs correctly to his own advantage. Such buyers have been known to slip a small coin between two of the counterpoise weights. In such a case they would be defrauding the seller. Again dishonest dealers have been known to stick a piece of chewing gum on the bottom of the poise to their own gain.

At Maximum Capacity.

These scales should be sensitive, that is, a small load should produce an appreciable movement of the beam. When a scale is acting properly the beam should "break" with a load of 2 pounds. The sluggish action of a scale usually increases with the load. Scales should therefore be tested for sensibility at somewhere near the maximum capacity. It is not necessary to carry a sealer's equipment in order to determine the sensitiveness of a scale. This test, as given by F. P. Downing, of Wisconsin, can be determined by any one simply by placing a heavy load on the scale and sliding the poise forward on the beam until the scale balances near the top of the trig loop. The reading on the beam should then be taken and the poise moved forward until the scale comes to a balance near the bottom of the trig loop. If the difference in the two readings is in excess of 10 pounds the scale is unfit for the weighing of stock. In buying stock a dealer can balance a scale "low,"

drive on the stock and then balance the scale "high." If the scale is sluggish he can easily defraud the seller out of from 10 to 15 pounds on weighing, which is a very appreciable amount when a single calf or hog is weighed.

The beam of these scales should be provided with a shoulder stop to prevent the sliding poise from moving back of the zero graduation. Instances are on record where this shoulder stop has been filed so that when the scale is brought to a balance with the poise back of the zero graduation and later used in weighing the buyer will be paying for less than the actual weight.

Various devices have been used that will produce an upward push on the platform, working directly against

the downward pressure of the load. According to railroad employees, a device of this kind was attached to a stock scale in a city in the western part of Wisconsin. Two vertical boards were nailed to the ends of a 2 by 4 scantling that rested in a horizontal position on the foundation of the scale, thus forming a lever. One end of this device projected upward beneath the platform of the scale to within a fraction of an inch of the platform. The other end projected upward through the floor in front of the beam box so that the stock man in weighing could press down on the same with his foot, thus decreasing the weight of the load to the extent desired. Similar devices are said to have been used by some wheat buyers in our own western provinces.

CONTENTS OF SQUARE TANKS

5 feet diameter, capacity per foot, in depth.....	4.66 barrels
6 feet diameter, capacity per foot, in depth.....	6.71 barrels
7 feet diameter, capacity per foot, in depth.....	9.13 barrels
8 feet diameter, capacity per foot, in depth.....	11.93 barrels
9 feet diameter, capacity per foot, in depth.....	15.10 barrels
10 feet diameter, capacity per foot, in depth.....	18.65 barrels

To find contents of square cistern, multiply length by breadth and multiply result by 1.728 and divide by 231. Result will be the number of gallons for each foot deep.

5 feet by 5 feet has capacity per foot depth of.....	5.92 barrels
6 feet by 6 feet has capacity per foot depth of.....	8.54 barrels
7 feet by 7 feet has capacity per foot depth of.....	11.63 barrels
8 feet by 8 feet has capacity per foot depth of.....	15.19 barrels
9 feet by 9 feet has capacity per foot depth of.....	19.39 barrels
10 feet by 10 feet has capacity per foot depth of.....	23.74 barrels

TABLE OF CONTENTS OF ROUND TANKS

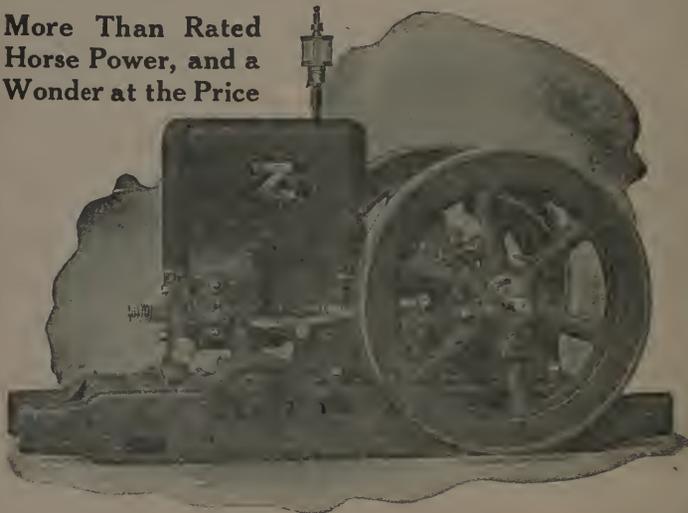
Diam. in feet	*Depth in Feet and Contents in Gallons.				
	*1	5	7	10	1
4.....	93.99	470	658	940	112
5.....	146.87	734	1028	1469	176
6.....	211.50	1058	1481	2115	253
7.....	287.86	1439	2015	2879	345
8.....	375.98	1880	2632	3760	451
9.....	475.85	2379	3331	4759	571
10.....	587.47	2938	4113	5875	7052
11.....	710.84	3554	4976	7109	8531
12.....	845.97	4230	5922	8460	10150

* To ascertain contents of a round tank of depth not given, multiply the contents of tank one foot deep (as in table) by the required depth in feet.

The New Fairbanks-Morse Type "Z"

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FARM POWER AND MACHINERY

Steam Engine.

When steam engines were invented, the rate at which they could work was compared to that at which a horse could work. A "foot-pound" of work is defined as the work done when "a force of 1 lb. is exerted through a distance of 1 foot." An engine or horse is said to be working at the rate of 1 horse power when it does 33,000 foot-pounds of work in one minute.

To calculate the rate at which a 1,500-lb. horse works when it exerts a pull of 150 lbs. at the rate of 2 1-2 miles an hour:

There are 5,280 feet in a mile, and 60 minutes in an hour. Therefore, 2 1-2 miles an hour is 2 1-2 times 5,280, divided by 60, which equals 220 feet a minute. The horse exerts

a force of 150 lbs. over a distance of 220 feet in one minute. Therefore, it does 150 times 220, or 33,000 foot-pounds of work in one minute, which equals 1 h.p.

If the horse were exerting a force equal to half its weight, 750 lbs., in going up hill, it would exert a force of 750 lbs. through 220 feet per minute. It would therefore do 750 times 220, or 165,000 foot-pounds, of work in one minute, which equals 5 h.p. This is one advantage a horse has over mechanical engines: A horse can work at five to ten times its ordinary rate for a short time, but the engine gains because it can keep it up an unlimited length of time at the same speed and force of exertion.

Mean Effective Pressure.

The mean effective pressure of a steam engine is easily measured from indicator card, but an exact calculation otherwise is more complicated. It is the result of subtracting the mean or average back pressure on piston from mean forward pressure. The greater distance the piston travels before the steam is cut off, the greater will be the mean effective

pressure. For instance, with an initial steam pressure of 80 lbs. per square inch and a cut off of 1-5, the mean effective pressure is about 31 lbs. With 1-3 cut off, it is about 47 lbs., and with 1-2 cut off, about 60 lbs., and with 3-4 cut off about 71 lbs. The average standard simple steam engine has a fixed cut off at a little over 1-2 the stroke.

Rated Horse Power.

This can be calculated by the rule: Horse-Power equals $P \times L \times A \times N$, divided by 33,000.

Where P equals the mean effective pressure in lbs. per square inch: L equals length in feet of piston stroke: A equals the area of piston in square inches: N equals the number of strokes per minute.

Example: An engine has a mean effective pressure of 30 lbs. per square inch; the length of the stroke is 1 foot; the area of the piston is 55 square inches, and the piston makes 240 power strokes per minute. The Horse-Power is:

$$\frac{30 \times 1 \times 55 \times 240}{33,000} = 12 \text{ H.P.}$$

Indicated Horse Power.

Indicated horse power is measured by what is known as an indicator card. It is an actual test under working conditions. By the use of the indicator the steam pressure on the piston is measured through the entire length of the stroke. If there is any fault in the engine due to poor construction or wear such as a leak past the piston rings or in the valves it will be shown by this method. In this

case the horse power actually delivered by the engine will necessarily be less than the rated horse power. Remember also that the rated horse power depends on the number of revolutions or speed of the engine. Manufacturers sometimes use a rated speed higher than is advisable in actual use, thus the actual or indicated horse power is lower than the rated horse power.

Gasoline Engines.

The modern gasoline engine owing to its simplicity and ease of operation is the most suitable form of power for use on the farm. The actual cost of operation on a fuel consumption basis is greater than in a steam engine, but this is more than overbalanced by the fact that it requires a less experienced operator and that when not in actual operation it does not require a boiler constantly attended, keeping a steam pressure of 100 lbs. ready for use.

Ignition.

The igniting of the explosive mixture in the cylinder is accomplished in the modern engine by electrical means. The current may be supplied by batteries, dynamos or magnetos. There are two kinds of electrical systems: low tension or make and break and high tension or jump spark. Poor ignition will cause irregular running of the engine. This may be caused by broken or loose wire or connections. In the make and break system care should be taken to see that the points of contact are clean and even, the points must snap apart sharply, the points must open the proper distance to get the right spark, the insulation or the terminals must be good, the spark must be timed to occur at the proper moment. In the jump spark ignition, good wiring and connection are also important, the points on the spark plug must be set at the proper distance, and kept clean. If batteries are used they should be tested occasionally to see that they are not becoming exhausted. The magneto is used to supply current when the engine is running, producing electricity in proportion to the speed of the engine. A poor contact between friction pulley and fly wheel, or a slipping belt may mean not enough electricity for ignition. Improper ignition will also be caused by worn brushes, weak brush springs, gummy oil or dirt on commutator, broken insulation around screws that hold brush holders in place and the too liberal use of oil or the collection of grease and dirt.

Compression.

To get power an engine's cylinder must be light. Poor compression makes it hard to start an engine because the fuel charge must be com-

pressed to give a good explosion and the force of the explosion should be expended on the top of the piston, and not be lost or weakened by getting out through leaky valves, or past the piston rings. If a poor grade of oil is used it will form a carbon deposit on the valve and valve seats, and unless cleaned off with kerosene will in time cause leaky valves.

Carburation.

A proper mixture of fuel and air is necessary for proper operation. Not enough "gas" will cause back fire and too much "gas" will be evident by a black smoke coming from exhaust. Dirt or water in the fuel will cause trouble, and it is therefore advisable to drain and clean the carburator frequently.

General Directions for Care and Operation.

The gasoline engine like all other pieces of machinery will give the best service if properly looked after, and tended as carefully as you would tend your live stock. The running of the engine is controlled by the ignition, compression and carburetion. If trouble occurs it is probably due to the fault at one of these three points.

In some cases the engine may run with a pounding or knock. This will be caused by loose connecting rod bearings, worn or broken piston rings, a loose wrist pin in piston or a loose fly wheel. A deep, heavy pound may be caused by pre-ignition. This should be immediately corrected or breakages may occur. Pre-ignition is caused by an overheated cylinder, a cylinder foul with carbon deposits from the oil, a short circuit due to broken insulation on your wire, not enough air in mixture, or too advanced or "early" a spark. If after turning your engine over it refuses to start don't go after your engine with a monkey wrench. More than likely the trouble is so simple that it is not even one listed in your directions. Is your switch open? How about your fuel? Your engine may be cold and a little priming will enable a few explosions to warm up the cylinder. Test your ignition, then your compression, and by a process of elimination the difficulty will soon be located.

DEPRECIATION IN VALUE AND COST OF REPAIRS OF
FARM IMPLEMENTS
Dominion Department of Agriculture

IMPLEMENT	Average life in years	Acreage covered	Depreciation per year	Additional cost for repairs per acre
Ploughs.....	15	1,500	6 to 7%	4 c.
Double Cultivators.....	20	4,000	5%	1½c.
Single Cultivators.....	20	3,000	5%	1½c.
Seeders.....	20	3,300	5%	1½c.
Mowers.....	15	900	6 to 7%	4¾c.
Rakes.....	20	2,500	5%	2 c.
Tedders.....	15	900	6 to 7%	1½c.
Hay Loaders.....	12	1,200	8 %	1½c.
Binders.....	12	1,800	8 %	1½c.
Corn Harvesters.....	7	700	14%	4 c.
Disc Harrows.....	10	1,000	10 %	¾c.
Cutaway Harrow.....	8	1,800	12½%	1c.
Manure Spreaders.....	8	800	12½%	3c.
Blizzard Blowers.....	5	8,000 tons	20%	1-3c. per ton

This table will be found useful in all estimates and calculations of farm costs. It must be remembered, however, that the average life of farm machinery will vary greatly according to the care given it, causing a variation in the figures given. The depreciation figure generally used for all housed machinery is 10 per cent., and this would be a reasonable figure to use for gasoline engines. In mak-

ing cost estimates there is generally one item called interest and depreciation. If, therefore, a gasoline engine cost \$200.00, money being worth 6 per cent., the interest and depreciation would be 16 per cent., or \$32.00. If the engine actually worked 200 days this would make a charge per day of \$6.25 in addition to fuel and labor charges.

Economical and Reliable Farm Power

Power from a Massey-Harris Engine is cheaper than man power—costs nothing in wages or keep when not working—and is “always on the job.”

Get one of these Engines, pump the water, saw the wood, run the cream separator, churn, washing machine, feed grinder, grindstone, ensilage cutter, pulper, etc.

Sizes, 1½ to 20 h.p.—all described in our free catalogue.



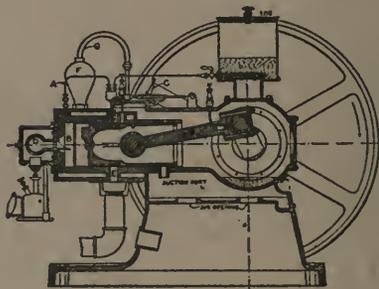
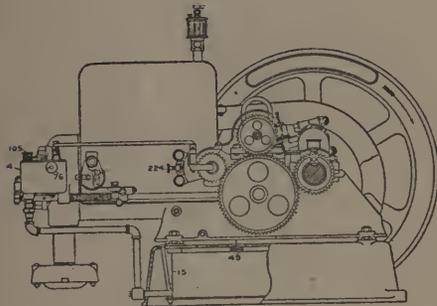
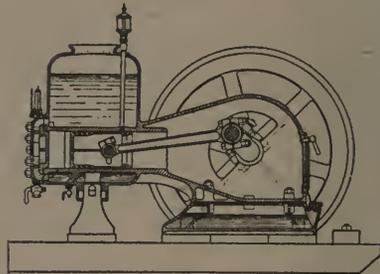
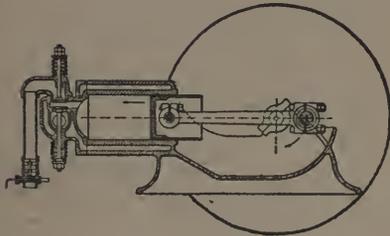
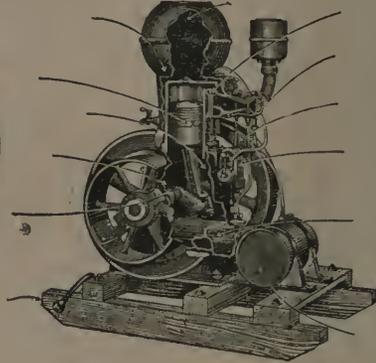
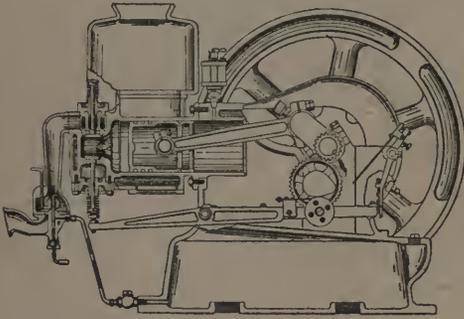
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SECTIONAL VIEWS OF GASOLINE ENGINES IN COMMON USE ON THE FARM



Five of these engines are of the horizontal and the sixth vertical. One thing in common that will be noticed is that all the cylinders are single acting. In one engine the rim of the fly wheel is simply indicated by a line. No attempt will be made to make comparisons, nor will space allow a lengthy discussion. Elsewhere

in this chapter will be found information as to the care and operation of gasoline engines. Many manufacturers have also issued catalogues or booklets in which will be found a great deal of useful information to the prospective purchaser or owner of a gasoline engine.

Table of Horse-Power Costs

Motive Power	Rate of Fuel Consumption	Cost of Fuel per Brake Test Horse-Power				
		1 Hour				
Gas Engine on Producer Gas	In pounds per H. P. Hour	Cost of Coal per 2,000 Pounds				
		\$3.00	\$4.00	\$5.00	\$6.00	\$7.00
	.8	.0012	.0016	.0020	.0024	.0028
	1.00	.0015	.0020	.0025	.0030	.0035
	1.25	.0019	.0025	.0031	.0037	.0044
1.50	.0023	.0030	.0037	.0044	.0053	

Gas Engine on Natural Gas	In Cubic Feet per H. P. Hour	Cost of Natural Gas 1,000 Cubic Feet				
		\$0.15	\$0.20	\$0.25	\$0.30	
	9	.0014	.0018	.0023	.0027	
	10	.0015	.0020	.0025	.0030	
	11	.0017	.0022	.0028	.0033	
	12	.0018	.0024	.0030	.0036	

Gas Engine on Illuminating Gas	In Cubic Feet per H. P. Hour	Cost of Gas per 1,000 Cubic Feet				
		\$0.60	\$0.70	\$0.80	\$0.90	\$1.00
	15	.0090	.0105	.0120	.0135	.0150
	17	.0102	.0119	.0136	.0153	.0170
	20	.0120	.0140	.0160	.0180	.0200

Gasoline Engine	In Pints per Brake H. P. Hour	Cost of Gasoline per Gallon				
		\$0.20	\$0.24	\$0.28	\$0.32	\$0.36
	.80	.0200	.0240	.0280	.0320	.0360
	1.00	.0250	.0300	.0350	.0400	.0450
	1.10	.0274	.0330	.0384	.0440	.0494

Kerosene Engine	In Pints per Brake H. P. Hour	Cost of Kerosene per Gallon				
		\$0.10	\$0.12	\$0.14	\$0.16	\$0.18
	1.00	.0125	.0150	.0175	.0200	.0225
	1.10	.0137	.0165	.0192	.0220	.0247
	1.20	.0150	.0180	.0210	.0240	.0270

Electric Motor 85% Efficiency of Wiring	In Kilowatts per H. P. Hour	Cost of Electricity per Kilowatt Hour				
		\$0.02	\$0.03	\$0.04	\$0.05	\$0.07
	0.878	.0175	.0263	.0351	.0439	.0527

Steam Engine on Coal	In Pound ^o per H. P. Hour	Cost of Coal per 2,000 Pounds				
		\$3.00	\$4.00	\$5.00	\$6.00	\$7.00
	4	.0060	.0080	.0100	.0120	.0140
	6	.0090	.0120	.0150	.0180	.0210
	8	.0120	.0160	.0200	.0240	.0280
	10	.0150	.0200	.0250	.0300	.0350

Power Required to Run Various Farm Machinery.

Machinery	Power Required
Emery Wheels	From 2 to 5 h.p.
Feed and Ensilage Cutters	From 3 to 35 h.p.
Corn Shellers	From 3 to 6 h.p.
Feed Mills, not exceeding 12"	From 4½ to 12 h.p.
Small Portable Wood Sawing Outfits	From 3 to 10 h.p.
Pneumatic Water System	From 1½ to 3 h.p.
Cream Separators	Not over 1½ h.p.
Threshing Machinery	From 3 to 35 h.p.
Bean Threshers	From 4½ to 8 h.p.
Well Drilling	From 8 to 12 h.p.
Small Washing Machines	From 3 to 10 h.p.
Milking Machines	From 1 to 3 h.p.
Haypresses—	
14 x 18 in. and 16 x 18 in.	8 h.p.
17 x 22 in. and 18 x 22 in.	12 h.p.
Pole Saws and Cord Wood Saws—	
20 x 24 in. saw (20 to 40 cords in 10 hrs.)	3 h.p. speed 1600 rev. per min.
24 x 28 in. saw (30 to 50 cords in 10 hrs.)	4½ h.p. speed 1500 rev. per min.
26 to 30 in. saw (40 to 80 cords in 10 hrs.)	6 h.p. speed 1400 rev. per min.
28 to 32 in. saw (60 to 100 cords in 10 hrs.)	8 h.p. speed 1300 rev. per min.
Churns—	
200- 300 lbs. churn	3 h.p.
300- 600 lbs. churn	4½ h.p.
600-1000 lbs. churn	6 h.p.
Corn Huskers—	
2 roll with carrier and cutter head	4½ h.p.
2 roll with shredder or cutter head & blower	6 h.p.
10 roll with carrier	25 h.p.
12 roll with blower	45-50 h.p.
Note.—Number of roll huskers decides power required.	
Concrete Mixers—	
Batch mixers (Mixer capacities are given in cubic yards per hour).	
7 yd. mixer	3 to 6 h.p.
10 yd. mixer	4 to 10 h.p.
20 yd. mixer	6 to 12 h.p.
30 yd. mixer	8 to 15 h.p.
40 yd. mixer	10 to 20 h.p.
Continuous Mixers—	
4-5 yd. mixer	3 h.p.
7 yd. mixer	5 h.p.
10 yd. mixer	6 h.p.
15 yd. mixer	9 h.p.
25 yd. mixer	12 h.p.

Note.—The power required for all machines varies greatly with the make: the manufacturers' catalogues usually give the power they recommend and one should be largely guided by these, remembering that the manufacturers place the power requirements as low as possible and that it is better to have a little too much than not enough power.

HORSE POWER REQUIRED TO PUMP 200 GALLONS OF WATER PER MINUTE TO VARIOUS HEIGHTS.

Gallons per minute	Height water is pumped	H.P. Required
200 gallons	20 feet	1 H.P.
200 gallons	40 feet	2 H.P.
200 gallons	60 feet	3 H.P.
200 gallons	80 feet	4 H.P.
200 gallons	100 feet	5 H.P.
200 gallons	150 feet	7 1/2 H.P.
200 gallons	200 feet	10 H.P.

HORSE POWER REQUIRED AND SIZE PUMP REQUIRED, TO PUMP VARIOUS NUMBERS OF GALLONS OF WATER PER HOUR TO HEIGHT OF 50 FEET.

Gallons per Hour	Height water is pumped	H.P. Required	Size Pump Required
240 gallons	50 feet	1-20	2 1/2" x 6"
480 gallons	50 feet	1-10	3 1/2" x 6"
600 gallons	50 feet	1-8	4" x 6"
900 gallons	50 feet	1-5	4 1/2" x 7"
1200 gallons	50 feet	1-4	5" x 7 1/2"
1500 gallons	50 feet	1-3	6" x 6 1/2"
1800 gallons	50 feet	2-5	6" x 8"

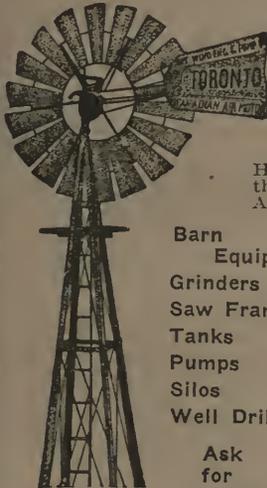
H.P. given is theoretical. Multiply by 2 to get safe margin.

LEADERS!

The Toronto Windmill and the Chapman Gasoline Engine lead in their respective lines. They are built right and they work right. Ask any man who owns one.

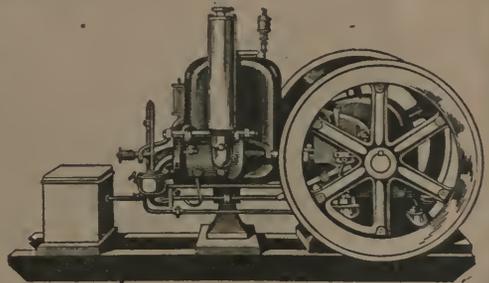
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Electrical Power.

Electricity as a source of power is being considered by many farmers. It would seem even simpler to operate than the gasoline engine. Before recommending electricity we should first make a comparison of operating costs. A table is given elsewhere in this chapter, which may be used to advantage. A comparison will show that electricity at 5c a kilowatt hour

is equal to gasoline at about 35c per gallon. The price of hydro power in Ontario must therefore be reduced, or gasoline must increase considerably in price before electricity becomes an economical source of power to the Ontario farmer. Another thing to be considered, of course, is first cost. This can be reduced to an annual charge based on a percentage for interest and depreciation.

Water Systems.

The perfecting of individual water systems has enabled the farmer to draw water from the tap as readily as the city dweller. There are two systems, the overhead tank, and the pressure tank system. Here again the gasoline engine is very useful. The power required to drive a pump is very small as will be noted in table elsewhere in this chapter. As the demand for water may be excessive for short periods, a storage tank is necessary in order that the work of the engine may be divided over a longer period. In the overhead system the tank is placed at a high point in the house or barn, and the water runs to the outlets by gravity, or in other words the pressure at the top is represented by the weight of a column

of water as high as surface of the water in the tank is above the tap. The pressure system is generally considered more satisfactory doing away with the necessity of supporting by proper construction the weight of water in the overhead tank. The pressure tank delivers the water at the outlet, no matter where located at from 60 to 80 lbs per sq. inch. Many manufacturers have a patented device whereby this system is self regulating. The engine or motor will stop pumping when the air pressure in the tank reaches a certain high point. As water is drawn off the pressure will fall until it reaches a certain low point, when the engine will automatically start pumping again.



Individual Threshers.

In recent years manufacturers have developed a small threshing outfit that may be owned and used with economy by the individual farmer. A few hours threshing after the grain is harvested is sufficient for feed until

the plowing season is over, and a man and one helper can thresh through the winter months his entire crop, having both engine and thresher in the barn. The noxious weeds carried from a poorly run farm are also avoided.

Units.

The "Acre-Foot" is the unit for measuring water used for irrigating land and is the amount of water which will cover one acre to a depth of one foot.

On this basis the unit is equivalent to covering two acres with six inches of water, or three acres with four inches, or twelve acres with one inch.

An "Acre-Inch" is one-twelfth of

an "Acre-Foot" or the quantity of water that will cover one acre to a depth of one inch. An "Acre-Foot" is equivalent to 43,560 cubic feet and an "Acre-Inch" to 3,630 cubic feet.

The flow of water is usually rated in cubic feet per second, so that one cubic foot per second will deliver two acre feet in twenty-four hours, which is equal to 450 gallons per minute.

Irrigating Data from Government Tests

Acres irrigated by different quantities of water, with allowance for evaporation; basis 28,320 gallons of water to irrigate one acre one inch deep.

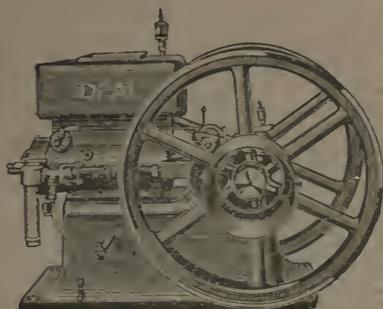
Acres Irrigated in Ten Hours

Gallons Pumped Per Minute	1 Inch Deep	2 Inches Deep	3 Inches Deep	4 Inches Deep	5 Inches Deep	6 Inches Deep
600	13.2	6.6	4.4	3.3	2.6	2.2
824	18.2	9.1	6.0	4.5	3.6	3.0
944	20.8	10.4	6.9	5.2	4.1	3.4
988	21.8	10.9	7.2	5.4	4.3	3.6
1000	22.1	11.0	7.3	5.5	4.4	3.7
1200	26.5	13.2	8.8	6.6	5.3	4.4
1500	33.1	16.5	11.0	8.2	6.6	5.5
2000	44.2	22.1	14.7	11.0	8.8	7.3

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GRAIN GRINDERS
TANKS, WATER BOXES
POLE and WOOD SAWS
PUMPS
CONCRETE MIXERS, Etc.

Write for Catalogues if Interested

Flow in Ditches and Flumes

Velocity in feet per second, and quantity in gallons per minute. For various sizes and slopes.

	Slope in Inches per 100 Feet	Cross-Section in Feet											
			1' x 1/2'	1 1/2' x 3/4'	2' x 1'	3' x 1 1/2'	4' x 2'	5' x 2 1/2'	6' x 3'	7' x 3 1/2'	8' x 4'	9' x 4 1/2'	
Ditches of Uniform Section Fairly Smooth	3/4 Inch	Velocity	0.46	0.64	0.82	1.1	1.4	1.6	1.9	2.1	2.3	2.5	
		G. P. M.	97	322	735	2250	5100	9000	15375	23000	33000	45370	
	1 1/2 Inches	Velocity	0.65	0.91	1.2	1.6	2.0	2.3	2.7	3.0	3.3	3.6	
		G. P. M.	142	457	105	3225	7200	12900	21700	33000	47250	65250	
	3 Inches	Velocity	0.93	1.3	1.6	2.2	2.8	3.3	3.8	4.2	4.7		
		G. P. M.	210	650	1425	4400	10000	18600	30750	46125	69000		
	4 1/2 Inches	Velocity	1.1	1.6	2.0	2.7	3.4	4.0	4.6				
		G. P. M.	247	810	1800	5475	12225	22500	37125				
	Rough Lumber or Smooth Cement	3/4 Inch	Velocity	1.2	1.6	1.9	2.6	3.2	3.7	4.2	4.6	5.0	5.4
			G. P. M.	270	825	1725	5200	1147	52085	93375	15025	27200	397500
		1 1/2 Inches	Velocity	1.7	2.2	2.7	3.7	4.5	5.2	5.9	6.5	7.1	7.7
			G. P. M.	382	1130	2430	7500	16200	29250	47625	71520	10200	1440250
3 Inches		Velocity	2.4	3.1	3.9	5.2	6.4	7.4					
		G. P. M.	540	1560	3510	10500	22950	41625					
4 1/2 Inches		Velocity	2.3	3.8	4.8	6.4	7.8						
		G. P. M.	650	1920	4312	12900	28050						
6 Inches		Velocity	3.3	4.4	5.5	7.3							
		G. P. M.	742	2220	4950	14775							
Flumes of Smooth Plained or F. & G. Lumber		3/4 Inch	Velocity	1.7	2.3	2.7	3.6	4.4	5.0	5.6	6.2	6.8	7.3
			G. P. M.	382	1162	2430	7275	15750	28125	45000	68250	97500	13750
	1 1/2 Inches	Velocity	2.4	3.2	3.9	5.1	6.2	7.1	8.0				
		G. P. M.	540	1620	3510	10275	22350	39750	64500				
	3 Inches	Velocity	3.4	4.5	5.5	7.2							
		G. P. M.	765	2250	4950	14550							
	4 1/2 Inches	Velocity	4.1	5.5	6.7								
		G. P. M.	915	2775	6037								
	6 Inches	Velocity	4.8	6.4	7.7								
		G. P. M.	1072	3225	6937								

Useful Information--Water

Doubling the diameter of a pipe increases its capacity four times. Friction on liquids in pipes increases as the square of the velocity.

The mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches or a column of water 33.9 feet high at sea level.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434. Approximately, we say that every foot elevation is equal to one-half pound pressure per square inch; this allows for ordinary friction.

To find the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144 and divide the product by the area of the pipe in inches.

To find the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water by 144 and divide the product by the velocity in feet per minute. The area being found, it is easy to get the diameter of pipe necessary.



The Gasoline Tractor Saves Time.

The automobile has its practical uses on the farm as well as in the city. The specially designed small farm tractor is one of the latest developments of the automobile industry. It enables the average farm in Ontario to obtain the advantages of tractor power hitherto confined to the large farms in the western provinces. Several well known manufacturers are now turning out a small tractor for this purpose which may revolutionize the methods of farming the average sized Canadian farm.

The ordinary pleasure car has also been adapted to many uses on the farm. The number of instances cited below are all taken from practical experience:

1. To haul produce to market
2. As motive power on the road for a truck or trailer.
3. As motive power in the fields for various implements.
4. To operate a thresher by means of a belt and pulley attached to the back wheel.
5. To operate in winter, feed cutters, cream separators and other apparatus by means of a pulley attached to the main shaft of the engine, and connected to the apparatus by means of belts, pulleys and counter shaft.

Get a Brantford Trailer

And save your automobile from rough usage.



Also hitch it to your wagon for a double load.

This simple, inexpensive, smooth running vehicle will bring your produce, fruit, milk, butter, to town as well as carrying the return load to the farm, and leave lots of room for your wife and daughter.

Auto wheels, rubber tires, ball bearings and strong, springy frame makes it draw a big load with little effort. Easy to attach and unhitch.

I manufacture MOTOR TRUCKS and TRAILERS at Brantford.

Write me to-day for price, stating capacity wanted.

R. O. CUMBACK, Brantford, Ont.

Strength of Materials.

The tensile strength of materials is measured by the least weight in pounds which will break a vertical rod one inch square, firmly and squarely fixed at its upper end, the load hanging from the lower end.

Tensile Strength of Materials in lbs. per square inch.

Elm	6,000	Cast Iron	20,000
Hickory	11,000	Wrought Iron	57,000
Maple	10,000	Wrought Iron Wire rope..	38,000
Oak	10,000	Leather belts, good	3,000
Poplar	7,000	Manilla rope, best	12,000
White Pine	10,000	Hemp rope, best	15,000
Ordinary Steel	85,000	Cast Steel	114,000

If under compression instead of tension cast iron will crush under a weight of 105 lbs. to the square inch, cast steel 142, and the various woods at about 3-4 of the tensile strength given. The crushing strength of stone is about 4,300 lbs. per square inch.

Factor of Safety.

In actual practice we have to deal with the load that may be safely borne, and for this purpose the breaking load is divided by a factor of safety to secure the desired safe load. The following table gives the usual factors of safety.

Material.	Steady Stress. (Buildings)	Varying Stress. (Bridges)	Shocks. (Machines)
Timber	8	10	15
Stone	15	25	30
Cast Iron	6	15	20
Wrought Iron	4	6	10
Steel	5	7	15

Strength of Common Ropes.

The following table shows breaking weight and also safe weights which may be borne by ordinary ropes:

Rope	Breaking Weight Borne with safety	
One-eighth inch diameter	78 lbs.	31 lbs.
One-fourth inch diameter	314 lbs.	125 lbs.
One-half inch diameter	1,250 lbs.	500 lbs.
One inch diameter	5,000 lbs.	2,000 lbs.
One and one-fourth inch diameter	7,500 lbs.	3,000 lbs.
One and one-half inch diameter	12,500 lbs.	4,500 lbs.

Human Force.

The proportionate force between the hand of man on the tool used and the force exerted by the tool is given respectively in the first and second columns following:

	Hand	Tool
Draw knife	100 lbs.	100 lbs.
Large auger	100 lbs.	800 lbs.
Screw driver	84 lbs.	250 lbs.
Wrench, vise handle	72 lbs.	1,000 lbs.
Windlass, one hand	60 lbs.	180 to 700 lbs.
Hand saw	36 lbs.	36 lbs.
Brace and bit	16 lbs.	150 to 700 lbs.
Button screw, thumb and finger	14 lbs.	14 to 70 lbs.

AGRICULTURAL STATISTICS

Compiled specially for the Canadian Farm Year Book by Ernest H. Godfrey, F.S.S.

Field Crops of Canada 1914 and 1915.—

The agricultural seasons of 1914 and 1915 were in strongest contrast to each other. That of 1914 was particularly unfavourable to the growth of grain. According to the reports of the Dominion Government the persistent drought throughout the greater part of the Northwest provinces in 1914 resulted in yields per acre of the chief cereals lower than in any season since 1910 and lower by between four and five bushels than the averages of the six years ended 1913. In Ontario and Quebec though the grain crops suffered from a dry season, the conditions were not so unfavourable, whilst in the Maritime Provinces a favourable season resulted in good returns.

Field Crops of 1915.—With reference to the field crops of 1915, the Census and Statistics Office of the Dominion Department of Trade and Commerce reported that the year will be a memorable one for the most abundant grain harvest ever reaped in Canada up to that time. This result was due to a remarkable combination of circumstances. The small grain harvest of 1914, ripened early and expeditiously threshed and marketed under favourable weather conditions, enabled the Western farmers to complete an unusually large proportion of fall ploughing in readiness for the next year's crop. In Ontario the acreage sown to fall wheat was increased by over 16 per cent as compared with the previous year, and the increase of fall wheat for all Canada was over 9 per cent. A mild winter and spring brought the fall wheat crop through with considerably less loss from killing than usual. The spring opened early, and as a general rule the conditions for seeding were favourable. With the prospect of high prices for wheat and other cereals, and responding to appeals for increased production on patriotic grounds, the farmers of Canada took the fullest advantage of their opportunities, with the result that the area sown to wheat for the harvest of 1915 was not only the largest on record in Canada, but exceeded the area sown in the previous year by 1,964,400 acres, or nearly 18 per cent. Finally, the growing season was uniformly favourable, and the average yields per acre of all the principal cereal crops in Canada were higher than in any previous year on record. For wheat, the average yield per acre was close upon 29 bushels,

or eight bushels more than the previous record of 21 bushels in 1913.

For the whole of Canada the principal field crops occupied in 1915 an estimated total area of 37,063,455 acres, as compared with 35,102,175 acres the area sown, and with 33,436,675 acres, the area harvested in 1914.

Total Grain Yields of 1915.—For the season of 1915, as compared with 1914, the total estimated yields of the grain crops were as follows: wheat 376,303,600 bushels as against 161,280,000 bushels in 1914; oats 520,103,000 bushels as against 313,078,000 bushels; barley 53,331,300 bushels as against 36,201,000 bushels; rye 2,394,100 bushels as against 2,016,800 bushels; peas 3,478,850 bushels as against 3,362,500 bushels; beans 723,400 bushels as against 797,500 bushels; buckwheat 7,865,900 bushels as against 8,626,000 bushels; flaxseed 10,628,000 bushels as against 7,175,200 bushels; mixed grains 17,523,100 bushels as against 16,382,500 bushels, and corn for husking 14,368,000 bushels as against 13,924,000 bushels. The total yield of wheat in 1915 was 85 per cent above that of 1914 and over 50 per cent above that of the annual average for the five years 1910 to 1914. The total yield of oats also was 47 per cent above that of 1914 and 29 per cent above the average.

Average Grain Yields per Acre, 1915.—

From the preceding paragraphs it is clear that the splendid total yields of wheat have been very largely due to the successful efforts of Canadian farmers in sowing a larger acreage; but, for the grain crops, magnificent average yields per acre were after all the principal factor in swelling out the totals. The following are the average yields in bushels per acre of the principal grain crops as compared with those of 1914, which are placed within parentheses: Fall wheat, 29.41 (21.41); spring wheat 28.93 (15.07); all wheat, 28.98 (15.67); oats, 45.76 (31.12); barley, 35.33 (24.21); rye, 21.32 (18.12); peas, 17.73 (17.64); beans, 16.70 (18.20); buckwheat, 22.88 (24.34); flaxseed, 13.18 (6.62); mixed grains, 37.54 (35.36); and corn for husking, 56.72 (54.39).

Quality of the Grain Crops.—The quality of the grain crops in 1915, as determined by the weight per measured bushel in lb., is, with the exception of one or two crops, superior to that of last year, and is also superior to the average of the last five years. The weights per bushel for 1915 are as follows: Fall wheat, 59.71 lb.,

spring wheat 60.31 lb., all wheat 60.19 lb., oats, 36.61 lb., barley, 48.26 lb., rye, 56.32 lb., peas 60.74 lb., beans 59.61 lb., buckwheat 48.02 lb., flax 55.28 lb., mixed grains 44.98 lb. and corn for husking, 56.32 lb.

Root and Fodder Crops 1914 and 1915.

—In 1914 the potato crop was a remarkably good one, and the average yield per acre for the whole of Canada, viz., 180 bushels, was higher than in any year since 1908, excepting only in 1909, when the average was 193 bushels. In Ontario, where the acreage under potatoes is larger than in any of the other provinces, the yield per acre in 1914, viz., 167 bushels, was the highest ever recorded for the province, whether by the Dominion or Provincial Department. The total yield of potatoes for Canada in 1914 was 85,672,000 bushels from 475,900 acres. But in 1915 the conditions were reversed. Although the area sown, viz., 478,600 acres, was larger, the total yield did not exceed 62,604,000 bushels, an average of not more than 130.81 bushels, which was lower than in any previous year except 1910 when it was 119.36 bushels. In Ontario the average yield per acre was not more than 92.66 bushels, almost the lowest yield of potatoes on record for the province. In the other provinces the potato yield was also poor, excepting in Alberta and in British Columbia. In Alberta the total yield was 5,155,000 bushels from 27,300 acres, an average of 188.84 bushels per acre, and in British Columbia the yield was 3,956,000 bushels from 16,000 acres, an average of 247.28 bushels. In both provinces the yield per acre was higher than in any recent year. In Alberta the yield was 211.64 bushels in 1912, and in British Columbia it was 252.31 bushels in 1911. Turnips and other roots for the whole of Canada yielded 64,281,000 bushels from 172,700 acres, as compared with 69,003,000 bushels from 175,000 acres in 1914, the yields per acre being 372.21 bushels in 1915, and 394.30 bushels in 1914. Of hay and clover the yield in 1915 was 10,953,000 tons from 7,875,000 acres, or 1.39 ton per acre; in 1914 the corresponding figures were 10,259,000 tons from 7,997,000 acres, a yield per acre of 1.28 ton. Alfalfa yielded 261,955 tons from 92,685 acres, as compared with 218,360 tons from 90,315 acres in 1914, the average yield per acre being 2.83 tons, compared with 2.42 tons. Fodder corn yielded 3,429,870 tons from 343,400 acres, as compared with 3,251,480 tons from 317,000 acres in 1910, the average yield being 10 tons in 1915, and 10¼ tons in 1914. The yield of

sugar beets was 141,000 tons from 18,000 acres, compared with 108,600 tons from 12,100 acres, the yields per acre being 7.83 tons in 1915 and 8.98 tons in 1914.

Values of Field Crops 1914 and 1915.—For all wheat in 1915, the average price per bushel for the whole of Canada is 39 cents less than that of last year and 8 cents more than that of the annual average for the five years ended 1914. The total values of the principal grain crops of 1915, compared with those of 1914 placed within parentheses were as follows: Wheat, \$312,569,400 (\$196,418,000); oats \$176,894,700 (\$151,811,000); barley, \$26,704,700 (\$21,557,000); rye, \$1,899,900 (\$1,679,300); peas \$5,730,700 (\$4,895,000); beans, \$2,206,800 (\$1,844,300); buckwheat, \$5,913,000 (\$6,213,000); flaxseed, \$15,965,000 (\$7,368,000); mixed grains, \$10,034,700 (\$10,759,400); and corn for husking \$10,243,000 (\$9,808,000). Including root and fodder crops, the total value of the field crops of Canada in 1915 amounted to \$797,669,500, comprising grain crops \$568,161,900, potatoes and sugar beets \$36,739,500; and fodder crops \$192,768,100. The corresponding values in 1914 were: Grain crops \$412,353,000; potatoes and sugar beets \$42,249,000 and fodder crops \$183,978,300, making a total of \$638,580,300.

Grain Production of the North West Provinces, 1914 and 1915.—In the three Northwest provinces of Manitoba, Saskatchewan and Alberta, the production of wheat in 1915 was estimated at 342,948,000 bushels, as compared with 140,958,000 bushels in 1914; of oats at 334,840,600 bushels as compared with 150,843,000 bushels; of barley at 35,317,200 bushels, as compared with 19,535,000 bushels, and flax at 10,559,000 bushels, as compared with 7,083,000 bushels. The wheat production of 1915 in Manitoba was 96,425,000 bushels from 3,342,900 acres, in Saskatchewan 195,168,000 bushels from 6,838,100 acres, and in Alberta 51,355,000 bushels from 1,563,700 acres.

Tabular Presentation by Provinces.—In the accompanying tables are given by provinces the whole of the data available for the field crops of 1914 and 1915. Table I shows the area, yield, quality and value for these two years, as compared with the annual average for the five years ended 1914. Table III gives the total areas and yields of wheat, oats, barley and flaxseed in the Northwest provinces for the years 1910 to 1915 and the annual average for the five years 1910 to 1914; and Table II shows the total areas and values of the field crops of Canada for the years 1910 to 1915. These tables are

taken from the "Census and Statistics Monthly" of January, 1916.

Wheat Surplus for Export.—Official calculations place the surplus of wheat available for export from the crop of 1915 at about 264 million bushels after allowing a deduction from the total estimated crop of 10 per cent for loss in cleaning and for non-merchantable grain and for the retention of 74½ million bushels for food and for seeding in 1916. The largest quantity of wheat and wheat flour previously exported from Canada in any one fiscal year was 142,574,000 bushels in 1913-14. The quantity estimated as available for export out of the crop of 1915 is about 121.6 million bushels in excess of this amount, and represents about 70 per cent of the total estimated wheat production of Canada in 1915. For the first time the Canadian wheat surplus proves more than sufficient to supply the annual average wheat deficit of the United Kingdom, which, according to British official calculations, amounts to over 215 million bushels.

Flax Fibre.—According to information published by the Census and Statistics Office, the area under flax grown for fibre in southern Ontario during 1915 was about 4,000 acres. From this area the production of flax fibre was about 800 tons, which at the average price of approximately 20 cents per lb., or \$400 per ton, was of the total value of \$320,000. In addition, 80 tons of tow, at \$35 per ton, realised \$2,800. About 30 per cent of the total production of fibre is shipped to Ireland, the rest being exported to New England States.

Tobacco.—The season for tobacco in 1915 was rather cool and very wet, particularly in Ontario, where the White Burley crops suffered greatly from Tobacco Root Rot, *Thielavia basicola*. However, the Virginia types, which as a rule, are grown on lighter soils and on ridges well drained, gave better crops than in 1914. The acreage in bright tobacco was also largely increased in 1915. In Quebec the summer of 1915 was a little cooler than usual, and in some districts the weather was rather wet. The crop was about normal in the northern districts. In the southern districts there was a little Root Rot, which materially reduced the yield. Both in Quebec and Ontario the autumn of 1915 was exceptionally favourable to the curing of the tobacco crop in the barns. All the tobaccos which were harvested in good time were practically cured by the end of October. Table IV gives the official estimates of the acreage and yield of

tobacco in Quebec and Ontario for each of the years 1913, 1914 and 1915.

Beetroot Sugar.—The total production of refined sugar manufactured from Canadian-grown beetroot was 36,838,267 lb. for the sugar campaign of 1915, as compared with 27,545,248 lb. in 1914. The acreage and yield of the roots are shown in Table I.

Numbers and Values of Farm Live Stock, 1914 and 1915.—Table V shows the latest estimates of the numbers of farm live stock in Canada for the five years 1911 to 1915. In 1914 the estimated total values of each description were as follows: Horses, \$371,430,000; cattle \$297,131,000; sheep, \$14,551,000; and swine, \$42,418,000, or for all descriptions an aggregate of \$725,530,000. In 1915 the corresponding values were as follows: Horses \$370,378,000; cattle, \$315,701,000; sheep, \$16,225,000; and swine, \$48,363,000, making a total of \$750,667,000.

Numbers of Pure Bred Live Stock in Canada, 1911.—Table VI shows the numbers of pure-bred live stock in Canada, according to the census of 1911. Horses comprised 22 different breeds, the principal in point of numbers being the Clydesdale, Shire, French-Canadian, Percheron and Suffolk Punch among the heavy draught breeds and Thoroughbreds, Hackneys and Standard-Bred amongst the light horses. Amongst the cattle, shorthorns very largely predominated with 56,614, or 45 per cent of the total. Holsteins were next with 23,292, then Ayrshires 17,257, Jerseys 8,124, and Herefords 7,611. Sheep, numbering 53,616 consisted of 14 named breeds. The largest numbers were Shropshires 17,678, next came Oxford Downs 9,127, Leicesters 8,919, and Cotswolds 8,539. Swine numbering 56,457, consisted most largely of Yorkshires 27,730, Berkshires 13,889, Tamworths 4,301 and Chester Whites 4,198.

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DO IT NOW!

Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.

Crops	Area	Yield per acre	Total Yield	Weight per measured bush.	Average price per bush.	Total Value
	acres	bush.	bush.	lb.	\$	\$
Canada—						
Fall wheat.....1914	973,300	21.41	20,837,000	59.61	1.05	21,818,000
1915	1,208,700	29.41	35,551,600	59.71	0.90	32,001,500
Average.....1910-14	1,010,000	21.78	22,003,000	60.26	0.81	19,236,000
Spring wheat.....1914	9,320,600	15.07	140,443,000	59.16	1.24	174,600,000
1915	11,777,700	28.93	340,752,000	60.31	0.83	280,567,900
Average.....1910-14	9,444,000	18.42	174,023,000	59.47	0.74	128,688,000
All wheat.....1914	10,293,900	15.67	161,280,000	59.49	1.22	196,418,000
1915	12,986,400	28.98	376,303,600	60.19	0.83	312,569,400
Average.....1910-14	10,454,000	18.75	196,026,000	59.61	0.75	147,924,000
Oats.....1914	10,061,500	31.12	313,078,000	35.31	0.48	151,811,000
1915	11,365,000	45.76	520,103,000	36.61	0.34	176,894,700
Average.....1910-14	9,749,000	35.25	343,612,000	35.58	0.36	125,072,000
Barley.....1914	1,495,600	24.21	36,201,000	47.22	0.60	21,557,000
1915	1,509,350	35.33	53,331,300	48.26	0.50	26,704,700
Average.....1910-14	1,500,000	27.62	41,436,000	47.58	0.50	20,547,000
Rye.....1914	111,280	18.12	2,016,800	55.47	0.83	1,679,300
1915	112,300	21.32	2,394,100	56.32	0.79	1,899,900
Average.....1910-14	121,000	17.90	2,155,000	55.36	0.73	1,581,000
Peas.....1914	205,550	17.64	3,362,500	60.53	1.46	4,895,000
1915	196,210	17.73	3,478,850	60.74	1.66	5,730,700
Average.....1910-14	267,000	15.51	4,140,000	59.14	1.11	4,633,000
Beans.....1914	43,830	18.20	797,500	60.21	2.31	1,844,300
1915	43,310	16.70	723,400	59.61	3.05	2,206,800
Average.....1910-14	48,000	18.20	874,000	59.41	2.00	1,751,000
Buckwheat.....1914	354,400	24.34	8,626,000	48.20	0.72	6,213,000
1915	343,800	22.88	7,865,900	48.02	0.75	5,913,000
Average.....1910-14	375,000	23.02	8,631,000	48.26	0.64	5,519,000
Mixed grains.....1914	463,300	35.36	16,382,500	45.51	0.66	10,759,400
1915	466,800	37.54	17,523,100	44.98	0.57	10,034,700
Average.....1910-14	478,000	32.74	15,652,000	45.06	0.58	9,177,000
Flax.....1914	1,084,000	6.62	7,175,200	52.49	1.03	7,368,000

	1915	806,600	13.18	10,628,000	55.28	1.50	15,965,000
Average.....	1910-14	1,224,000	10.65	13,033,000	55.28	1.10	14,394,000
Corn for husking.....	1914	256,000	54.39	13,924,000	56.62	0.71	9,808,000
	1915	253,300	56.72	14,368,000	56.32	0.71	10,243,000
Average.....	1910-14	290,000	55.97	16,231,090	55.20	0.63	10,232,000
Potatoes.....	1914	475,900	180.02	85,672,000	.....	0.49	41,598,000
	1915	478,600	130.81	62,604,000	.....	0.57	35,964,000
Average.....	1910-14	476,000	157.96	75,190,000	.....	0.49	37,107,000
Turnips, mangolds, etc.....	1914	175,000	394.30	69,003,000	.....	0.27	18,934,000
	1915	172,700	372.21	64,281,000	.....	0.26	16,560,000
Average.....	1910-14	189,000	366.04	69,181,000	.....	0.25	17,453,000
		tons	tons			per ton	
Hay and clover.....	1914	7,997,000	1.28	10,259,000	.....	14.3	145,999,000
	1915	7,875,000	1.39	10,953,000	.....	14.2	155,807,000
Average.....	1910-14	8,268,000	1.42	11,706,000	.....	11.61	135,867,000
Fodder corn.....	1914	317,000	10.25	3,251,480	.....	4.91	15,949,700
	1915	343,400	10.00	3,429,870	.....	4.96	16,999,100
Average.....	1910-14	302,000	9.46	2,856,000	.....	4.84	13,831,000
Sugar beets.....	1914	12,100	8.98	108,600	.....	5.99	651,000
	1915	18,000	7.83	141,000	.....	5.50	775,500
Average.....	1910-14	17,000	9.65	164,000	.....	5.86	962,000
Alfalfa.....	1914	90,315	2.42	218,360	.....	14.17	3,095,600
	1915	92,685	2.83	261,955	.....	12.98	3,402,000
Average.....	1910-14	88,000	2.46	217,000	.....	12.13	2,632,000
			bush.	bush.		per bush.	
P. E. Island— Spring wheat.....	1914	32,000	25.28	809,000	57.51	1.04	841,000
	1915	34,400	19.00	653,600	59.05	1.08	705,800
Average.....	1910-14	31,000	20.97	623,000	59.06	1.00	620,000
Oats.....	1914	183,000	41.51	7,596,000	37.46	0.48	3,646,000
	1915	196,000	34.86	6,832,500	36.70	0.45	3,074,600
Average.....	1910-14	181,000	34.96	6,329,000	36.58	0.42	2,661,000
Barley.....	1914	3,800	31.25	119,000	47.33	0.64	76,000
	1915	3,700	28.88	106,800	48.83	0.71	75,800
Average.....	1910-14	4,500	26.89	121,000	47.86	0.62	75,000
Peas.....	1914	80	40.00	3,200	60.00	2.00	6,400
	1915	70	15.75	1,100	61.67	2.33	2,500
Average.....	1910-14	75	25.33	1,900	58.60	1.53	2,900
Buckwheat.....	1914	2,600	32.91	86,000	47.33	0.70	60,000
	1915	2,600	29.00	75,400	48.15	0.75	56,500
Average.....	1910-14	2,640	28.03	74,000	47.33	0.64	47,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.
continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Average price per bush.	Total Value
	acres	bush.	bush.	bush.	\$	\$
Mixed grains.....1914	7,860	45.75	360,000	46.04	0.56	202,000
1915	8,000	38.65	309,200	43.00	0.55	170,000
Average.....1910-14	7,500	40.40	303,000	44.35	0.50	150,000
Potatoes.....1914	32,000	212.70	6,806,000	.....	0.23	1,565,000
1915	31,000	114.78	3,558,000	.....	0.46	1,637,000
Average.....1910-14	32,000	184.69	5,910,000	.....	0.29	1,691,000
Turnips, mangolds, etc.....1914	7,900	450.58	3,560,000	.....	0.22	783,000
1915	7,600	449.46	3,551,000	.....	0.26	923,000
Average.....1910-14	7,600	470.53	3,576,000	.....	0.21	764,000
		tons	tons		per ton	
Hay and clover.....1914	192,000	1.74	334,000	.....	13.4	4,355,000
1915	198,000	1.77	351,000	.....	12.18	4,275,000
Average.....1910-14	201,000	1.47	296,000	.....	10.96	3,244,000
Fodder corn.....1914	270	9.00	2,400	.....	4.00	9,600
1915	260	13.00	3,400	.....	3.00	10,200
Average.....1910-14	270	8.88	2,400	.....	3.04	7,300
Alfalfa.....1914	.....	.....	.....	.....	.....	.....
1915	55	3.00	165	.....	14.00	2,300
Average.....1910-14	67	2.61	175	.....	10.06	1,760
Nova Scotia—		bush.	bush.		per bush.	
Spring wheat.....1914	12,000	21.87	262,000	59.81	1.25	328,000
1915	13,300	18.57	247,000	59.26	1.21	298,700
Average.....1910-14	12,700	20.47	260,000	59.08	1.13	295,000
Oats.....1914	101,800	34.00	3,461,000	35.07	0.61	2,111,000
1915	112,000	31.14	3,487,700	34.18	0.59	2,057,700
Average.....1910-14	100,000	30.89	3,089,000	34.28	0.54	1,670,000
Barley.....1914	4,800	28.72	138,000	47.90	0.84	116,000
1915	4,900	26.20	128,400	48.39	0.80	102,700
Average.....1910-14	5,140	27.25	140,100	48.49	0.78	109,000
Rye.....1914	280	17.67	5,000	56.00	1.05	5,300

	1915	300 15.00	4,500	56.00 1.08	4,900
Average.....	1910-14	310 18.30	5,675	56.00 0.95	5,400
Peas.....	1914	190 22.23	4,200	60.20 2.04	8,600
	1915	190 18.66	3,550	59.00 2.01	7,100
Average.....	1910-14	180 25.30	4,555	59.74 1.75	7,980
Beans.....	1914	840 22.00	18,500	59.77 2.99	55,000
	1915	840 17.50	14,700	59.83 3.87	56,800
Average.....	1910-14	865 22.66	19,600	59.33 2.45	48,000
Buckwheat.....	1914	10,000 25.94	259,000	48.05 0.72	186,000
	1915	10,200 21.72	221,500	47.45 0.72	159,500
Average.....	1910-14	11,000 23.54	259,000	47.21 0.66	172,000
Mixed grains.....	1914	3,900 37.18	145,000	43.45 0.71	103,000
	1915	4,100 34.16	140,000	43.05 0.71	99,400
Average.....	1910-14	4,000 32.25	129,000	43.83 0.66	86,000
Corn for husking.....	1914	-----	-----	-----	-----
	1915	-----	-----	-----	-----
Average.....	1910-13	85 47.06	4,000	43.66 0.75	3,000
Potatoes.....	1914	32,500 220.45	7,165,000	----- 0.49	3,511,000
	1915	33,700 141.23	4,759,000	----- 0.58	2,760,000
Average.....	1910-14	32,000 195.03	6,241,000	----- 0.48	2,999,000
Turnips, mangolds, etc.....	1914	9,000 387.42	3,487,000	----- 0.38	1,325,000
	1915	9,200 390.02	3,589,000	----- 0.34	1,223,000
Average.....	1910-14	11,000 404.82	4,453,000	----- 0.34	1,495,000
		tons	tons	per ton	
Hay and clover.....	1914	518,000 1.89	979,000	----- 14.50	14,196,000
	1915	538,000 1.78	958,000	----- 13.33	12,770,000
Average.....	1910-14	528,000 1.63	861,000	----- 12.21	10,509,000
Fodder corn.....	1914	520 7.67	4,000	----- 6.00	24,000
	1915	500 4.64	2,300	----- 7.00	16,000
Average.....	1910-14	585 8.55	5,000	----- 5.20	26,000
Alfalfa.....	1914	30 2.00	60	----- 14.00	800
	1915	30 2.30	70	----- 13.00	900
Average.....	1910-14	25 3.00	75	----- 12.00	900
New Brunswick—		bush.	bush.	per bush.	
Spring wheat.....	1914	12,600 18.57	234,000	59.70 1.30	304,000
	1915	14,000 19.09	267,000	59.69 1.26	335,000
Average.....	1910-14	13,200 18.57	245,100	58.98 1.07	263,000
Oats.....	1914	200,000 32.44	6,488,000	35.48 0.59	3,828,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.
continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Aver- age price per bush.	Total Value
	acres	bush.	bush.	bush.	\$	\$
1915	201,000	27.66	5,559,600	36.33	0.55	3,058,000
Average.....1910-14	199,700	29.61	5,913,000	35.20	0.52	3,062,000
Barley.....1914	2,400	26.81	64,000	47.95	1.14	73,000
1915	2,100	22.96	48,000	48.85	0.85	40,800
Average.....1910-14	2,600	26.77	69,600	47.62	0.70	49,000
Peas.....1914	460	20.70	10,000	59.85	1.36	14,000
1915	420	17.08	6,700	60.27	2.52	16,900
Average.....1910-14	540	20.37	11,000	58.04	1.40	15,400
Beans.....1914	290	20.82	6,000	59.55	2.89	17,300
1915	270	21.37	5,700	60.71	4.03	23,000
Average.....1910-14	300	19.67	5,900	58.97	2.59	15,300
Buckwheat.....1914	63,800	26.43	1,686,000	47.76	0.61	1,028,000
1915	58,000	22.68	1,315,000	47.51	0.73	960,000
Average.....1910-14	63,000	25.13	1,583,000	47.72	0.58	911,000
Mixed grains.....1914	950	30.33	29,000	40.92	0.65	19,000
1915	900	31.50	28,400	45.80	0.71	20,000
Average.....1910-14	960	29.17	28,000	43.64	0.64	18,000
Corn for husking Average.....1910-13	50	19.40	970	.....	0.87	840
Potatoes.....1914	43,900	239.96	10,534,000	.....	0.40	4,214,000
1915	40,000	144.31	5,772,000	.....	0.64	3,694,000
Average.....1910-14	42,000	203.69	8,555,000	.....	0.44	3,791,000
Turnips, mangolds, etc.....1914	8,400	289.96	2,436,000	.....	0.35	853,000
1915	8,000	329.10	2,633,000	.....	0.33	869,000
Average.....1910-14	9,000	338.67	3,048,000	.....	0.33	1,014,000
Hay and clover.....1914	571,000	1.36	777,000	.....	12.47	9,689,000
1915	569,000	1.39	791,000	.....	14.00	11,074,000
Average.....1910-14	602,000	1.31	788,000	.....	10.00	7,878,000
Fodder corn.....1914	120	4.00	480	.....	6.00	3,000
1915	110	7.00	770	.....	2.50	1,900

Average.....1910-14	180	8.89	1,600	.....	4.38	7,000
Alfalfa.....1914	135	2.25	300	.....	9.25	2,800
1915	140	2.25	320	.....	12.00	3,800
Average.....1910-14	120	2.54	305	.....	9.84	3,000
Quebec—		bush.	bush.		per bush.	
Spring wheat.....1914	55,000	18.00	990,000	59.65	1.35	1,337,000
1915	71,000	19.88	1,411,000	59.62	1.34	1,891,000
Average.....1910-14	61,000	16.89	1,030,000	59.28	1.22	1,259,000
Oats.....1914	1,327,000	31.74	42,119,000	37.06	0.58	24,429,000
1915	1,400,000	30.13	42,182,000	36.92	0.55	23,200,000
Average.....1910-14	1,349,000	27.56	37,179,000	36.09	0.52	19,196,000
Barley.....1914	85,000	26.60	2,261,000	48.98	0.86	1,944,000
1915	85,000	26.53	2,255,000	48.79	0.86	1,939,000
Average.....1910-14	94,000	24.25	2,280,000	48.05	0.78	1,781,000
Rye.....1914	9,000	17.30	156,000	55.11	1.09	170,000
1915	8,700	16.71	145,000	55.90	1.12	162,000
Average.....1910-14	10,800	15.46	167,000	54.94	1.01	168,000
Peas.....1914	24,000	18.00	432,000	61.63	2.35	1,015,000
1915	24,400	16.56	404,000	61.14	2.46	998,000
Average.....1910-14	29,000	15.72	456,000	58.91	1.78	811,000
Beans.....1914	4,700	18.87	89,000	60.87	2.70	240,000
1915	4,700	21.89	103,000	59.38	3.17	327,000
Average.....1910-14	5,000	18.40	92,000	59.75	2.29	211,000
Buckwheat.....1914	102,000	24.28	2,477,000	48.60	0.83	2,056,000
1915	104,000	24.69	2,568,000	48.17	0.84	2,157,000
Average.....1910-14	113,000	23.27	2,629,000	47.76	0.74	1,950,000
Mixed grains.....1914	99,000	30.00	2,970,000	49.95	0.77	2,287,000
1915	101,000	29.67	2,877,000	45.44	0.73	2,188,000
Average.....1910-14	102,500	26.83	2,750,000	45.92	0.68	1,880,000
Flax.....1914	700	11.70	8,200	54.48	1.93	16,000
1915	600	11.89	7,000	54.16	2.18	15,000
Average.....1910-14	980	10.71	10,500	54.12	1.90	20,000
Corn for husking.....1914	17,000	30.24	514,000	56.65	1.08	555,000
1915	16,300	31.17	508,000	56.85	1.12	569,000
Average.....1910-14	19,300	29.69	573,000	55.94	1.00	574,000
Potatoes.....1914	115,000	189.66	21,811,000	.....	0.43	9,161,000
1915	117,000	149.66	17,510,000	.....	0.55	9,631,000
Average.....1910-14	119,000	150.46	17,914,000	.....	0.46	8,315,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.
continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Average price per bush.	Total Value
Canada—	acres	bush.	bush.	bush.	\$	\$
Turnips, mangolds, etc.....1914	10,500	328.20	3,446,100	.....	0.37	1,275,000
.....1915	10,200	308.25	3,144,000	.....	0.36	1,132,000
Average.....1910-14	12,000	313.08	3,757,000	.....	0.35	1,308,000
		tons	tons		per ton	
Hay and clover.....1914	2,979,000	1.20	3,575,000	.....	14.88	53,196,000
.....1915	2,922,000	1.26	3,682,000	.....	15.89	58,507,000
Average.....1910-14	3,124,000	1.44	4,485,000	.....	10.95	49,083,000
Fodder corn.....1914	33,000	7.18	237,000	.....	6.40	1,517,000
.....1915	34,000	8.61	293,000	.....	6.39	1,872,000
Average.....1910-14	36,000	8.05	290,000	.....	4.94	1,433,000
Alfalfa.....1914	2,950	2.06	6,000	.....	13.43	81,000
.....1915	2,860	2.84	8,100	.....	11.78	95,000
Average.....1910-14	3,400	2.50	8,500	.....	9.53	81,000
		bush.	bush.		per bush.	
Ontario—		bush.	bush.			
Fall wheat.....1914	727,400	21.51	15,646,000	59.77	1.08	16,898,000
.....1915	972,000	28.34	27,546,000	59.41	0.93	25,618,000
Average.....1910-14	759,000	22.07	16,758,000	60.40	0.90	15,353,000
Spring wheat.....1914	107,000	18.80	2,012,000	59.05	1.07	2,153,000
.....1915	121,000	22.36	2,706,000	59.41	0.96	2,598,000
Average.....1910-14	117,000	18.41	2,154,000	58.90	0.92	1,977,000
All wheat.....1914	834,000	21.16	17,658,000	59.50	1.07	19,051,000
.....1915	1,093,000	27.67	30,252,000	59.41	0.93	28,216,000
Average.....1910-14	876,000	21.59	18,912,000	60.18	0.92	17,330,000
Oats.....1914	2,840,000	35.00	99,400,000	34.07	0.49	48,706,000
.....1915	3,095,000	39.68	122,810,000	34.67	0.39	47,896,000
Average.....1910-14	2,823,000	33.68	95,084,000	33.80	0.42	39,732,000
Barley.....1914	461,000	30.34	13,987,000	47.83	0.64	8,952,000
.....1915	449,000	34.23	15,369,000	47.83	0.56	8,607,000
Average.....1910-14	496,000	28.81	14,289,000	47.49	0.61	8,677,000
Rye.....1914	78,000	17.19	1,341,000	55.47	0.85	1,140,000
.....1915	78,000	19.88	1,551,000	56.89	0.79	1,225,000

Average.....	1910-14	89,000	17.04	1,516,000	55.57	0.75	1,133,000
Peas.....	1914	179,000	16.00	2,864,000	59.88	1.32	3,780,000
	1915	169,000	17.79	3,007,000	59.86	1.54	4,631,000
Average.....	1910-14	235,000	15.22	3,607,000	58.68	1.03	3,720,000
Beans.....	1914	38,000	18.00	684,000	59.88	2.24	1,532,000
	1915	37,500	16.00	600,000	59.76	3.05	1,800,000
Average.....	1910-14	42,000	17.90	752,000	59.92	1.95	1,465,000
Buckwheat.....	1914	176,000	23.40	4,118,000	47.83	0.70	2,883,000
	1915	169,000	21.81	3,686,000	48.21	0.70	2,580,000
Average.....	1910-14	184,000	22.21	4,086,000	47.76	0.60	2,438,000
Mixed grains.....	1914	344,000	36.66	12,611,000	44.58	0.63	7,945,000
	1915	345,000	39.91	13,769,000	44.76	0.54	7,435,000
Flax.....	1914	5,300	15.76	84,000	55.78	1.70	143,000
	1915	5,000	12.38	62,000	50.78	1.72	107,000
Average.....	1910-14	8,000	15.00	120,000	53.60	1.62	194,000
Corn for husking.....	1914	239,000	56.11	13,410,000	56.22	0.69	9,253,000
	1915	237,000	58.48	13,860,000	55.75	0.69	9,674,000
Average.....	1910-14	270,000	57.90	15,653,000	56.48	0.62	9,654,000
Potatoes.....	1914	154,000	167.35	25,772,000	.....	0.47	12,113,000
	1915	155,000	92.66	14,362,000	.....	0.76	10,915,000
Average.....	1910-14	156,000	128.09	19,982,000	.....	0.58	11,612,000
Turnips, mangolds, etc.....	1914	114,000	430.31	49,055,000	.....	0.21	10,302,000
	1915	112,000	394.42	44,175,000	.....	0.21	9,277,000
Average.....	1910-14	127,000	375.66	47,709,000	.....	0.20	9,596,000
Hay and clover.....	1914	3,171,000	1.14	3,615,000	.....	14.91	53,900,000
	1915	3,082,000	1.32	4,068,000	.....	14.06	57,196,000
Average.....	1910-14	3,296,000	1.34	4,420,000	.....	12.38	54,755,000
Fodder corn.....	1914	267,000	10.95	2,924,000	.....	4.72	13,801,000
	1915	287,000	10.63	3,051,000	.....	4.76	14,523,000
Average.....	1910-14	252,000	9.84	2,480,000	.....	4.71	11,680,000
Sugar beets.....	1914	12,000	9.00	108,000	.....	6.00	648,000
	1915	18,000	7.83	141,000	.....	5.50	775,500
Average.....	1910-14	16,000	9.68	155,000	.....	5.92	919,000
Alfalfa.....	1914	61,000	2.26	138,000	.....	15.01	2,071,000
	1915	60,000	2.72	163,000	.....	13.41	2,186,000
Average.....	1910-14	65,000	2.32	151,000	.....	12.02	1,815,000
Manitoba—							
Fall wheat.....	1914	15,000	16.00	240,000	59.50	0.89	214,000
	1915	10,900	33.30	363,000	61.33	0.88	319,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915*
 continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Aver- age price per bush.	Total Value
Canada—	acres	bush.	bush.	bush.	\$	\$
Average.....1910-14	13,000	21.92	285,000	59.94	0.73	206,000
Spring wheat.....1914	2,601,000	14.75	38,365,000	59.39	1.01	38,749,000
1915	3,332,000	28.83	96,062,000	61.18	0.85	81,653,000
Average.....1910-14	2,809,000	17.82	50,068,000	59.97	0.74	37,463,000
All wheat.....1914	2,616,000	14.84	38,605,000	59.39	1.01	38,963,000
1915	3,342,900	28.84	96,425,000	61.18	0.85	81,972,000
Average.....1910-14	2,823,000	17.84	50,354,000	60.03	0.74	37,670,000
Oats.....1914	1,331,000	28.25	31,951,000	34.21	0.48	15,336,000
1915	1,441,000	48.21	69,471,000	36.36	0.32	22,231,000
Average.....1910-14	1,319,000	35.83	47,256,000	35.32	0.30	15,172,000
Barley.....1914	468,000	21.00	9,828,000	46.00	0.55	5,405,000
1915	490,000	36.25	17,763,000	47.70	0.50	8,882,000
Average.....1910-14	462,000	26.59	12,283,000	47.08	0.42	5,168,000
Rye.....1914	5,000	20.00	100,000	57.00	0.90	90,000
1915	5,800	26.74	155,000	57.50	0.73	113,000
Average.....1910-14	4,500	19.55	88,000	56.33	0.69	61,000
Mixed grains.....1914	1,490	20.25	30,000	.....	0.48	14,400
1915	1,550	32.50	50,000	43.00	0.41	21,000
Average.....1910-14	1,300	31.07	40,400	.....	0.42	17,100
Flax.....1914	40,000	8.44	338,000	55.41	1.10	372,000
1915	34,000	11.00	374,000	55.00	1.54	576,000
Average.....1910-14	62,000	11.45	710,000	55.52	1.33	947,000
Potatoes.....	26,900	117.91	3,172,000	.....	0.72	2,284,000
1915	28,300	109.67	3,104,000	.....	0.54	1,676,000
Average.....1910-14	26,500	172.30	4,566,000	.....	0.44	2,029,000
Turnips, mangolds, etc.....1914	3,900	268.50	1,047,000	.....	0.54	565,000
1915	4,300	269.01	1,157,000	.....	0.35	405,000
Average.....1910-14	3,600	297.78	1,072,000	.....	0.42	453,000
Hay and clover.....1914	162,000	1.24	201,000	.....	9.12	1,833,000
1915	159,000	1.93	307,000	.....	9.63	2,956,000

Average.....1910-14	153,000	1.40	214,000	.....	9.39	2,010,000
Fodder corn.....1914	13,000	5.55	72,000	.....	7.60	547,000
1915	18,000	3.36	60,000	.....	8.33	500,000
Average.....1910-14	9,900	6.77	67,000	.....	8.82	601,000
Alfalfa.....1914	4,500	2.04	9,000	.....	13.21	119,000
1915	4,700	2.19	10,300	.....	11.17	115,000
Average.....1910-14	3,200	2.31	7,400	.....	11.22	83,000
Saskatchewan—						
Fall wheat.....1914	4,300	bush. 15.50	bush. 67,000	60.33	per bush. 0.99	66,000
1915	4,100	30.76	126,000	.....	0.81	102,000
Average.....1910-14	3,000	20.00	60,000	59.65	0.75	45,000
Spring wheat.....	5,344,000	13.74	73,427,000	59.04	1.48	108,672,000
1915	6,834,000	28.54	195,042,000	60.75	0.81	157,984,000
Average.....1910-14	5,224,000	18.30	95,554,000	59.89	0.74	71,141,000
All wheat.....1914	5,348,300	13.74	73,494,000	59.07	1.48	108,738,000
1915	6,838,100	28.54	195,168,000	.....	0.81	158,086,000
Average.....1910-14	5,227,000	18.30	95,613,000	59.97	0.74	71,187,000
Oats.....1914	2,520,000	24.53	61,816,000	33.71	0.45	27,817,000
1915	2,937,000	53.67	157,628,600	37.48	0.28	44,136,000
Average.....1910-14	2,410,000	38.17	91,996,000	36.01	0.29	26,334,000
Barley.....1914	290,000	16.90	4,901,000	43.87	0.50	2,451,000
1915	287,000	36.83	10,570,200	47.54	0.43	4,545,000
Average.....1910-14	264,000	27.76	7,328,000	46.79	0.38	2,783,000
1914	2,600	20.90	54,000	58.50	0.67	36,000
Rye.....1915	2,700	28.00	75,600	55.17	0.75	57,000
Average.....1910-14	2,200	22.73	50,000	56.58	0.54	27,000
Peas.....1915	400	23.00	9,200	61.00	1.40	13,000
Average.....1910-13	355	20.00	7,100	.....	1.03	7,300
Mixed grains.....1914	1,900	15.50	29,500	.....	0.51	15,000
1915	1,950	30.00	58,500	48.33	0.45	26,300
Average.....1910-14	1,600	31.25	51,000	.....	0.51	26,000
Flax.....1914	958,000	6.40	6,131,000	51.02	1.01	6,192,000
1915	697,000	13.00	9,061,000	55.89	1.50	13,592,000
Average.....1910-14	1,062,000	10.60	11,262,000	54.30	1.09	12,220,000
Potatoes.....1914	30,600	133.51	4,085,000	.....	1.05	4,289,000
1915	30,300	146.15	4,428,000	.....	0.49	2,170,000
Average.....1910-14	29,000	166.90	4,840,000	.....	0.57	2,771,000
Turnips, mangolds, etc.....1914	12,900	248.91	3,211,000	.....	0.71	2,280,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.
continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Aver- age price per bush.	Total Value
Canada—	acres	bush.	bush.	bush.	\$	\$
1915	12,400	236.75	2,936,000	.....	0.52	1,527,000
Average.....1910-14	11,000	269.45	2,964,000	.....	0.50	1,492,000
Hay and clover.....1914	70,000	1.74	122,000	.....	6.84	834,000
1915	67,000	1.41	94,000	.....	6.96	654,000
Average.....1910-14	54,000	1.65	89,000	.....	7.87	700,000
Fodder corn.....1914	1,900	3.66	7,000	.....	3.50	24,500
1915	2,000	4.16	8,300	.....	3.00	25,000
Average.....1910-14	1,400	4.29	6,000	.....	6.50	39,000
Alfalfa.....1914	1,800	2.59	5,000	.....	15.00	75,000
1915	1,800	1.71	3,000	.....	14.50	44,000
Average.....1910-14	1,200	2.25	2,700	.....	14.44	39,000
Alberta—		bush.	bush.		per bush.	
Fall wheat.....1914	221,100	21.30	4,709,000	58.26	0.94	4,426,000
1915	215,700	33.92	7,316,000	61.32	0.79	5,780,000
Average.....1910-14	229,000	20.64	4,727,000	59.75	0.73	3,452,000
Spring wheat.....1914	1,150,000	21.00	24,150,000	60.75	0.91	21,977,000
1915	1,348,000	32.67	44,039,000	61.57	0.79	34,791,000
Average.....1910-14	1,169,000	20.46	23,913,000	59.68	0.65	15,482,000
All wheat.....1914	1,371,100	21.05	28,859,000	60.17	0.91	26,403,000
1915	1,563,700	32.84	51,355,000	61.52	0.79	40,571,000
Average.....1910-14	1,398,000	20.49	28,639,000	59.67	0.66	18,934,000
Oats.....1914	1,502,000	38.00	57,076,000	38.01	0.42	23,972,000
1915	1,912,000	56.35	107,741,000	39.76	0.27	29,090,000
Average.....1910-14	1,321,000	41.09	54,276,000	38.20	0.29	15,811,000
Barley.....1914	178,000	27.00	4,806,000	48.47	0.51	2,451,000
1915	185,000	37.75	6,984,000	49.57	0.35	2,444,000
Average.....1910-14	170,000	28.30	4,811,000	48.07	0.38	1,836,000
Rye.....1914	16,400	22.00	360,800	55.83	0.66	238,000
1915	16,800	28.61	463,000	56.63	0.73	338,000
Average.....1910-14	14,000	23.43	328,000	55.67	0.57	187,000
Peas.....1914	470	17.25	8,100	58.66	1.47	12,000

	1915	430	20.00	8,600	62.00	1.65	14,200
Average.....	1910-14	440	17.26	7,595	58.66	1.14	8,680
Mixed grains.....	1914	1,800	40.00	72,000	.....	0.47	34,000
	1915	1,700	39.17	67,000	47.20	0.34	23,000
Average.....	1910-14	2,260	32.30	73,000	.....	0.41	30,000
Flax.....	1914	80,000	7.67	614,000	55.781	.05	645,000
	1915	70,000	16.05	1,124,000	56.37	1.49	1,675,000
Average.....	1910-14	91,000	10.23	931,000	55.03	1.09	1,012,000
Potatoes.....	1914	26,300	138.86	3,652,000	.....	0.65	2,374,000
	1915	27,300	188.84	5,155,000	.....	0.33	1,701,000
Average.....	1910-14	25,000	165.80	4,145,000	.....	0.47	1,951,000
Turnips, mangolds, etc.....	1914	4,900	255.53	1,252,000	.....	0.60	751,000
	1915	4,900	276.73	1,356,000	.....	0.39	529,000
Average.....	1910-14	4,200	259.76	1,091,000	.....	0.48	526,000
Hay and clover.....	1914	176,000	1.73	304,000	.....	8.31	2,526,000
	1915	173,000	1.80	311,000	.....	8.61	2,678,000
Average.....	1910-14	167,000	1.52	253,000	.....	10.04	2,539,000
Fodder corn.....	1914	800	2.00	1,600	.....	3.50	5,600
	1915	1,100	5.14	5,700	.....	5.00	29,000
Average.....	1910-14	800	2.25	1,800	.....	7.22	13,000
Sugar beets.....	1914	100	6.00	600	.....	5.00	3,000
Average.....	1910-14	1,400	6.21	8,700	.....	5.00	44,000
Alfalfa.....	1914	11,400	2.77	32,000	.....	11.41	365,000
	1915	11,000	3.06	34,000	.....	9.31	317,000
Average.....	1910-14	8,000	22.6	21,000	.....	11.05	232,000
British Columbia—			bush.	bush.		per	
Fall wheat.....	1914	5,500	31.82	175,000	60.00	1.22	214,000
	1915	6,000	33.44	200,600	60.46	0.91	182,500
Average.....	1910-14	5,700	30.35	173,000	59.68	1.04	180,000
Spring wheat.....	1914	7,000	27.77	194,000	59.50	1.23	239,000
	1915	10,000	32.43	324,400	58.40	0.96	311,400
Average.....	1910-14	6,600	26.82	177,000	59.23	1.06	188,000
All wheat.....	1914	12,500	29.52	369,000	59.74	1.23	453,000
	1915	16,000	32.80	525,000	59.32	0.94	493,900
Average.....	1910-14	12,300	28.46	350,000	59.46	1.05	367,000
Oats.....	1914	56,700	55.93	3,171,000	35.63	0.62	1,966,000
	1915	71,000	61.84	4,390,600	36.28	0.49	2,151,400
Average.....	1910-14	46,000	54.13	2,490,000	36.73	0.58	1,433,000

I. Area, Yield, Quality and Value of Principal Field Crops in Canada, 1914 and 1915.
continued.

Crops	Area	Yield per acre	Total Yield	Weight per meas- ured bush.	Aver- age price per bush.	Total Value
Canada—	acres	bush.	bush.	bush.	\$	\$
Barley.....1914	2,600	37.29	97,000	48.83	0.92	89,000
.....1915	2,650	40.36	106,900	49.89	0.64	68,400
Average.....1910-14	2,500	37.60	94,000	48.83	0.74	70,000
Peas.....1914	1,350	30.00	41,000	60.00	1.45	59,000
.....1915	1,300	29.75	38,700	60.00	1.24	48,000
Average.....1910-14	1,500	27.73	41,600	62.00	1.35	56,000
Mixed grains.....1914	2,400	56.67	136,000	48.00	1.03	140,000
.....1915	2,600	40.00	104,000	.....	0.50	52,000
Average.....1910-14	2,050	44.88	92,000	48.00	0.67	61,800
Potatoes.....1914	14,700	182.00	2,675,000	.....	0.78	2,087,000
.....1915	16,000	247.28	3,956,000	.....	0.45	1,780,000
Average.....1910-14	14,500	209.52	3,038,000	.....	0.64	1,948,000
Turnips, mangolds, etc.....1914	3,500	431.00	1,509,000	.....	0.53	800,000
.....1915	3,800	455.61	1,731,000	.....	0.39	675,000
Average.....1910-14	3,150	479.68	1,511,000	.....	0.53	805,000
Hay and clover.....1914	158,000	2.23	352,000	.....	15.54	5,470,000
.....1915	167,000	2.34	391,000	.....	14.57	5,697,000
Average.....1910-14	142,300	2.10	298,500	.....	17.15	5,120,000
Fodder corn.....1914	390	8.00	3,000	.....	6.00	18,000
.....1915	430	12.62	5,400	.....	4.00	22,000
Average.....1910-14	400	7.50	3,000	.....	8.33	25,000
Alfalfa.....1914	8,500	3.33	28,000	.....	13.60	381,000
.....1915	12,100	3.52	43,000	.....	14.84	638,000
Average.....1910-14	6,300	4.13	26,000	.....	15.39	400,000

**Timely
Subjects**

Of interest to Live Stock Breeders
and Farmers each week in

**Canadian
Farm**

FARM PRESS, LTD.,

181 SImcoe St.,

Toronto, Ontario.

II. Total Areas and Values of Field Crops in Canada, 1910-1915.

Provinces	AREAS.						Average for the 5 years 1910-1914
	1910	1911	1912	1913	1914	1915	
	acres	acres	acres	acres	acres	acres	acres
N.W. Prov.'s							
Wheat.....	7,867,894	9,991,281	10,011,000	10,036,000	9,335,000	11,744,700	9,448,000
Oats.....	3,880,604	4,861,563	5,365,000	5,792,000	5,353,000	6,290,000	5,050,000
Barley.....	667,072	886,225	960,000	1,025,000	936,000	962,000	895,000
Flax.....	572,185	868,936	2,012,000	1,545,000	1,078,000	801,000	1,215,000
Manitoba--							
Wheat.....	2,760,371	3,094,833	2,839,000	2,804,000	2,616,000	3,342,900	2,823,000
Oats.....	1,209,173	1,307,434	1,348,000	1,398,000	1,331,000	1,441,000	1,319,000
Barley.....	416,016	448,105	481,000	496,000	468,000	490,000	462,000
Flax.....	34,684	79,765	100,000	54,000	40,000	34,000	62,000
Saskatch'w'n							
Wheat.....	4,228,222	5,256,474	5,582,000	5,720,000	5,348,300	6,838,100	5,227,000
Oats.....	1,888,359	2,332,912	2,556,000	2,755,000	2,520,000	2,937,000	2,410,000
Barley.....	129,621	273,988	292,000	332,000	290,000	287,000	264,000
Flax.....	506,425	682,000	1,780,000	1,386,000	958,000	697,000	1,062,000
Alberta--							
Wheat.....	879,301	1,639,974	1,590,000	1,512,000	1,371,100	1,563,700	1,398,000
Oats.....	783,072	1,221,217	1,461,000	1,639,000	1,502,000	1,912,000	1,321,000
Barley.....	121,435	164,132	187,000	197,000	178,000	185,000	170,000
Flax.....	31,076	107,171	132,000	105,000	80,000	70,000	91,000

VALUES.

	\$	\$	\$	\$	\$	\$
Canada.....	396,635,240	597,926,000	557,344,100	552,771,500	638,580,300	797,669,500
P. E. Island.....	6,681,140	9,099,300	9,456,000	9,535,500	11,544,000	10,932,700
Nova Scotia.....	11,430,300	17,174,500	19,420,000	17,132,900	21,969,700	19,556,700
New Brunswick.....	12,140,500	17,695,200	17,295,700	17,965,100	20,045,100	20,096,400
Quebec.....	76,325,000	106,248,000	69,901,000	88,589,000	99,279,000	104,683,000
Ontario.....	149,607,000	195,764,000	198,715,000	167,835,000	196,220,000	207,043,500
Manitoba.....	42,800,000	76,548,000	71,647,000	64,557,000	65,528,400	119,447,000
Saskatchewan.....	74,755,300	115,426,000	115,813,000	129,376,000	152,751,500	224,875,300
Alberta.....	16,150,000	48,475,000	44,503,400	46,712,000	59,779,600	79,409,200
British Columbia.....	6,746,000	11,496,000	10,593,000	11,069,000	11,463,000	11,625,700

NOTE.—In 1914 the total areas estimated to be sown to field crops amounted to 35,102,175 acres; but the productive surface in the Northwest provinces was reduced by the following areas of crops which failed in consequence of the drought: Wheat 728,100 acres, oats 753,000 acres, barley 102,000 acres, flax 79,000 acres and sugar beets 2,000 acres in Alberta, and 1,400 acres in Ontario.

III. Comparative Areas and Yields of Wheat, Oats, Barley and Flaxseed in the Northwest Provinces, 1910-1915.

Provinces	AREAS.					
	1910	1911	1912	1913	1914	1915
	acres	acres	acres	acres	acres	acres
Canada.....	30,279,336	34,545,672	35,575,550	35,375,430	33,436,675	37,063,455
P. E. Island.....	476,671	477,035	462,880	456,970	461,510	481,985
Nova Scotia.....	709,788	709,703	700,160	711,630	693,860	727,260
New Brunswick.....	952,085	978,530	931,990	906,130	904,055	893,940
Quebec.....	5,242,593	5,375,066	5,010,400	4,898,800	4,863,850	4,901,760

Ontario.....	9,288,078	9,648,909	9,349,000	9,200,000	8,973,700	9,391,500
Manitoba.....	4,594,784	5,134,087	4,971,400	4,965,000	4,671,790	5,592,550
Saskatchewan.....	6,817,841	8,644,102	10,315,800	10,307,600	9,238,000	10,877,650
Alberta.....	1,999,963	3,351,745	3,603,060	3,690,100	3,369,270	3,966,930
British Columbia.....	197,533	226,495	230,860	238,700	260,640	292,880

	bush.	bush.	bush.	bush.	bush.	bush.	bush.
N.W. Prov's.							
Wheat.....	110,165,155	208,366,000	204,280,000	209,262,000	140,958,000	342,948,000	174,606,000
Oats.....	105,400,393	176,292,000	242,321,000	242,413,000	150,843,000	334,840,600	183,454,000
Barley.....	12,047,806	27,966,000	31,600,000	31,060,000	19,535,000	35,317,200	24,442,000
Flax.....	4,148,315	9,938,500	25,978,000	17,366,000	7,083,000	10,559,000	12,903,000
Manitoba—							
Wheat.....	34,125,949	62,689,000	63,017,000	53,331,000	38,605,000	96,425,000	50,354,000
Oats.....	30,378,379	60,037,000	57,154,000	56,759,000	31,951,000	69,471,000	47,256,000
Barley.....	6,506,634	14,949,000	15,826,000	14,305,000	9,828,000	17,763,000	12,283,000
Flax.....	176,675	1,152,000	1,252,000	632,000	338,000	374,000	710,000
Saskatchewan							
Wheat.....	66,978,996	109,075,000	106,960,000	121,559,000	73,494,000	195,168,000	95,613,000
Oats.....	58,922,791	107,594,000	117,537,000	114,112,000	61,816,000	157,628,600	91,996,000
Barley.....	3,061,007	8,661,000	9,595,000	10,421,000	4,901,000	10,570,200	7,328,000
Flax.....	3,893,160	7,672,500	23,033,000	15,579,000	6,131,000	9,061,000	11,262,000
Alberta—							
Wheat.....	9,060,210	36,602,000	34,303,000	34,372,000	28,859,000	51,355,000	28,639,000
Oats.....	16,099,223	59,034,000	67,630,000	71,542,000	57,076,000	107,741,000	54,276,000
Barley.....	2,480,165	4,356,000	5,179,000	6,334,000	4,806,000	6,984,000	4,831,000
Flax.....	78,480	1,114,000	1,693,000	1,555,000	614,000	1,124,000	931,000

IV. Area and Yield of Tobacco in Canada, 1913 to 1915.

Provinces	1913	1914	1915	1913	1914	1915	1913	1914	1915
	acres	acres	acres	lb.	lb.	lb.	lb.	lb.	lb.
Quebec.....	5,000	4,750	4,500	4,500,000	5,000,000	4,050,000	900	950	900
Ontario.....	6,000	5,000	4,500	8,000,000	6,000,000	4,950,000	1,300	1,200	1,100
Total.....	11,000	9,750	9,000	12,500,000	11,000,000	9,000,000	1,136	1,128	1,000

V. Numbers of Farm Live Stock in Canada, 1911 to 1915.

Live Stock	1911	1912	1913	1914	1915
	No.	No.	No.	No.	No.
Canada—					
Horses.....	2,595,912	2,692,357	2,866,008	2,947,738	2,996,099
Milch cows.....	2,594,179	2,604,488	2,740,434	2,673,286	2,666,846
Other cattle.....	3,939,257	3,827,373	3,915,687	3,363,531	3,399,155
Sheep.....	2,175,302	2,082,381	2,128,531	2,058,045	2,038,662
Swine.....	3,610,428	3,477,310	3,448,326	3,434,261	3,111,900
Prince Edward Island—					
Horses.....	35,935	35,638	35,952	36,114	36,898
Milch cows.....	52,109	49,415	48,565	47,317	47,043
Other cattle.....	68,287	64,688	64,261	61,048	59,503
Sheep.....	91,232	87,793	85,660	85,351	86,640
Swine.....	56,377	50,463	43,762	41,718	40,792
Nova Scotia—					
Horses.....	61,355	61,735	62,550	62,581	63,244

Milch cows.....	129,302	130,104	130,468	128,237	128,814
Other cattle.....	158,122	156,051	153,726	148,269	144,458
Sheep.....	220,907	216,135	217,734	211,921	205,542
Swine.....	63,322	61,194	56,580	53,892	53,402
New Brunswick—					
Horses.....	65,458	65,582	65,108	65,702	65,827
Milch cows.....	108,532	110,507	106,904	102,713	101,665
Other cattle.....	113,659	113,136	107,864	99,256	96,437
Sheep.....	158,216	148,723	135,115	211,739	111,026
Swine.....	87,391	85,905	77,014	73,325	72,533
Quebec—					
Horses.....	369,237	367,402	369,974	372,009	372,567
Milch cows.....	753,134	755,770	761,816	733,476	720,420
Other cattle.....	697,860	695,906	693,540	625,958	612,500
Sheep.....	637,062	620,881	602,751	571,287	554,491
Swine.....	793,348	747,254	661,768	634,569	632,729
Ontario—					
Horses.....	811,585	805,271	902,628	904,975	903,527
Milch cows.....	1,032,979	1,033,392	1,141,071	1,085,843	1,077,808
Other cattle.....	1,471,694	1,380,890	1,460,015	970,445	935,606
Sheep.....	743,483	677,462	705,848	640,416	611,789
Swine.....	1,864,165	1,693,594	1,652,440	1,553,624	1,469,573
Manitoba—					
Horses.....	280,374	293,776	304,088	316,707	317,847
Milch cows.....	155,337	148,471	152,792	156,306	157,494
Other cattle.....	279,776	267,130	256,926	251,996	246,603
Sheep.....	37,322	40,800	42,840	45,303	50,880
Swine.....	188,416	183,370	184,745	186,276	163,308
Saskatchewan—					
Horses.....	507,400	551,645	580,386	609,521	630,062
Milch cows.....	181,146	184,896	194,843	204,624	211,684
Other cattle.....	452,466	461,244	468,255	474,436	543,609
Sheep.....	114,216	114,810	115,568	126,027	133,311
Swine.....	286,295	344,298	386,784	454,703	411,324
Alberta—					
Horses.....	407,153	451,573	484,809	519,424	544,772
Milch cows.....	147,687	157,922	168,376	179,068	183,974
Other cattle.....	592,163	587,307	610,917	633,032	660,000
Sheep.....	133,592	135,075	178,015	211,001	238,579
Swine.....	237,510	278,747	350,692	397,123	229,696
British Columbia—					
Horses.....	57,415	59,735	60,518	60,705	61,355
Milch cows.....	33,953	34,011	35,599	35,702	37,944
Other cattle.....	105,230	101,021	100,183	99,091	100,439
Sheep.....	39,272	40,702	45,000	45,000	46,404
Swine.....	33,604	32,485	34,541	39,031	38,543

NOTE.—The numbers of live stock in 1911 are the actual returns of the Census of that year. The numbers for the years 1912 to 1915 are estimates based upon the Census of 1911 and compiled from the reports of correspondents.

Meadowbrook Farm Jerseys

Whitby, Ont.

THE HOME OF HIGH-CLASS IMPORTED AND CANADIAN
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—ADDRESS ALL CORRESPONDENCE TO—

R. J. Fleming

MEADOWBROOK FARM, WHITBY, ONTARIO

WHO'S WHO IN AGRICULTURE!

- ALEXANDER, J. Lee**, Hillhurst, Ont. Born Coaticook, Que., Aug., 1871. Son of Jason and Elizabeth (Hill) Alexander. Married Blanche E. Edwards. Director C.G.E. Exhibition, Sherbrooke, Que.; Councillor Tp. of Compton. Formerly partner of firm of Edwards & Alexander. Now farming under name of Edwards and Alexander. 300 acres of land and over 100 head of Jersey cattle.
- AGAR, Amos**, Nashville, Ont. Born Township Vaughan, Ont., August, 1856. Son of Richard and Jane Agar. Married Alice Dalziel. Farmer, specializing in Clydesdale, Shire and Carriage Horses. Thirty-five years in business.
- AMOS, George**, Moffatt, Ont. Born Waterloo Co., Ont., 1860. Son of Robert and Mrs. Amos. Married Ellen Adams. Member Dominion Shorthorn Breeders' Ass'n. For 19 years a member of firm of Geo. Amos & Sons, Shorthorn breeders.
- AMOS, Robert T.**, Moffatt, Ont. Born Waterloo Co., April, 1885. Son of Geo. and Mrs. Amos. Married Margaret MacKenzie. Director Dominion Shorthorn Breeders' Ass'n. Member of firm of G. Amos & Sons, Shorthorn breeders of 19 years standing.
- ARKELL, Reginald T.**, Live Stock Branch, Department of Agriculture, Ottawa, Ont. Born Arkell, Ont., March, 1888. Son of Henry and Jessie Arkell. Married Mabel H. Mehaffy, graduate Ontario Agricultural College. Chief of Sheep and Goat Division, Dominion Live Stock Branch, Ottawa. Formerly Professor Animal Husbandry, New Hampshire Agricultural College, U.S.A.
- BAGG, Alfred E.**, Edgeley P.O., Ont. Born Grahamsville, Ont., July, 1888. Son of James and Mrs. Bagg. Married Flossie Locke. Breeder of pedigreed Jersey cattle and registered Yorkshire hogs.
- BAILEY, Charles Frederick**, Parliament Buildings, Toronto, Ont. Born Nova Scotia Sept. 17, 1880. Son of Mrs. Peter Innes, Coldbrook, N.S. Married Louise D. Hogg, graduate Ontario Agricultural College in 1903. Former Live Stock Specialist, Ontario Department of Agriculture. Appointed Assistant Deputy Minister of Agriculture for Ontario in 1913.
- BAIN, C. E.**, Taunton, Ont. Born April, 1880. Son of William and Mrs. Bain. Married Myrtle Milson. Farming; specializing in Shorthorn cattle, Shropshire sheep and Berkshire swine. Twelve years in business.
- BALL, R. J.**, Hanover, Ont. Born Grey Co., Ont., Jan., 1857. Son of James and Jane Ball. Married Mary Jane Leonard. Member of Dominion Parliament. Farming until year 1885.
- BALLANTYNE, W. W.**, Stratford, Ont. Born Downie Tp., Perth Co., Ont., July, 1861. Son of Hon. Thomas and Mary Ballantyne. Married Elizabeth Moderwell. Ex.-Pres. of Perth Farmers' Institute; North Perth Agricultural Ex-Society; Canadian Ayrshire Breeders' Ass'n. Now President and a Director of Executive of Guelph Winter Fair. Vice Pres. Dominion Cattle Breeders' Assn. Director Canadian National Exhibition. Director Live Stock Breeders' Assn.
- BAYNTON, E. E.**, Bigstick Lake, Saskatchewan. Son of William Baynton and Alice Roe. Specialist in Shropshire and Leicester sheep, Berkshire hogs, Leghorn poultry, etc. Twelve years in business. Vice-President Saskatchewan Sheep Breeders' Assn. Crop Correspondent, Department of Agriculture, Ottawa, Ont.
- BARBER, Howard**, Gatineau Pt., Que. Born West Templeton, 1878. Son of C. W. and Mrs. Barber. Unmarried. Director County Agricultural Society. Breeder of Clydesdale horses for past twenty years. Judge of horses at various fairs.
- BARR, George H.**, Dairy Division, Ottawa, Ont. Born Perth Co., July, 1864. Son of John and Mrs. Barr. Married Mary Hamilton. Chief of Dairy Division, Ottawa. Chief Dairy Instructor for Western Ontario.
- BEDFORD, Spencer**, Argyle. Parliament Buildings, Winnipeg. Born Sussex, England, 1851. Son of Jacob and Elizabeth Bedford. Married Minnie Bolton. Came to Canada in 1863. Farmed in Western Canada. Inspector, Canada N. W. Land Co., Scottish Ontario and N. British Co.'s. In 1888, Superintendent Experimental Farm, Brandon. Professor, Field Husbandry, Manitoba Agricultural College 1902-1912. Deputy Minister of Agriculture and Immigration, 1912-1915. At present Weed Commissioner and Superintendent Demonstration Farms for Manitoba.
- BINNIE, Thomas H.**, Priceville, Ont. Born Priceville, 1884. Son of Geo. Binnie and Sarah Snell. Unmarried. Specializing in Holstein cattle. Secretary-Treasurer, Grey County Cattle Breeders' Club and Grey County Board of Agriculture. Graduated from O. A. C., 1907. Two years in agricultural journalism.
- BLACK, D. Allan**, Kingston, Ont. Born Fergus, Ont., Dec., 1865. Married Miss Ferguson. Farming for 12 years. Holstein cattle and Shropshire sheep. Practicing dentistry in Kingston.
- BLACK, William John**, Ottawa, Ont. Born Mansfield, Dufferin Co., Ont., Nov., 1872. Organized Manitoba Agricultural College. President of same, 1906-1916. Deputy Minister of Agriculture, Manitoba, 1904. Appointed Secretary Agricultural Commission, 1916.
- BOAG, John A.**, Queensville, Ont. Born East Gwillimbury. President Clydesdale Assn. of Canada. Breeder and importer of Clydesdale and Hackney horses for 30 years. Senior member, John A. Boag & Son, Queensville.
- BOWMAN, James A.**, Guelph, Ont. Born Grey County, April, 1863. Son of William and Elizabeth Bowman. Married Mary J. Simpson. Vice-President Canadian Aberdeen-Angus Assn. Trustee, Macdonald Consolidated School, Guelph. Twenty-five years a breeder and exhibitor of purebred stock, exhibiting from Halifax to Edmonton, Aberdeen-Angus cattle, Shropshire sheep.

- BOWSFIELD, James, MacGregor,** Manitoba. Born Milton, Ont., 1856. Son of George and Mary Bowsfield. Married Amelia J. Plumber. Farming. Short-horn cattle, Clydesdale horses and Yorkshire swine. Director Agricultural Society, MacGregor.
- BRETHEN, G. A.,** Norwood, Ont. Born Norwood, Aug., 1877. Son of W. H. and Elizabeth Brethen. Married Bertha Knox. Director, Holstein Friesian Ass'n. Nine years a breeder of Holstein Friesian cattle. Has developed some high producing females. One a 29,000 lb. cow.
- BROCK, R. B.,** R. R. 5, Simcoe, Ont. Born Jarvis, Ont., 1858. Son of John Brock and Elizabeth Foster. Married Mary Louisa O'Mahony. Breeder of Registered Holsteins. Pathmaster, School Trustee. Held positions as President, Vice-President and Secretary of farmers and fraternal organizations. Eleven years as a breeder of Holsteins.
- BROWNE, James, Neudorf,** Saskatchewan. Born Garlochhead, May, 1865. Son of Ruben Bennet Browne, France. Specializing in Aberdeen-Angus cattle. Director, Canadian Aberdeen-Angus Association. Director, Saskatchewan Sheep Breeders' Association. Twenty-four years a farmer.
- BUCK, F. E.,** Central Experimental Farm, Ottawa, Ont. Graduate, Macdonald College, Que., 1911. Associate of Cornell University, N. Y. Appointed Assistant in Ornamental Gardening, Horticultural Division, Central Experimental Farm, Ottawa, 1911.
- BULL, Bartley A.,** Brampton, Ont. Born Brampton, May, 1886. Son of late B. H. and Mrs. Bull. Unmarried. Secretary, Canadian Jersey Cattle Club. Member firm of B. H. Bull & Sons, breeders and importers of Jersey cattle. Member Canadian National Exhibition. Graduate in Arts, U. of T., 1906. Farm of 500 acres with over 400 head of Jerseys.
- BULL, Duncan O.,** Brampton, Ont. Born Brampton, Jan, 1878. Son of the late B. H. Bull and Sarah Duncan Bull. Married Eleanor Lazier. Ten years Vice-President, Canadian Jersey Cattle Club. Director, American J. C. C. for 3 years. Member of the firm of B. H. Bull & Sons, owners of the largest Jersey herd in British Empire. Justice of the Peace.
- BULL, Louis J. C.,** Brampton, Ont. Born Downsview, Ont., Dec., 1874. Son of B. H. Bull and Sarah Duncan. Married Jessie Baskerville. Specialist in Clydesdale horses and Jersey cattle. Eighteen years in business. Reeve of Brampton, 1915. Vice-President, Ontario Fairs Association.
- BURRELL, Hon. Martin, Dominion Minister of Agriculture,** Ottawa, Ont. Born Faringdon, Berks, Eng., Oct., 1858. Son of Edward and Jane (Larmer) Burrell. Married Sara B. Armstrong. Came to Canada, 1883. Fruit farming, Niagara Peninsula. Fourteen years connected with Farmers' Institute. Writer and lecturer on horticultural subjects. Moved to B. C., 1900. Fruit farming, Kettle Valley, B. C. Fruit Commissioner and Lecturer in England for B. C. Government, 1907-1908.
- Member of Board of Horticulture, B.C. Elected to House of Commons for Yale-Cariboo, 1908; re-elected, 1911. Called to Borden Cabinet as Minister of Agriculture and re-elected by acclamation, 1911. Mayor, Grand Forks, 1903.
- BYRNES, John,** Dept. Trade and Commerce, Ottawa, Ont. Born Ottawa, 1859. In Government service 33 years. Now chief of Inspection Branch and Grain Statistician. In charge of grain branch since 1901.
- CAESAR, Lawson, O. A. C.,** Guelph. Born Mono Rd., Ont., Feb., 1870. Son of John and Jane Caesar. Married Mary E. Manson. Formerly Classical Master, Port Hope High School. Now Provincial Entomologist for Ontario and Associate Professor of Entomology, O. A. C., Guelph.
- CARON, Hon. Joseph Edouard, Minister of Agriculture,** Province of Quebec, Parliament Buildings, Que. Born St. Louise, Que., Jan., 1886. Son of Edouard and Deranges (Cloutier) Caron. Married Matilda Destrois-Maisons, 1897. Educated St. Annes College. Farming in Ste. Louise. Elected Provincial Legislature for L'Islet, 1902-4-8. Defeated 1913. Elected to Provincial Legislature for Les Isles d la M., 1913. Appointed Provincial Minister of Agriculture, Nov., 1909.
- CARVELL, F. B.,** Woodstock, N. B. Born Woodstock, N. B., Aug., 1863. Son of Bishop Carvell and Margaret Lindsay. Married Carrie B. Parks. Extensive hay farming.
- CHRISTIE, Peter,** Manchester Ont. Breeder of Clydesdale horses and Short-horn cattle. Ex-member of the Dominion Parliament for South Ontario. Ex-President Clydesdale Horse Association of Canada. At present Vice-President for Ontario and member of the Executive Committee of that Association. Director Guelph Winter Fair.
- CLARK, J. Artemas, Experimental Station,** Charlottetown, P. E. I. Born Bay View, Aug., 1878. Son of John C. and Annie M. (Simpson) Clark. Married W. Allison Toole, of Tooleton, N. S., March 30th, 1910. Assistant on Seed Commission Staff, 1908. Superintendent, Experimental Station, Charlottetown, since organization in 1909. Graduate, Ontario Agricultural Col., 1906. Graduate, School of Agriculture, Cornell University, 1908. Sixteen years actively engaged in agriculture.
- CREELMAN, Geo. Christie, President,** Ont. Agricultural College, Guelph. Born Collingwood, Ont., May, 1867. Son of J. S. and Isabel (Patterson) Creelman. Married Ada Mills, daughter of Dr. James Mills, M.A., LL.D., 1892. Graduate, Toronto University (B.S.A.), 1888; Cornell, Wisconsin; Michigan Agricultural College; Mississippi Agricultural College; McGill University (LL.D.), 1910. Prof. Biology Mississippi A. C., 1889-1892. Supt. Farmers' Institutes, Ont., 1897-1904. Elected President, American Ass'n. Farmers' Institutes, 1904. Appointed President, Ont. Agri. Coll., 1904. Chairman, Board of Control Fruit Exp. Stat.'s for Ontario.

- CUMMING, Melville**, Truro, Nova Scotia. Born Stellarton, N. S., January, 1876. Son of Dr. T. and Mrs. M. Cumming. Married Alice Archibald. Secretary for Agriculture for Nova Scotia. Principal, College of Agriculture, Truro, N. S.
- DAGGETT, J. B., Frederickton, N. B.** Born New Brunswick, May, 1869. Son of Edmund and Susan Daggett. Married Lizzie J. Merrithew. Secretary for Agriculture, New Brunswick. For 7 years breeder of Ayrshire and Holstein cattle, Clydesdale horses, Oxford sheep and Yorkshire pigs.
- DAY, William H., O. A. C., Guelph, Ont.** Born Tp. of Fenelon, Sept., 1871. Son of Nathan and Polly Ann Day. Married Ethel E. Williams. Honor Mathematics and Physics, University, Toronto, and Gold Medalist in Physics. Demonstrator in Physics, O. A. C., 1903. Lecturer, ditto, 1904. Professor of Physics, 1906. In charge of Drainage Educational Work in Ontario. Lightning Rod Investigator.
- DEAN, Henry H., O. A. C., Guelph, Ont.** Born Waterloo Co., Ont., Nov. 1865. Son of Walter Dean (obit.) and Theresa Hahnel. Married Almada Ansley, Guelph. Appointed Professor, Dairy Husbandry, O. A. C., 1891. For eighteen years in charge of Dairy Herd at O. A. C. Owner of Dairy and Fruit Farm, Grimsby, Ont. Holstein-Friesian cattle.
- DE COURCY, Daniel, Mitchell, Ont.** Born Doon Mills, Ont., April, 1853. Son of P. D. De Courcy. Married Julie Keyes. Director, Dominion Swine Breeders' Ass'n. Past President, ditto. Twenty-eight years farming. Clydesdale horses and Chester White swine.
- DICKSON, Hugh A., Central Onslow, Nova Scotia.** Born August 25th, 1835. Son of Eli Dickson and Hannah Archibald. Married Clara J. Hill. Specialist in Guernsey cattle and Yorkshire swine. Vice-President, Canadian Guernsey Breeders' Association. In business of farming since 1901.
- DOHERTY, T. K., Dept. of Agriculture, Ottawa.** Born Sherbrooke, Que, 1858. Son of W. M. Doherty. Married Ada Richard. Bachelor of Laws. Commissioner for Canada of the International Institute of Agriculture. Delegate for Canada at the 1911 and 1913 meetings of General Assembly. Source of foreign information in the Bulletin of Foreign Agricultural Intelligence.
- DRYDEN, William A., Maple Farm, Brooklin, Ont.** Born Brooklin. Son of the late Hon. John Dryden. Specialist in Shorthorn cattle and Shropshire sheep.
- DUFF, Hon. Jas. Stoddart, Parliament Buildings, Toronto.** Born Cookstown, Ont., June, 1856. Son of John and Eliza Jane (Stodders) Duff. Farmer. Elected Ontario Legislature for Simcoe West, 1898; re-elected, 1902, 1905, 1908, 1911. Appointed Minister of Agriculture, Whitney Government, 1908. Councillor, Township Essa, Ont., since 1888. Deputy Reeve. Married Jane Bell Stoddart.
- EADIE, J. D., Vars, Ont.** Born Russell, Ont., Nov., 1862. Son of William and Sarah Eadie. Married Jennie Paul. Specializing in Clydesdale horses and Ayrshire cattle. Farming since 1881. Director, Township and County Fair.
- ELFORD, Frederick Charles, Experimental Farm, Ottawa.** Born Waterloo County, Ont., 1871. Son of J. H. and Mary Elford. At present Dominion Poultry Husbandman and Chief of Poultry Division, Ottawa Dept. of Agriculture. Formerly manager and Lecturer, Poultry Dept., Macdonald College, Quebec. Farming in Huron County, Ontario, up to 1903.
- ELLIOTT, T. D., Bolton, Ont.** Born Bolton, Aug., 1856. Married Helen H. Evans. Importer and breeder of Percherons and Clydesdales since 1904. Director, Canadian Clydesdale Horse Ass'n.
- ELLISON, Hon. Price, Minister of Finance and Agriculture for British Columbia.** Born England, March, 1862. Went to B. C., 1876. Farmer and rancher, Okanagan District, 11,000 acres of land. For three years the largest grower of wheat in B. C. First to urge importance of irrigation. Elected to B. C. Legislature for Yale, 1898-1900-1903-1909. Appointed Commissioner of Lands, Oct., 1909. Minister of Finance and Agriculture since 1910. Address, Victoria, B. C.
- FAREWELL, A. A., Oshawa, Ont.** Born Oshawa, Sept., 1855. Son of Charles and Mary (McGill) Farewell. Married Mary Caroline Fowke. Farming for past ten years. Specializing in Holstein-Friesian cattle and Rhode Island Red fowl.
- GALBRAITH, Alexander, Parliament Buildings, Edmonton, Alta.** Born Scotland, May, 1853. Married Christina MacNicol. President, American Clydesdale Ass'n. Ex-Pres., American Horse Ass'n. For 33 years a breeder and importer of Clydesdales, Shires, Percherons. Appointed Superintendent Fairs and Institutes for Alberta, 1915.
- GANDIER, Stace Harvey, O. A. C., Guelph, Ont.** Born Toronto, Ont., 1886. Son of Rev. Jabez and Mrs. Gandier, Pelee Island. Graduate Ontario Agricultural College. Number of years teaching public school in Ontario, also Instructor in Agriculture. Appointed Secretary to President, O. A. C., in 1911.
- GIBSON, Alfred Leonard, Department of Chemistry, O. A. C., Guelph, Ont.** Born Manchester, England, Jan., 1887. Lecturer in Agricultural Chemistry and Specialist in Soils and Fertilizers at O. A. C., Guelph. Degrees B.S.A., N. D.A., N.D.D.
- GIBSON, J. T., Denfield, Ont.** Born England, 1841. Married Jennie Robson. Ex-President, Ontario Sheep Breeders' Ass'n. Sixty years in business of farming. Shorthorn cattle and Lincoln sheep.
- GIRARD, Joseph, St. Gideon, Chicoutimi.** Born St. Nobain, August, 1854. Son of Cotone Girard and Marie Tremblay. Married Emma Cote, M. P.P. for Chicoutimi, 1900. M.P., 1911-1916. Farming. Specializing in French-Canadian cattle. Former President, Quebec Dairy Society. President, School Commission for 20 years. President, Agricultural Society, Lake St. John, for 24 years. President, Cheese Board, 20 years.

- GOODERHAM, Gordon S.**, Clarkson, Ont. Born Toronto, Nov., 1884. Son of Mr. and Mrs. W. G. Gooderham, Toronto. Farming 360 acres. Holstein-Friesian cattle, White Leghorn fowl. Orcharding and small fruits. Farming since 1906.
- GORMLEY, A. G.**, Unionville, Ont., Breeder of Clydesdale horses. Ex-Director and ex-member of Executive Committee, Clydesdale Horse Ass'n. of Canada.
- GRISDALE, J. H.**, Central Experimental Farm, Ottawa, Ont. Born St. Marthe, Que., Feb. 18th, 1870. Son of A. B. Grisdale and Elizabeth Simpson. Gold Medallist, O. A. C., Guelph, 1898. Winner at 1st students' judging contest, Nebraska, 1898. Agriculturist, Central Experimental Farm, 1899-1909. Dominion Agriculturist, 1909-1911. Director of Dominion Experimental Farms since 1911, also Director, Eastern Ontario Fat Stock and Dairy Show.
- HALLMAN, A. C.**, Breslau, Ont. Born New Dundee, Ont., Oct., 1858. Son of John S. Hallman. Married Orenda Ann Baldwin. Ex.-Pres., Holstein Ass'n. of Canada. Twenty years Farmers' Institute Staff of Ontario. Reeve Waterloo Township. Specializing in Holstein Friesian cattle, Tamworth swine and Barred Rock poultry. Thirty years in farming industry.
- HARDING, Wm. S.**, Hammond River, N.B. Born Welsford, N. B., Feby., 1876. Son of Wm. S. Harding, Sr. Married May R. Armstrong. Director, Maritime Stock Breeders' Ass'n. Breeder of Holstein cattle and Yorkshire swine.
- HARRISON, Major Francis Charles**, St. Barbe, Macdonald College, Que. Born 1871, Birmingham, Eng. Son of F. Sladen Harrison, late H. M.'s 4th Regt. Graduate, Toronto University (B.S.A.), 1892; Berne University; Wisconsin University, Michigan University; Cambridge University; Copenhagen University, and McGill University, B.Sc., 1907; M.Sc., 1907; D.Sc., 1908; Prof. Biology, O. A. C., Guelph, 1893-7; Bact. do, 1898-1905. Since then, Prof. Bacteriology, Macdonald College, St. Annas, Que. Principal since 1911. Married Margaret Rosalind Mills, second daughter of Dr. Jas. Mills.
- HENDRIE, William**, Hamilton, Ont. Born Hamilton, Ont., 1863. Son of William and Margaret (Walker) Hendrie. Married Elizabeth Brown. President, Thoroughbred Horse Society of Canada. President, Hendrie & Co., agents for G. T. Ry. of Canada.
- HUBBARD, William Woodbridge**, Dominion Experimental Station, Fredericton, New Brunswick. Born Burton, N. B., August 4th, 1866. Son of F. A. and S. H. Hubbard. Married Anna L. Gregory. Superintendent, Experimental Station, Fredericton, N.B.
- JAMES, Charles C.**, 144 St. George St., Toronto. Born Napanee, Ont., June 1863. Professor of Chemistry, O. A. C., Guelph, 1886-1891. Deputy Minister of Agriculture for Ontario, 1891-1912. Appointed Agricultural Commissioner for Canada in 1912.
- JOHNSON, A. A.**, Straffordville, Ont. Born Straffordville, Oct. 21st, 1882. Son of L. Johnson and V. E. Stratton. Married M. E. Maguire. Farmer. Specializing in Holstein Friesian Cattle. Ten years in business.
- JONES, Daniel H.**, Guelph, Ont. Born Worcestershire, Eng., 1865. Son of Joseph Jones and Mary Ann Jones. Married Helen Grace Carlyle. Graduate of Ontario Agricultural College. Professor of Bacteriology, Ontario Agricultural College, Guelph.
- KAY, William F.**, Phillipsburg, Que. Born Montreal, 1876. Member of Federal Parliament. Breeder of Clydesdale horses and Ayrshire cattle for 15 years. Proprietor Ravensdale Stock Farm, Phillipsburg, Que.
- KEITH, William**, Listowel, Ont. Born Aberdeenshire, Scotland, 1841. Married Jane McGeorge. For 20 years prominently connected with the cheese industry of Western Ontario as a sales-manager. Now farming. Specializing in Shorthorn cattle and Tamworth swine.
- KELLY, Robert J.**, Culloden, Ont. Born Oneida, Ontario, March 20th, 1871. Son of Jesse and Mary Kelly, Hagersville, Ont. Married Jennie B. Lindsay, of Hagersville. Breeder of Holstein-Friesian cattle and Barred Plymouth Rock poultry for past 12 years. President, Tillsonburg and Dereham Agricultural Society. Secretary, Southern Ontario Consignment Sales Co. People's Warden of St. Stephen's Church, Culloden, Ont.
- LEUSZLER, Jacob**, Bright, Ont. Born Ontario, 1864. Married Hannah Gabel. Councillor. Member of Board, Oxford Holstein Breeders' Club. Specialist in purebred Holsteins and Yorkshire hogs. In business all life.
- LIPSIT, Louis H.**, Straffordville, Ont. Born Straffordville, Feb. 24th, 1879. Son of William and Susan Lipsit. Married Olive G. Williamson. Breeder of purebred Holstein cattle for the last ten years. Prominent in Canadian Exhibition Showings as an exhibitor of Holstein-Friesian cattle.
- LOCHHEAD, William**, B.S.A., M.S.C., Macdonald College, St. Anne De Belleville, Quebec. Born Listowel, Ont., 1864. Son of William L. and Helen Campbell. Married Lillas Grant. Professor Biology, Ontario Agricultural College, 1898-1906. Professor Biology, Macdonald College, Que., since 1906. President Quebec Society Protection of Plants. President Quebec Pomological Society. Editor Journal of Agriculture, Quebec. Ex.-President Ontario Entomological Society.
- MARSHALL, Hon. Duncan McLean**, Minister of Agriculture for Province of Alberta, Edmonton, Alta. Born Bruce Co., Ont., Sept., 1872. Son of John and Margaret (McMurchy) Marshall. Spent twenty years on home farm. Taught school, 1890-1894. One of organizers of Patrons of Industry, Ont., 1897-1898. Moved to Alberta, 1905. Editor, Manager Daily Bulletin, Edmonton. Owns and operates large farm. Olds District. Elected to Alberta Legislature for Olds, 1909. Received present appointment, Rutherford Administration, 1909; reappointed, 1910. Established Alberta Provincial Schools of Agriculture, 1913. Closely identified with journalism as editor and owner of various newspapers since 1900. Married Christina MacIsaac of P. E. I., 1899. Two sons.

- MASON, Wallace H.**, Simcoe, Ont. Born Townsend, Ont., June, 1884. Son of Walter E. and Sarah Mason. Married Rosamond M. Mott. President Norfolk Holstein Breeders' Club. Breeder Holstein cattle.
- McCREADY, S. B.**, Prince of Wales College, Charlottetown, P. E. I. Born Harriston, Ontario. Son of Alexander McCreedy, Harriston, Ont. Science Master, London Collegiate Institute, 1898-1905. Prof. of Nature Study, Macdonald Institute, Guelph, Ont., 1905-1911. Acting head Botanical Dept., O. A. C., 1908-1911. Director Schools Division, Exp. Union, 1909-1915. Director of Elementary Agricultural Education for Ontario, 1911-1915. Appointed Head of Rural Science Dept., Prince of Wales College, Charlottetown, P. E. I., in 1915.
- McDIARMID, H. S.**, Fingal, Ont. Born Fingal, February 15th, 1883. Son of John and Mrs. McDiarmid. Breeder of Holstein cattle and Yorkshire swine. Twelve years in business. President Shelden Farmers' Club.
- McEACHRAN, Duncan**, Ormsby Grange Stock Farm, Ormsdown, P. Q. Born Campbelltown, Argyllshire, Scotland, Oct., 1841. Son of David McEachran and Jennie Blackney. Married Esther Plasket, St. Croix, W. I. Originator of Cattle Quarantine and Chief Inspector for the Dominion for twenty-seven years. Vice-President Cochrane Ranch. President and General Manager New Woolrand Ranch, Alberta. Dean and Professor Faculty of Comparative Medicine, McGill University. Proprietor Ormsby Grange Stock Farm, specializing in the best blood of Clydesdale horse breed.
- McEWEN, P. J.**, Wyoming, Ont. Born Carleton Place, Ont., June, 1876. Son of James McEwen and Christina Scott. Farming: Specializing in Berkshire swine. President Ontario Berkshire Breeders' Association. Twenty-one years farming.
- McGREGOR, James D.**, Brandon, Manitoba. Born Amherstburg, Ont. President Brandon Winter Fair. Director Brandon Summer Fair, etc. Farming for past 20 years. Noted as a breeder of Aberdeen-Angus cattle, Suffolk Down sheep, Berkshire and Poland China Hogs.
- McGUGAN, A. D.**, Rodney, Ont. Born Elgin County, Ont., July, 1862. Son of D. McGugan and Jane McKay. Married Bessie Todd. Farming: Specializing in Hackney horses and Holstein-Friesian cattle. In business 35 years.
- McKEE, John**, Norval, Oxford Co., Ont. Born Norwich, July, 1864. Son of Hugh and Annie McKee. Married Annie M. Hepburn. Breeder of Ayrshire cattle. Herd established in 1872 by Hugh McKee. Secretary-Treasurer Southern Counties Ayrshire Club. Director Canadian Ayrshire Breeders' Association. Secretary-Treasurer North Norwich Agricultural Society. Auditor North Norwich Township and for Otter Mutual Fire Insurance Co.
- McKENZIE, John**, Willowdale, Ont. Born Oak Ridges, Ont., April, 1869. Breeder of Tamworth swine and Holstein cattle.
- McKILLOP, John A.**, West Lorne, Ont. Born Elgin Co., Oct., 1861. Son of Arch. and Mary (McKellar) McKillop. Married Sarah J. Ferguson. Director Elgin Winter Fair and County Farmers' Institute. Ex.-Prof. Kentucky University. Manager Agr. Dept. of A. McKillop & Sons, Ltd., and Secy. of same, breeders of light horses and Shorthorn cattle for 25 years.
- McKINNON, Alexander**, Hillsburg, Ont. Born Erin Tp., Ont., 1855. Son of Neil and Margaret (McMillan) McKinnon. Reeve of Erin Tp. Warden Wellington Co., 1906. Farming 25 years. Aberdeen-Angus cattle.
- McKINNON, Hon. Murdock**, Montague, P. E. I. Born Brooklin, Kings Co. Farmer. Elected to Prince Edward Island Legislature for King's 4th District, 1897; re-elected general election, 1900-4-8-12. Since Dec. 5, 1911, Provincial Secretary-Treasurer and Commissioner of Agriculture for P. E. I.
- McKIRDY, William**, Napinka, Manitoba. Born Ayrshire, Scotland, May, 1864. Director Manitoba Horse Breeders' Ass'n. Director Brandon Summer Fair. Twenty-seven years in farming industry. Shorthorn cattle and Clydesdale horses. Member of firm of McKirdy Bros.
- McMILLAN, D. Dutton**, Ont. Born Scotland, 1844. Son of Donald and Janet (Greenlees) McMillan. Married Annie Goldie. Breeder of Shorthorns and Clydesdales for 30 years. Lincoln sheep and Berkshire hogs for over 10 years.
- MacNUTT, Hon. Thos.**, Saltcoats, Sask. Born Campbellton, N. B., Aug., 1850. Son of C. S. and Emily A. (Sims) MacNutt. Married Margaret McFayden. Farming in Western Canada for 40 years. Pres. Agr. Socy. Director several local institutions. Former speaker Saskatchewan Legislature. Holstein cattle.
- McPHEE, D. A.**, Vankleek Hill, Ont. Born Crystal Spring Farm, Vankleek Hill, 1878. Son of Daniel McPhee. Fifteen years farming. Specialist in Holstein-Friesian cattle and Oxford Down sheep. Herd of 80 head of Holsteins.
- MONDON, A. A.**, Montreal, Que. Born St. Francois Du Lac, Feb., 1872. Son of E. and Georgina (Desmanais) Mondon. Married Augustine Cardins. Member of Parliament, Ottawa. Gen. Mgr. The Quebec and Western Canada Land Syndicate, Ltd. Specializing in Shorthorn cattle 6 years.
- MONTEITH, Nelson**, Stratford, Ont. Born Downie Tp., Ont., Nov., 1862. Son of Samuel and Annie Jane (Nelson) Monteith. Married Ida May Lupton. Ex-M.P.P. Ex-Minister of Agriculture for Ontario. Past President Ontario Experimental Union. Stratford Agricultural Society. Farmers' Institute. School Trustee, Tp. Coun., Reeve and Warden. Graduate O. A. C. Now farming. Thirty-two years in business. Clydesdales, Shorthorns and Leicesters.
- MONTGOMERY, G. H.**, K. C., Dominion Express Building, Montreal. Born Phillipsburgh, 1874. Proprietor of Lakeside Stock Farm, Phillipsburgh, Que. Specializing in Ayrshire cattle.

- MORRIS, James, M.P.**, Aubrey, Que. Son of Patrick Morris and Ann McRae. Unmarried. Farmer and stonemason. Mayor of St. Jean Chrysostome for 2 years. Director Chateaugay Agricultural Society. Candidate general election, 1911. Elected in bye-election, 1913. Specialist in Live stock. Farming 30 years.
- MORRISON, John A.**, Mount Elgin, Ont. Born Oxford County. Son of Douglas and Lavinia Morrison. Breeder of Ayrshire cattle. High standing in R. O. P. for Ayrshires. Director Southern Ayrshire Breeders' Club of Ontario. Formerly Township Councillor and Reeve.
- MOTHERWELL, Hon. W. R.**, Minister of Agriculture, Province of Saskatchewan. Born Perth, Ont., Jan., 1860. Son of John and Eliza Motherwell. Married Miss A. Rogers, New Boyne, Ont., (d) 1884; secondly, Miss Kate Gillespie, Fife Hill, Sask., 1908. Went West, 1881. One of pioneers of Manitoba. Farm at Abernethy. Founded first grain growers' association in Sask. Member for Humboldt since 1908. Commissioner of Agriculture and Provincial Secretary in Scott Administration since its formation, 1905. Organizer and formerly President Central Can. Seed Growers' Ass'n.
- MUIR, Archie**, Scarboro, Ont. Born Scarboro, March, 1870. Son of Archie and Catherine (Loane) Muir. Married May Elizabeth Thomson. School Trustee and Secy.-Treas. Twenty-five years farming. Purebred Holstein cattle.
- MUNROE, William A.**, Rosthern, Sask. Born Chesterville, Ont., June, 1874. Son of John W. and Amelia Munroe. Married Jessie Dean. Graduate O. A. C., Guelph. District Rep. Ont. Dept. Agriculture, 1907-1909. Appointed Superintendent Dominion Exp. Station, Rosthern, Sask.
- MURRAY, Jas. A.**, Fredericton, N. B. Born, Moncton, N. B., Jan., 1864. Son of John Murray. Married Caroline Murray. Minister of Agriculture for New Brunswick.
- OASTLER, J. R.**, East Selkirk, Ont. Born Parry Sound, Ont., 1876. Son of Andrew Oastler. Married Beatrice Andrews. Live Stock Husbandman, Crookston Exp. Sta. Manager Van Horne Farm, East Selkirk. Specializing in Shorthorn cattle and Yorkshire swine for 20 years. Ex-President Farmers' Institute, Charlotte Co., N. B. Graduate O. A. C., Guelph.
- PETTIT, H. M.**, Freeman, Ont. Born Freeman, Ont. Son of W. G. Pettit. Secretary-Treasurer Dominion Cattle Breeders' Ass'n. Farmer: Shorthorn cattle, Clydesdale horses. Firm of J. A. and H. M. Pettit.
- PETTIT, Morley**, Guelph, Ont. Born Belmont, Elgin Co., Ont. Son of S. F. and Abigail (De Witt) Pettit. Unmarried. Beekeeping industry 17 years. Appointed Provincial Apiarist for Ontario in 1909. Lecturer Beekeeping O. A. C., Guelph. Secretary-Treasurer Ontario Beekeepers' Ass'n. Vice-President U. S. National Beekeepers' Ass'n.
- POWER, William**, Quebec, P. Q. Born Sillery Cove, Que., February, 1849. Son of William Power and Mary Fitzgerald. Married Winnifred Rockett. Specializing in French-Canadian cattle. Member of Dominion Parliament for Kamouraska County, Quebec.
- PYM, Bros.**, Mirror, Alberta. Born in England. Four years specializing in Hereford cattle.
- REYNOLDS, Joseph Benson**, Manitoba. Agricultural College, Winnipeg. Born Durham County, Ont., Dec., 1867. Son of Joseph and Anne Reynolds. Married Margaret Gowdy. Bachelor of Arts with honors in Mathematics and Physics, Toronto University, 1893. Master of Arts, 1911. Professor of English, Ontario Agricultural College, 1893-1915. Appointed President of Manitoba Agricultural College, Oct., 1915.
- RICE, George**, Stonewall, Manitoba. Born Tillsonburg, Ont., June, 1861. Son of George Rice and Agnes Gracey Watt. Married Rebecca Mercer. Past Township Councillor. Farming for last 25 years. Specializing in Holstein-Friesian cattle.
- RICHARDSON, John W.**, Caledonia, Ont. Born _____, Sept., 1871. Son of Matthew and Dorothy Richardson. Married Annie M. Marshall. President and Secretary-Treasurer Caledonia Fair for 10 years. Vice-President and Director of Holstein-Friesian Ass'n. President Haldimand Farmers' Institute. Breeder of Holstein-Friesian cattle for 20 years. Winner of 1st prize for best Dairy Farm in Ontario in 3 years' competition. Farm was one of the first to grow alfalfa in Ontario.
- RIVERS, Walburn, R. R. 5**, Ingersoll, Ont. Born Oxford Tp., Ont., Dec., 1867. Son of William and Mary Rivers. Married Agnes Jane Bishop. Seventeen years farming. Purebred Holstein cattle. Animals in 7 day official test and R. O. P.
- ROADHOUSE, W. Bert**, Parliament Buildings, Toronto, Ont. Born Malton, Peel County July 25, 1886. Son of Neriah and Elizabeth Roadhouse. Married Lillian Maude Wyndow. Formerly Secretary to the Minister of Agriculture for Ontario. Secretary Ontario Government Milk Commission. Since 1912, Deputy Minister of Agriculture for Ontario.
- ROSS, Theodore**, Charlottetown, P. E. I. Born North Bedeque, May, 1876. Son of Murdock and Margaret (Caruthers) Ross. Married Florence Annear. Secretary Agriculture P. E. I. Secretary Fruit Growers' Ass'n., Secretary Live Stock Ass'n., Secretary Farmers' Inst., P. E. I. Specializing on Shorthorn cattle. Private farm.
- ROTHWELL, B.**, Ottawa, Ont. Born Hillsdale Farm, Ottawa, 1850. Warden Carleton Co. President Ottawa Dairy Co. Vice-President and Director Central Canada Fair. Forty years breeder and importer of Clydesdales.
- RUTHERFORD, J. H.**, Albion, Ontario. Born Albion, 1874. Married Mary Lee. Farming: Specializing in purebred poultry and Hampshire hogs. Twenty years on the farm. School Trustee for 15 years.
- SAUNDERS, Charles E.**, Experimental Farm, Ottawa, Ont. Born London, Ont., Feb., 1867. Son of Dr. William Saunders, C. M. G. Married Sarah Agnes Robinson. At present occupying position as Dominion Cerealists.

- SEXSMITH, John A.**, Preniveau, Ont. Born Belmont Tp., Ont., 1866. Son of Thomas and Margaret Sexsmith. Married Bessie M. Buchanan. Director East Peterboro Agricultural and Farmers' Institute. Elected member for E. Peterboro, 1908; re-elected 1911. Appointed Chairman Agricultural Committee, 1912.
- SCHARF, Adam**, Cummings Bridge, Ont. Born Carleton Co., Ont., March, 1860. Son of James and Jane Scharf. Farming since 1895. Specializing in Clydesdales. Exhibitor at Eastern Live Stock Shows. Director Ottawa Winter Fair.
- SHUTT, Frank Thomas**, Experimental Farm, Ottawa. Born London, Eng., Sept., 1859. Son of William Denis and Charlotte Shutt. Married Miss Cawthorne. Held position of Dominion Chemist and Assistant Director Experimental Farm, Ottawa, since 1887. M.A.D.Sc. — F.I.C., F.R.C.S., etc., etc.
- SMITH, H. DUDLEY**, Ancaster, Ontario. Born Montreal, May 31st, 1867. Prominent as a breeder of Hereford cattle. Exhibitor at all important live stock shows in Canada. Secretary Canadian Hereford Breeders' Association. Twenty-seven years in the farming industry.
- SMITH, William**, Columbus, Ont. Born East Whitby, Ont., November 16th, 1847. Son of William Smith and Elizabeth Laing. Married Helen Barns. Member of Parliament for South Ontario, 1887-1896; re-elected 1911. Director Dominion Shorthorn Breeders' Association. Ex-President Canadian Clydesdale Association. Formerly Reeve of East Whitby for 4 years.
- SNELL, John Ferguson**, Macdonald College, Quebec. Born Brampton, Ont., Oct., 1870. Son of John C. and Jane (Ferguson) Snell. Married Evelyn Morphy. Professor of Chemistry, Macdonald College, Que. Ass't. Editor Journal of Agriculture and Horticulture. Vice-Patron Pure Maple Sugar and Syrup Co-operative Agricultural Association. Author "Elementary Household Chemistry" and authority on maple products.
- SPROULE, T. S.**, Markdale, Ont. Born York Co., Ont., Oct., 1843. Son of James Sproule. Married Jane Mitchell. M. D. Thirty years in business. Specializing in Shorthorn cattle, Yorkshire swine and Shropshire sheep.
- STEPHEN, Mrs. W. F.**, Huntingdon, Que. Born Georgetown, Ont. Daughter of Lawrence and Hannah Phin. Rose. Lecturer and Demonstrator in Dairying, O. A. C. for 14 years. Lecturer Women's Institutes throughout Dominion. Was first Woman's Institute speaker in Canada. Actively engaged in furthering cause of Women's Institutes since their inception 18 years ago. Recognized authority on dairy matters. Author "Farm Dairying." For several years has edited Home page Canadian Farm.
- STEPHEN, William Frank**, Huntingdon, Que. Born Trout River, Que., May, 1863. Son of James Stephen and Margaret Wattie. Married Janet Macfarlane, deceased; later married Laura Rose. For 23 years a breeder of Ayrshire cattle and Yorkshire swine, 1883-1911. Secretary Canadian Ayrshire Breeders' Ass'n.; Montreal Milk Shippers' Ass'n.; Huntingdon Dairymen's Ass'n.; Huntingdon Agricultural Society. Expert judge of dairy cattle. Judged at Alaska, Yukon, Pacific Exposition in 1909. Writer on dairy and kindred farm topics.
- STEVENS, W. F.**, Edmonton, Alberta. Born Port Elgin, Ont., February 15th, 1859. Son of Hobart and Mary Stevens. Married Olive E. Harter. President Calgary Fat Stock Show. Live Stock Commissioner for Alberta.
- TABER, Russel H.**, "Hillcrest," Condie, Sask. Born Whitevale, Ont., 1835. Son of Dr. Russel Taber, M. D., and Lucia E. Major. President Saskatchewan Horse Breeders' Ass'n. Director Regina Provincial and Winter Fairs. Director Western Canada Live Stock Union. Prominent in the public life of Western Provinces.
- TAYLOR, Herbert Marshall**, Earnscliffe Farm, Ardrossan, Alberta. Born Missouri, Mar., 1890. Son of J. G. and Mrs. Taylor. Married Ada Yates Petrie. Farmer. Aberdeen-Angue cattle, Tamworth swine, Hampshire sheep and Angora goats.
- TERRY, John Redge**, Dept. of Agriculture, Victoria, B. C. Born Kent, England, 1877. Married Emily K. Wood. Formerly on staff of Poultry Department O. A. C., Guelph. Now Chief Poultry Instructor for Province of British Columbia. Thirteen years in public work.
- THOMPSON, P. A.**, Hillsburg, Ont. Born Erin Tp., Ont., 1871. Son of Angus and Christina (Hyndman) Thompson. Since 1900 a breeder of Aberdeen-Angus cattle.
- THORNE, W. B.**, Aldersyde, Alberta. Born New Brunswick, 1848. Son of Butler and Frances Thorne. Married Miss Benjamin. Specialist in Percheron and French Coach horses. President of Canadian Percheron Association for 4 years. Now a member of the executive. Twenty years in business of farming.
- TOLMIE, Simon Fraser**, Victoria, B. C. Born Victoria, Jan., 1867. Son of Dr. W. F. and Jane Tolmie. Married Annie Harap. Qualified Veterinary Surgeon. Chief Inspector for British Columbia Health of Animals Branch, B. C. Representative Dominion Live Stock Commission. President B. C. Agricultural Association and B. C. Veterinary Ass'n. Proprietor Braefoot Dairy Farm, Victoria. Holstein cattle, Shropshire sheep and Yorkshire hogs. Seven years.
- VAN ZANT, H.**, Flora, Ont. Born Markham, Ont. Sept., 1856. Son of Almer and Sarah Van Zant. Married Margaret Stapleton. Departmental Government Veterinarian for 5 years. Now Live Stock Representative Farmers' Advocate. Private farm. Aberdeen-Angus, Dorsets, Tamworth swine.
- WATSON, E.**, Hudson Heights, Que. Born Rockwood, Ont., July, 1880. Son of J. A. Watson, Georgetown Ont. Married Emma K. Patterson. Farming. Specialist in Clydesdale and Hackney horses. 10 years. Director Canadian Hackney Horse Society and 2nd Vice-President Canadian Pony Society.

WATT, James A. Elora, Ont. Born Elora, April, 1886. Married. Director Canadian Shorthorn Breeders' Ass'n. Farming. Owner of champion Shorthorn Bull of Canada. Prominent in the show rings of both Eastern and Western Canada.

WILSON, James Lockie, 582 Huron St., Toronto. Born Alexandria, Ont., Nov. 12th, 1856. Son of Robert and Agnes Wilson. Married Mary Hodge, of Cornwall, Ont. Secretary Ontario Horticultural Association, Ontario Association of Fairs and Exhibitions, Ontario Plowmen's Association. Managing Director Ontario Vegetable Growers' Association. Superintendent Agri-

cultural and Horticultural Societies of Ontario. Grand Foreman, Ancient Order of Foresters. Grand Chiefstain Sons of Scotland. Was for 30 years engaged in farming, specializing in purebred Ayrshire cattle. Prominent in show ring. Other lines—light horses, Shropshire sheep, Berkshire hogs. **WINKLER, Hon. Valentine**, Minister of Agriculture, Manitoba. Born Grey Co., Ont., 1864. Went to Manitoba, 1879. Elected to Legislature, 1892. Represents Constituency of Rhineland and Morland. Appointed Minister of Agriculture and Immigration, June, 1915. Address, Parliament Buildings, Winnipeg, Man.

DAIRY TEST OTTAWA WINTER FAIR, 1916

Name of Cow	Owner	Lbs. of Milk.	% Fat.	Total Points
AYRSHIRES				
Glenshamrock Canty Again—A. Hume & Co., Campbellford		170.4	3.9	216.62
Polly 2nd of Fernbrook—E. B. Palmer & Sons, Norwich..		161.3	3.9	201.38
Spicy Lass—A. Hume & Co.		157.5	3.8	196.77
Hobsland Barbara—R. R. Ness, Howick, Que.		151.4	3.8	184.16
Gracie—R. T. Brownlee, Hemmingford		142.	4.	179.29
Lady Marion—R. T. Brownlee		138.3	4.	177.54
Flora—D. T. Ness, Howick, Que.		143.8	4.	177.05
Airmount Boneva—E. B. Palmer & Sons		154.2	3.5	175.85
36 MONTHS, UNDER 48				
White Floss of Springbank—Jos. Hudson & Son, Lyn		151.7	3.5	173.43
Humesbaugh Helen—A. Hume & Co.		131.1	3.8	159.57
Lily of Fernside—E. B. Palmer & Sons		131.8	3.	133.50
Jemima of Springbank—Jos. Hudson & Son		117.9	3.4	132.43
UNDER 36 MONTHS				
Susana of Evergreen—E. B. Palmer & Sons		146.7	3.5	169.26
Burnside Pearlina—R. R. Ness		105.	3.8	128.88
White Rose of Lacolle—R. T. Brownlee		109.7	3.4	123.78
HOLSTEINS				
Desta—Jas. Knapp, Merrickville		295.5	2.8	279.86
Ideal Netherland Posch—W. J. Bailey, Jarvis		266.7	3.	268.70
Lady DeKol Patty—Ed. Baker, Winchester		239.6	3.1	247.25
Pontiac Alice—M. McDowell, Oxford Ctr.		223.7	3.3	243.55
Margaret Rose—E. Baker		220.1	3.3	241.56
Amy Abbekerk Posch—A. E. Hulet, Norwich.....		207.6	3.3	226.36
36 MONTHS, UNDER 48				
Lyndenwood Colantha—W. J. Bailey		228.5	3.3	250.87
Ideal Daisy Faforit—W. J. Bailey		195.2	3.6	229.14
Pauline Colantha Mercena—A. E. Hulet		219.2	3.1	224.32
Lady Ormsby Colanthus—Martin McDowell		163.5	3.6	195.44
Epworth Barbara—F. H. McCullough, Navan		151.4	3.8	184.16
Alice Ormsby—Martin McDowell		167.9	3.3	183.58
UNDER 36 MONTHS				
Lady Pauline Colantha—A. E. Hulet		184.7	3.4	205.89
Pansy Connor DeKol—Ed. Baker		161.1	3.7	191.66
Dora DeKol Korndyke—Ed. Baker		181.3	3.2	191.50
Princess Ormsby DeKol—Martin McDowell		180.2	3.	181.97
Abbekerk Jewell DeKol—McDowder, Billing's Bdg		151.	3.4	167.84
Lady Francy DeKo Teake—Jas. Knapp		122.	3.5	148.55
SHORTHORNS				
Royal Princess—S. W. Jackson, Woodstock		140.3	4.2	185.56
Roselia—S. W. Jackson		114.	3.6	135.02
Fascination—S. W. Jackson		106.3	3.9	133.38
3 YEAR OLDS				
Red Bess—S. W. Jackson		78.5	4.3	106.38
Butterfly Rose—S. W. Jackson		66.9	4.4	97.10

LIVE STOCK DIRECTORY

AGRICULTURAL AND LIVE STOCK ASSOCIATIONS OF CANADA

With List of Officers for 1916

National Live Stock Association

President, Andrew Graham, Pome-roy, Ont.; Secretary, R. W. Wade, Toronto, Ont.

Clydesdale Horse Association of Canada

President, J. A. Boag, Queenville, Ont.; Secretary, J. W. Wheaton, Toronto, Ont.

Hackney Horse Society

President, Harry Boag, Barrie, Ont.; Secretary, H. M. Robinson, Don Mills Road, Toronto, Ont.

Shire Horse Breeders' Association

President, C. F. Porter, Appleby, Ont.; Secretary, G. de W. Green, Toronto, Ont.

Canadian Pony Association

President, Chas. Lovejoy, Mimico, Ont.; Secretary, G. de W. Green, Toronto, Ont.

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President, John Gardhouse, Weston, Ont.; Secretary, R. W. Wade, Toronto, Ont.

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President, J. M. Gardhouse, Weston, Ont.; Secretary, W. G. Petit, Freeman, Ont.

Dominion Ayrshire Breeders' Association

President, M. St. Marie Compton, Que.; Secretary, W. F. Stephens, Huntingdon, Que.

Canadian Hereford Breeders' Association

President, L. O. Clifford, Oshawa, Ont.; Secretary, H. D. Smith, Hamilton, Ont.

Canadian Aberdeen Angus Association

President, J. D. McGregor, Brandon, Man.; Secretary, W. I. Smale, Brandon, Man.

Dominion Sheep Breeders' Association

President, J. E. Cousins, Harriston, Ont.; Sec-

retary, R. W. Wade, Toronto, Ont.

Dominion Swine Breeders' Association

President, J. C. Stewart, Osgoods, Ont.; Secretary, R. W. Wade, Toronto, Ont.

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President, W. J. Cowan, Cannington, Ont.; Secretary, John W. I. Brant, Ottawa, Ont.

Canadian Percheron Horse Breeders' Association

Secretary, F. R. Pike, High River, Alta.

Canadian Thoroughbred Horse Society

President, Col. W. Hendrie, Hamilton, Ont.; Secretary, T. J. Macabe, Toronto.

Canadian Suffolk Horse Society

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Canadian French Coach Horse Association

Secretary, E. S. Richardson, Calgar, Alta.

Canadian Holstein-Friesian Association

President, M. L. Haley, Springfield, Ont.; Secretary, W. A. Clemens, St. George, Ont.

Canadian Jersey Cattle Club

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Ontario Berkshire Breeders' Association

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President, J. C. Stuart, Osgoode, Ont.; Secretary, R. W. Wade, Toronto.

Dairymen's Association (Eastern)

President, J. N. Stone, Warkworth, Ont.; Secretary, James R. Anderson.

Dairymen's Association (Western)

President, James Preston, St. Thomas, Ont.; Secretary, F. Hems, London, Ont.

Poultry Association (Eastern)

President, Geo. A. Robertson, Ottawa, Ont.; Secretary, W. J. Jackson, Cgrp, Ont.

Poultry Association (Western)

President, W. Barber, Toronto; Secretary, R. W. Wade, Parliament Bldgs., Toronto.

Fruit Growers' Association

President, D. Johnson, Forest; Secretary, P. W. Hodgetts, Toronto.

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President, F. F. Reeves, Humber Bay, Secretary, J. Lockie Wilson, Toronto.

Bee-Keepers' Association

President, Dennis DeJan; Secretary Morley Petit, Guelph, Ont.

Ontario Plowmen's Association

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Superintendent of Agricultural and Horticultural Societies—J. Lockie Wilson.

Superintendent of Farmers' and Womens' Institutes and Director of Dairy Instruction—Geo. A. Putnam.



Duroc-Jersey sow, champion "other district breeds," Canadian National, 1915.

Director Live Stock Branch—R. W. Wade, B.S.A., Toronto.

Director Fruit Branch—P. W. Hodgetts.

Western Ontario Seed Growers' Association

President, A. McKinney, Amherstburg, Ont., Secretary, R. W. Wade, Toronto.

Note.—The offices of the above are all in the Parliament Buildings, Toronto, Ont.

MANITOBA

G. H. Grigg, Winnipeg, is Secretary of all Provincial Live Stock Associations.

Cattle Breeders' Association

President, J. R. Hume, Souris,

Horse Breeders' Association

President, J. G. Washington, Ninga.

Sheep Breeders' Association

President, Geo. Gordon, Oak Lake.

Swine Breeders' Association

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President, W. H. Moore, Scotch Lake; Secretary, Morris Scovil, Gagetown.

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Agricultural Society No. 34—President, John A. Campbell, Springhill; Secretary, Matthew Tennant, Fredericton.

Agricultural Society No. 44—President, H. G. Corbett, Lakeville; Secretary, F. K. P. McKenzie, Centreville.

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Alberta Swine Breeders' Association—President, Lew Hutchinson, Duhamel; Secretary, E. L. Richardson, Calgary.

Alberta Sheep Breeders' Association—Secretary, E. L. Richardson, Calgary; President, Bryce Wright, Calgary.

Alberta Winter Fair—E. L. Richardson, Secretary.

Calgary Industrial Exhibition—E. L. Richardson, Secretary; E. J. Dewey, Calgary, President.



Champion Berkshire sow, Canadian National, 1915.

NOVA SCOTIA

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Beef Breeders' Association

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British Columbia Dairymen's Association

H. Rive, Secretary.

British Columbia Poultry Association

J. R. Terry, Secretary.

British Columbia Fruit Growers' Association

R. M. Winslow, Secretary.

British Columbia Agricultural Fairs Association

W. J. Bonavia, Secretary.

British Columbia Central Farmers' Institute

W. J. Bonavia, Secretary.

(Address Dept. of Agriculture, Victoria, B.C., for all bodies).

Vancouver Island Flockmasters' Association

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Fraser Valley Milk Producers' Association

Secretary, W. J. Park, Pitt Meadows.

Poultry and Dairymen's Association of Mission District

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Nicola Stock Breeders' and Agricultural Association

Secretary, H. H. Matthews, Nicola.

Pitt Meadows Poultry and Dairymen's Association

Secretary, J. Howlett, Pitt Meadows.

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Secretary, J. Howlett, Pitt Meadows.

Secretary, T. Wadsworth, Knutsford.

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Comax Valley Live Stock Association

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President, R. H. Taber, Condie; Secretary, J. C. Smith, Regina.

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President, Robert Sinton, Regina; Secretary-Treasurer, J. C. Smith, Regina; Manager, D. T. Elderkin, Regina.

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Saskatchewan Hail Insurance Commission

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Note.—In absence of J. C. Smith. Prof. Bredt is acting secretary of the breed associations.

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French-Canadian Horse Breeders' Association

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Cow Testing Associations, with Some Notes on the Sampling and Testing of Milk.

Sweet Cream Butter.

Apparatus for the Determination of Fat and Water in Butter.

Buttermaking on the Farm.

The Use of Ice on the Farm.

The Cooling of Milk for Cheesemaking. Cold Storage and the Cold Storage Act. The Dairying Industry in Canada. Notes for Factory Cheesemakers. Cream Cheese.

A List of the Cheese Factories, Creameries and Condensed Milk Plants in Canada.

The Care of Cream for Buttermaking.

Co-operation in Fruit Growing.

Modern Methods of Packing Apples and Pears.

Small Cold Storage, etc.

Results of Experiments with early, medium and late Sowings of Grain.

Weeds.

Barnyard Manure.

Production of Bacon for the British market.

Sheep Husbandry in Canada.

Beef Raising in Canada.

Horsebreeding and Rearing.

Care of Market Eggs.

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Ontario Agricultural College, Guelph, Ontario

President, G. C. Creelman, B.S.A., LL.D.; Prof. of Dairy Husbandry, H. H. Dean, B.S.A.; Prof. of Field Husbandry, C. A. Zavitz, B.S.A.; Associate, W. J. Squirrel; Prof. of Veterinary Science, Dr. J. H. Reed; Prof. of Animal Husbandry, G. E. Day, B.S.A.; Assistant, H. King; Prof. of Chemistry, R. Harcourt, B.S.A.; Prof. of Poultry Husbandry, W. R. Graham, B.S.A.; Prof. of Biology, Dr. Bethune; Lecturer in English, G. Unwin, B.S.A.; Prof. of Physics, W. Day, B.S.A.; Prof. of Horticulture, J. W. Crow, B.S.A.; Prof. of Botany, J. E. Howitt, B.S.A.; Assistants, Profs. A. W. Baker, B.S.A., J. Wright, B.S.A.; Economic Entomologist for Ontario, L. Caesar, B.S.A.; Prof. of Bacteriology, D. H. Jones; Secretary-Registrar, S. H. Gandier, B.S.A.

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FACULTY OF AGRICULTURE, UNIVERSITY OF SASKATCHEWAN

Saskatoon, Sask.

William John Rutherford, B.S.A. (Tor.), Dean and Professor of Animal Husbandry; Alexander Rodger Greig, B.Sc. (McGill), Professor of Agriculture Engineering; John Bracken, B.S.A. (Tor.), Professor of Field Husbandry; G. H. Cutler, B.S.A., Professor of Field Husbandry; Thomas Nathaniel Willing, Secretary and Assistant Professor of Natural History; Robert Dawson MacLaurin, Ph.D. (Harv.), Professor of Chemistry; Samuel Earl Greenway, Esq., Director of Extension Work; John L. Hogg, Ph.D. (Harv.), Professor of Physics; Laurie



Champion Southdown ewe at Canadian National Exhibition, 1915.

Lorne Burgess, Ph.D. (Harv.), Assistant Professor of Chemistry; A. Malcolm Shaw, B.S.A., Professor of Animal Husbandry; W. L. Thompson, Professor of Biology; Archibald Richard Weir, Instructor in English and Mathematics.

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Carleton J. Lynde, Ph.D., Professor of Physics.

James Murray, B.S.A., Professor of Cereal Husbandry.

J. F. Snell, Ph.D., Professor of Chemistry.

H. Barton, B.S.A., Professor of Animal Husbandry.

WAR BOOKS

We have secured through the English firm of J. M. Dent & Sons, a most complete list of books relating to and bearing on the Great War. Among them are the following:—

War Lords—A. G. Gardiner. 30c. post paid; 14,000 copies already sold in Canada.

War Thoughts of An Optimist—Benjamin A. Gould. 75c. post paid. An American citizen, now a resident of Canada.

The Nations at War—L. Cecil Lane. 85c. post paid. A forecast of the political and moral results of the war.

Winners at Principal Canadian Fairs, 1915-16

Clydesdales

CANADIAN NATIONAL

- STALLION, Four Years and Over—1 and 2, Graham Bros., on Lord Gleniffer and Alert; 3 and 4, T. H. Hassard, on Macaroon and Wyomyo; 5, T. D. Elliott, on Ardyne Blend.
- STALLION, Three Years Old—1, 2 and 3, Graham Bros., on Baron Ascot, Lord Malcolm and Fyvie Peer.
- STALLION, Two Years Old—1, Hassard, on The Count of Hillcrest; 2 and 3, Graham Bros., on Cedric King and Royal Regent; 4, W. N. McEachren, on Marquis' Own.
- STALLION, One Year—1, Graham Bros., on Macqueen of Atha; 2, Jno. M. Orr, on Bruce Pacific.
- CHAMPION STALLION—Lord Gleniffer.
- FILLY, Three Years—1, Graham Bros., on Quenelda of Petty; 2, P. W. Boynton, on Kate B.
- FILLY, Two Years—1, J. M. Gardhouse, on Nancy Rycroft; 2, A. E. Rea, on Blink of Aermont; 3, J. B. Borland, on Village Lady; 4, Orr, on Whiteside Queen.
- FILLY, One Year—1 and 2, H. A. Mason, on Heather Moon and Princess of Aden.
- BROOD MARE, with Foal by Her Side—1, 2 and 3, W. F. Batty, on Daisy of Tandy and Bell Heather.
- YELD MARE, Any Age—1, Hassard, on Nell of Aikton; 2 and 5, Mason, on Snowdrop and Pride of Aucheneleith; 3, Graham Bros., on Castle Belle; 4, Paterson Bros., on Molly of Western Lovat.
- FOAL of 1915—1 and 2, Batty, on Molly May and Molly Queen.
- MARE with Two of Her Progeny—1, Batty, on Newbigging Beauty.
- CHAMPION FEMALE—Nancy Rycroft.
- BEST STRING OF FIVE—1, Graham Bros.
- BEST STRING OF FIVE, the Get of One Sire—1, Batty.

CANADIAN NATIONAL

(Canadian Breds)

- STALLION, Three Years Old and Over—1, Hassard, on Randolph Romeo; 2 and 3, Thos. McMichael, on International and Glen Rae; 4, Peter

Morrison, on Lionel Lad.

- STALLION, Two Years Old—1, Samuel Stong, on Everlasting Gay Boy; 2, Graham Bros., on Royal Regent; 3, Geo. Clayton, on Marquis' Own.
- STALLION, One-Year-Old—1, W. F. Batty, on Duke Carruchan; 2, Jos. Telfer, on Marathon Again; 3, Geo. Clayton, on Noble Jimmie; 4, Jas. Leonard, on Noble Majestic.
- FILLY, Three Years Old—1, Boynton, on Kate B.
- FILLY, Two Years—1, Batty, on Nora Carruchan; 2, Dale, on Glennie Mac; 3, Snyder, on Bedelia.
- FILLY, One Year—1, Dale, on Floradora; 2, Batty, on Nellie Carruchan; 3, McMichael, on Mabel.
- BROOD MARE with Foal by Her Side—1, Bennett, on My Queen; 2, McMichael, Spring Beauty; 3, Dale, on Mossy Rose; 4, Snyder, on Queen.
- FOAL OF 1915—1, McMichael; 2, Batty, on Moncrieffe Belle, Albion; 3, Snyder, on Prince.
- CHAMPION FILLY—Hassard, on Daisy Dean.

OTTAWA (Winter 1916)

- AGED STALLIONS—1, Lord Gleniffer, Graham Bros.; 2, Scotias Pride, Smith & Richardson; 3, Baron Ian, Jno. A. Boagson; 4, Baron Minto, Graham Bros.; 5, Alert, Graham Bros.
- STALLIONS, Three Years—1, Baron Ascot, Graham Bros.; 2, Fyvie Peer, Graham Bros.; 3, Birchburn, Boag & Son; 4, Royal Type, Smith & Richardson.
- STALLION, Three Years—1, Cedric King, Graham Bros.; 2, Everard, Smith & Richardson; 3, Baron Kipling, Smith & Richardson; 4, Sir Baron Wallace, A. Watson & Son.
- STALLIONS, Two Years—1, Royal Design, Smith & Richardson; 2, Luck Coin, N. Scharf; 3, Barons Revolt, A. Watson & Son.
- CHAMPION STALLION—Lord Gleniffer.
- AGED MARES—1, Royalette, W. W. Hogg; 2, Laura Dee Smith & Richardson; 3, Ella Fleming, A. Watson & Son; 4, Castle Belle, Graham Bros.

MARES, Three Years—1, Craigie Meg, A. A. Scharf; 2, Solway Duchess, Boag & Son.

MARES, Two Years—1, Lady Ascot, Boag & Son; 2, Queen Darnley, T. A. Russell.

MARES, One Year—1, Denholm Hill Blossom, W. W. Hogg; 2, Rosy Harmony, A. Scharf; 3, Woodside Rose-land, R. Ness & Son; 4, Lady Mon-crief, J. Vipond.

CHAMPION MARE—Royalette.

CLYDESDALES (Canadian Bred)

Ottawa Winter Fair, 1916.

AGED STALLIONS—1, Special Royal Favorite, J. Telfer; 2, Koyama, Wal-len; 3, Baron Morris, W. A. Mor-row; 4, Baron Gibson, W. J. Graham.

STALLIONS, Three Years—1, Prince Rodrick, J. Vipond; 2, Ross Mc-Gregor, L. Richardson; 3, Chattans Buchlyvie, E. Plattens; 4, Soutas Buchlyvie, E. H. Graham.

STALLIONS, Two Years—1, Royal Regent, Graham Bros.; 2, Spencer of the Briars, R. Ness & Son; 3, Baron's Pride, A. Scharf; 4, Sir Acme, Peter Christie & Son.

STALLIONS, One Year—1, MacSuc-cess of Atha, E. H. Graham; 2, Scot-tish Diadem, J. J. Hodgins; 3, Baron Cedar, A. Scharf.

CHAMPION STALLION—Royal Re-gent.

AGED MARES—1, Aberdeen's Grace, T. B. McCaulay; 2, Royal Rose, A. Watson; 3, Princess Lucy Belle, J. Rothwell; 4, Moss Rose, A. Watson.

MARES, Three Years—1, Lady Har-mony, A. Watson; 2, Lady Nether-lea, T. B. McCaulay; 3, Kate Favor-ite, J. Vipond.

MARES, Two Years—1, Lady Bydand, Graham Bros.; 2, Woodside Rosebud, R. Ness & Son; 3, Lady Garnet, W. Batty; 4, Minnie Favorite, F. W. Brad-ley.

MARES, One Year—1, Ivory Margaret, Smith & Richardson; 2, Jean Arm-our, W. W. Hogg; 3, Nellie Car-ruchan, W. Batty.

CHAMPION MARE—Lady Bydand.

OTTAWA (Summer, 1915)

AGED STALLIONS—1, R. Ness & Son, on Sir Spencer; 2, Ben Roth-well, on Dunnottar; 3, T. H. Has-

sard, on Wyomyo; 4, Smith & Ric-hardson, on Scotia's Pride.

STALLIONS, Four Years Old and Over, Importers Excluded—1, A. Mason, on Prince of Aden; 2, Sher-brooke Horse Breeding Co., on Royal Cup; 3, Geo. McRae, on Scottish Ring; 4, J. D. Fraser, on Lord How-ick.

STALLIONS, Two Years Old—1, T. H. Hassard, on The Count of Hill-crest; 2, Smith & Richardson, on Everard; 3, Robt. Todd, on Elm-vaie's Pride; 4, Adam Scarf, on Fyvie Junior.

STALLIONS, One Year—1, Nixon Scarf, on Lucky Coin 2nd; 2, Wm. Nussey, on Oakhurst Sir Robert.

CHAMPION STALLION — Sir Spencer.

BROOD MARE with Foal at Foot—1, Rothwell, on Manilla; 2, Nixon Scarf, on Jenny Valdor; 3, W. J. McGerrigle, on Corono; 4, T. B. Macaulay, on Lady Armandale.

FOAL—1, Rothwell; 2, S. McGerrigle; 3, W. J. McGerrigle; 4, Macaulay.

YELD MARE—1, Hassard, on Nell of Aikton; 2, Ness, on Darling of Begg; 3, Smith & Richardson, on Laura Dee; 4, Mason, on Snowdrop.

FILLY, Three Years—1, 3 and 4, Smith & Richardson, on Dickiebelle, Mandoline and Black Maid; 2, A. Scarf, on Craigie Meg.

FILLY, Two Years—1, Rothwell, on Syringa; 2, Ness, on Woodside Rose-bud; 3, Mason, on Blink of Aermont; 4, Nussey.

FILLY, One Year—1, A. Scarf, on Rosie Harmony; 2, Mason, on Hea-ther Moon; 3, Ness, on Woodside Rosalind; 4, Rothwell, on Sweet Peggy.

CHAMPION MARE—Syringa.

STALLION and Three of His Get—1, Ness, on Sir Spencer; 2, Rothwell, on Dunnottar; 3, Nussey, on Baron Silloth's Heir.

CANADIAN BREDS

(Central Canada, 1915)

AGED STALLIONS—1, J. F. Staples, on Baron Elator; 2, Wm. Nussey, on Baron Silloth's Heir; 3, Wm. Allan, on Koyama; 4, Smith & Richardson, on Mascot's Pride.

TALLIONS, Three Years—1, T. H. Hassard, on Randolph Romeo; 2,

Geo. H. Montgomery, on Sir Roger.
STALLIONS, Two Years—1, R. Ness & Son, on Spencer of the Briars; 2, Adam Scarf, on Baron's Pride 2nd; 3, Staples, on Golden Don; 4, T. B. McCaulay, on Prince Netherlea.

STALLIONS, One Year—1, S. McGerrigle; 2, Nussey, on Oakhurst Shapely Prince.

BROOD MARE AND FOAL—1, Staples, on Golden Gem; 2, Scarf, on Lady Gold; 3, W. J. McGerrigle, on Flossie Fyvie; 4, D. A. McCormick, on Maud of the Briars.

YELD MARE—1, Hassard, on Daisy Dean; 2, McCaulay, on Aberdeen Grace; 3, Rothwell, on Cherrybank.

FILLY, Three Years—1, McCaulay, on Lady Netherlea; 2, S. McGerrigle; 3, Staples, on Golden Maggie; 4, Scarf, on Lady Harmony.

FILLY, Two Years—1, Staples, on Golden Crest; 2, Snyder, on Bedelia.

FILLY, One Year—1, Nussey; 2, Tierney, on Kintore Moss Rose; 3, Scarf, on Rose of Fairview; 4, McCaulay, on Queen Netherlea.

CHAMPION STALLION—Randolph Romeo.

CHAMPION MARE—Daisy Dean.

SPECIAL FOR THREE CLYDESDALE MARES, Any Age, sired by a Clydesdale Stallion—1, S. Watt; 2, R. Bivington.

GUELPH (Winter)

AGED STALLIONS—1 and 4, Graham Bros., on Lord Gleniffer and Alert; 2, Smith & Richardson, on Scotia's Pride; 3, Jno. Boag & Son, on Baron Senwick; 5, T. D. Elliott, on Ardyne Blend.

STALLION FOALED IN 1912—1, 2 and 3, Graham Bros., on Baron Ascot, Fyvie Peer and Lord Malcolm; 4, Boag & Son, on Birchburn; 5, Smith & Richardson, on Royal Type.

STALLION FOALED IN 1913—1, Graham Bros., on Cedric King; 2, T. H. Hassard, on The Count of Hillcrest; 3 and 4, Smith & Richardson, on Baron Kipling and Everard.

STALLION FOALED IN 1914—1, Smith & Richardson, on Royal Design; 2, Graham Bros., on MacQueen of Atha.

CHAMPION STALLION—Baron Ascot.

AGED MARE—1, W. W. Hogg, on Royalette; 2, Smith & Richardson,

on Laura Dee; 3, Hassard, on Nell of Aikton; 4 and 7, H. A. Mason, on Snowdrop and Pride of Auchencleith; Geo. Miller, on Bloom of Whitefield.

MARE FOALED IN 1912—1, Graham Bros., on Quenelda of Petty; 2, Smith & Richardson, on Mandoline; 3, Hogg, on Lady Mary Aberdeen; 4, Boag & Son, on Solway Duchess.

MARE FOALED IN 1913—1, Boag & Son, on Lady Ascot; 2, Mason, on Blink of Airmont.

MARE FOALED IN 1914—1, Mason, on Heather Moon; 2 and 3, Hogg, on Jean Armour and Denholmhill Blossom.

MARE AND TWO OF HER PROGENY—1, Jno. D. McGibbon, on Young Jess of Whitefauld; 2, Wilson, on Fanny Clark; 3, Batty, on Newbigging Beauty; 4, R. C. Rogerson, on Maggie 4th of Drum.

THREE, THE GET OF IMPORTED SIRE—1, W. F. Batty, on get of Gallant Carruchan; 2, McGibbon, on get of Marathon.

CHAMPION MARE—Royalette.

CANADIAN BREDS (Guelph)

AGED STALLION—1, Thos. McMichael, on Lord Ronald; 2, Hastings Bros., on Baron Rozelle; 3, Wm. Woodley, on Peerless Ascot; 5, R. C. Rogerson, on Orla's Boy.

STALLION FOALED IN 1912—1, T. H. Hassard, on Randolph Romeo; 2, McMichael, on International; 3, Lew. Richardson, on Ross MacGregor, by Lord George; 4, G. A. Smith, on His Royalty; 5, Hodgkinson & Tisdale, on Golden Spark.

STALLION FOALED IN 1913—1, Graham Bros., on Royal Regent; 2, Peter Christie, on Sir Acme; 3, R. J. Barton, on Canada's Glory by Celtic Baron; 4, A. G. Gormley, on Appolo by Beau Ideal; 5, Fred J. Wilson, on Gay Ronald by Montrave Ronald.

STALLION FOALED IN 1914—1, W. F. Batty, on Duke Carruchan; 2, Alex. Farr, on Tommy Atkins; 3, Geo. Miller, on Grandee's First; 4, J. Rae, on Major's Pride; 5, Hassard, on Sir Elgin.

STALLION FOALED IN 1915—1, Hassard, on Pride of Dunedin; 2, R. Fewster, on Sprucehill Favorite;

5, Dale & Son, on Honest Tom.
CHAMPION STALLION—Randolph Romeo.

AGED MARE—1, Hassard, on Daisy Dean; 2, Hastings, on Queen of Tuan; 3, Miller, on Charm; 4, Tuck & Son, on Queen Maud.

MARE FOALED IN 1912—1, Wilson, on Bertha Orla.

MARE FOALED IN 1913—1, Miller, on Scotland's Charm; 2, Roe, on Lady Bydand; 3, McGibbon, on Jennie Crawford; 4, Batty, on Nora Carruchan; 5, McCort & Son, on Bessie Scott.

MARE FOALED IN 1914—1, Batty, on Nellie Carruchan; 2, A. Watt, on Flora Dora; 3, McCort & Son, on Jean Scott; 4, Beattie, on Miss Blossom.

MARE FOALED IN 1915—1, Arbogast Bros., on Nellie Muir; 2 and 4, McGibbon, on Marathon Belle and Lady Marathon; 3, Steen, on Fancy Baroness.

THREE, THE GET OF SIRE—1 and 2, McMichael, on get of Glen Rae.

MARE AND TWO OF HER PROGENY—1, Miller, on Charm; 2, McMichael, on Princess Glendrie; 3, Gray, on Minnie.

CHAMPION C. B. MARE—Scotland's Charm.

CALGARY (Summer)

AGED STALLIONS—1, Scotland's Cornet, E. D. Adams; 2, Royal Trustee, P. M. Bredt; 3, Solicitor's General, W. E. Butler; 4, Cycloys, F. Schroeder.

STALLION, Three Years—1, Astrophel, F. Schroeder.

STALLION, Two Years—1, Scotland's Bulwark, A. L. Dollar; 2, Western Homesteake Prince, P. M. Bredt; 3, Scotland's Might, A. L. Dollar; 4, General John, P. M. Bredt.

STALLION, One Year—1, Imperial Newton, D. Jones; 2, Maxwell of Dalemead, G. C. Milnes; 3, Prince Victor Hood, P. M. Bredt.

CHAMPION STALLION—Scotland's Cornet.

BROOD MARE—1, Poppy Bredt; 2, Miss Newton, Jones; 3, Lady Rozelle, Thorburn & Riddle.

MARE, One Year—1, Jess of Craigwillie, A. Webster; 2, Sweet Barlae, A. Ingram; 3, Maggie Flemming,

Thorburn & Riddle; 4, Geraldine, P. M. Bredt.

MARE, Three Years—1, Pride of Craig, P. M. Bredt; 2, Braco Kate, P. M. Bredt; 3, Elcho's Lady, Thorburn & Riddle; 4, Olive Bennie, P. M. Bredt.

FILLY, Two Years—1, Hopeful Beauty, P. M. Bredt; 2, Brown Bess, Thorburn; 3, Edenwold Beauty, Bredt.

FILLY, One Year—1, Balgreggan Queen, Bredt; 2, Maggie McNeil, Thorburn & Riddle; 3, Royal Princess, Thorburn & Riddle.

CHAMPION FEMALE—Jess of Craigwillie.

EDMONTON (Summer)

AGED STALLIONS—1, Gay Douglas, D. Cameron; 2, Royal Trustee, P. M. Bredt; 3, Solicitor General, W. E. Butler; 4, King Byron, H. Burns; 5, Clarendon, W. C. Gillies.

STALLION, Three Years—1, Dunrobin Hiawatha, W. C. Sutherland.

STALLION, Two Years—1, Dunrobin Pathfinder, Sutherland; 2, General John, Bredt; 3, Western Hero, Bredt; 4, Prince Minnick, Minnick.

YEARLING STALLION—1, Prince Victor Hood, Mrs. Bredt.

CHAMPION STALLION—Dunrobin Pathfinder.

BROOD MARE, with Foal by Side—1, Poppy, Bredt; 2, Rosy McLaren, Jamieson; 3, Rosie's Beauty, Bredt; 4, Lady Elcho, D. Thorburn.

YELD MARE, Three Years and Over—1, Pride of the Craig, Bredt; 2, Bonnie Doune, Sutherland; 3, Lady Sylvander, Sutherland; 4, Maggie Fleming, Thorburn; 5, Rosie Elcho, Thorburn.

FILLY, Two Years—1, Hopeful Beauty, Bredt; 2, Brown Bess, Thorburn; 3, Golden West Ailsa, Bredt; 4, Scottish Queen, Minnick.

YEARLING FILLY—1, Lady Hazel, J. A. Jamieson; 2, Lady Jane, Sutherland; 3, Balgreggan Queen, Bredt; 4, Princess Kathleen, Sutherland.

FOAL OF 1915—1, Bredt; 2 and 3, Jamieson; 4, P. H. Winter; 5, Thorburn.

CHAMPION MARE—Poppy.

BRANDON (Summer Fair)

AGED STALLION—1, Charnock, J. Tucker; 2, Johnston Count, Andrew

- Graham; 3, Carrick, Taylor & McCallum; 4, Lord Scott, W. J. McCallum, Brampton, Ont.; 5, Cairnhill, Brandon Horse Co.
- STALLION FOALED IN 1912**—1, Gay Palmerston, C. and D. R. McDonald; 2, Forrest Yet, D. E. Ferguson; 3, Esmond, R. McFlenna.
- STALLION FOALEL IN 1913**—1, The Bruce of Hillcrest, R. S. Taber; 2, Carruchan Knight, Wm. Grant; 3, Donald of Vista, McDonald; 4, Sweet Heart's Pride, Miller; 5, Count Ideal, Graham.
- STALLION FOALED IN 1914**—1, Lordly Prince Rupert, Coates; 2, Baron Kitchener of Hillcrest, Taber; 3, Napinka King Gartley, McKirdy Bros.; 4, Baron's Heir, Jno. Crawford; 5, Baron Sackville, Hairsire.
- CHAMPION STALLION**—The Bruce of Hillcrest.
- MARE FOALED IN 1912**—1, Lady Beresford, Dawley; 2, Maud Gartley, Reaburn & Son; 3, Jennie Baron, Jno. Crawford; 4, Lainty Countess, Graham; 5, Lady Grace, Grant.
- FILLY FOALED IN 1913**—1, Princess Carruchan, Grant; 2, May Daisy Bell, Leckie; 3, Lady Ruby, Tosh; 4, Mary Gartley, McKirdy Bros.; 5, Mona of Hillcrest, Dawley.
- FILLY FOALED IN 1914**—1, Crowned Queen, McKirdy Bros.; 2, Fanny Fern, White; 3, Countess Ema, Graham; 4, Peg o' My Heart, Hairsire; 5, Countess Ethel, Graham.
- FOAL OF 1915**—1, A. McPhail; 2, Graham; 3, Crawford; 4, Taber; 5, Graham.
- BROOD MARE with Foal by Side**—1, Ruby Gay, David Little; 2, Flos-hend Princess, G. C. Porterfield; 3, May Urquhart, Stewart; 4, Lady Wiston, Wishart; 5, Carmen Vic, Wood.
- YELD MARE**—1, Lady Hopetown, Grant; 2, Valdoroh, White; 3, Fanny Baron, White; 4, Royal Beauty, Reaburn & Son; 5, Darling Bell, Wishart.
- CHAMPION MARE**—Princess Carruchan.
- of Fleming, McMillan.
- STALLION OF 1912**—1, Park Mains Bruce, Alex. Mutch; 2, Hillcrest Montgrave, Mutch; 3, Lord Tooley, Williamson.
- STALLION OF 1913**—1, The Count of Hillcrest, Wallace; 2, Golden Youth, Thos. Heggie; 3, Majestic Wave, Radcliffe; 4, Curruchan Knight, Grant; 5, Doune Lodge Baron Alton, Mutch.
- STALLION OF 1914**—1, Grand Royal Gem, Stutt; 2, Baron Wallace of Hillcrest, Wallace; 3, Baron Kitchner of Hillcrest, Taber; 4, Lord Roberts of Hillcrest, Taber.
- CHAMPION STALLION**—The Count of Hillcrest.
- BROOD MARE WITH FOAL**—1, Meadow Lawn Princess, Heggie; 2, Flower of Shallock, Stutt; 3, Doune Lodge Rose, Mutch.
- AGED MARE**—1, Lady Hopetown, Grant; 2, Queen of the Revels, Taber; 3, Lady Linda, Taber.
- FILLY OF 1913**—1, Princess Carruchans, Wm. Grant; 2, Rosy B. Hagerty; 3, Lady Ethel, Radcliff; 4, Tidal Bell, Radcliff.
- FILLY OF 1914**—1, Craigie Mains Rose, Mutch; 2, Lady Sylvan Queen, Hagerty; 3, Fair Lady Jean, Stutt.
- CHAMPION MARE**—Princess Carruchan.
- BEST FIVE CLYDESDALES**—1, Taber; 2, Grant; 3, Mutch.
- SASKATOON (Summer Fair.)**
- AGED STALLION**—1, B. F. Bray; 2, Straughan and McWilliam; 3, D. Caswell; 4, R. W. Caswell.
- STALLION, Three Years**—1, W. C. Sutherland; 2, Wm. Grant.
- YEARLING STALLION**—1, Sutherland; 2, D. Caswell.
- STALLION, Two Years**—1, Thos. Wallace; 2, Bray; 3, Graham and Straughan; 4, W. McKay.
- FOAL OF 1915**—1, 4 and 5, Sutherland; 2, D. Caswell; 3, McKay.
- BROOD MARE**—1 and 3, Sutherland; 2, D. Caswell; 4, Graham and Straughan.
- YELD MARE**—1, 2 and 5, Caswell; 3 and 4, Sutherland.
- 1, Mayoress; 2, Amy of Darley; 3, Bonnie Doune; 4, Lady Sylvander; 5, Lady Hopetown.
- MARE, Three Years**—1, Dougan; 2,
- REGINA (Summer Fair)**
- AGED STALLION**—1, The Bruce, R. S. Taber; 2, Haile's Surprise, How; 3, Mahomet, G. A. Stutt; 4, Craigie Member, J. E. Dashney; 5, London City, H. Schoenraht; 6, Prince Royal

- McKay; 3, Sutherland; 4, D. Caswell.
- FILLY, Two Years—1, Dougan; 2, Carscadden; 3, Sutherland; 4, McKay.
- YEARLING FILLY—1 and 2, Sutherland; 3, Carscadden; 4, Grant.
- CHAMPION STALLION—Bray.
- CHAMPION MARE—Dougan.
- THREE, GET OF SIRE—1 and 2, Sutherland.
- TWO, PROGENY OF MARE—1, Sutherland; 2, Mackay.
- BEST STALLION AND THREE MARES—1, Sutherland; 2, Dougan; 3, R. W. Caswell.
- CHAMPION CANADIAN - BRED STALLION—Wallace.
- CHAMPION CANADIAN - BRED MARE—Dougan.
-
- CLYDESALES, IMP.—LONDON
- AGED STALLION—1, T. D. Elliott, on Ardyne Blend by Hiawatha; 2, H. McLean, on Early Dudley by Royal Edward; 3, Thos. Wilkinson & Guest, on Lawrason's Pride by Royal Favorite; 4, Crabb & Harris, on Lord Armstrong; 5, Elliott, on Madura.
- STALLION; Three Years Old—1, Thos. McMichael, on International by Prince Romeo.
- STALLION, Two Years Old—1, Jno. Ballantyne, on Prince of Langside by Popinjay; 2, Samuel MacMurray, on Lawrason's Pride.
- STALLION, One Year Old—1, W. F. Batty, on Duke Carruchan by Gallant Carruchan.
- CHAMPION STALLION — Ardyne Blend.
- BROOD MARE, with Foal—1, W. W. Hogg, on Royalette by Royal Edward; 2, Batty, on Newbigging Beauty by Hiawatha; 3, McMichael on Spring Beauty by Glen Rae; 4, Hogg, on Iris of Petty by Bonnie Buchlyvie; 5, Durst, on Buiston Jean by Outlook.
- FILLY, Three Years Old—1, Hogg, on Lady Aberdeen by Rubio.
- FILLY, Two Years Old—1, McMichael, on Maggie Rae by Glen Rae; 2, Hogg, on Tibbie of Denholm Hill by Brigadier Gerrard; 3, Webster Bros., Glencoe.
- FILLY, One Year Old—1, Hogg, on Jean Armour by Dunure David; 2, Wilkinson & Guest.
- FOAL—1, Durst; 2, Batty; 3, Dale; 4, Hogg; 5, McMichael.
- CHAMPION MARE—Royalette.
- STALLION and Three of His Get—1, Wilkinson & Guest, on Lawrason's Pride.

Percherons

- CANADIAN NATIONAL
- STALLION, Four Years and Over—1, T. D. Elliott, on Irade; 2, J. B. Hogate, on Koursier; 3, Wm. Pears, on Guedo; 4, Hogate, on Caprice.
- STALLION, Three Years—1, G. E. Boulter, on Herculoïd.
- STALLION, Two Years—1, W. G. Hill & Son; 2, Hogate.
- STALLION, One Year—1, Pears, on General Cormier; 2, Gurney & Son, on Boulder Grange Prince.
- CHAMPION STALLION—Irade.
- YELD MARE—1, Hassard, on Labeuviniere; 2, Hogate, on Lacune; 3, A. W. Dobson, on Kalmouck; 4, Boulter, on Lorene.
- FILLY, Three Years—1, Hogate, on Meche.
- FILLY, Two Years—1, Pears, on Lady Impresse; 2, Hill & Son, on Polly Patricia; 3, Pears, on Lady Julia; 4, Boulter, on Lou Lou.
- YEARLING FILLY—1, 2 and 3, Pears, on Lady Mary, Lady Kagnat and Lady Kate.
- BROOD MARE—1, 2, 3 and 4, Pears, on Lady Grey, Julia, Impresse and Kocarde.
- FOAL OF 1915—1, Pears, on Marshall Cormier; 2, Boulter, on Titania; 3, Pears, on Lady Lorraine.
- MARE AND TWO PROGENY—1 and 2, Pears; 3, Boulter.
- CHAMPION MARE—Labeuviniere.
- BEST STRING OF FIVE—Pears.
- DOM. GOV'T. SPECIAL, Five the Get of One Sire—1 and 2, Pears; 3, Boulter.
-
- OTTAWA.
- (Winter Fair, 1916)
- Only seven were exhibited in the Percheron classes. Aged stallions were there in all and went, first, W. D. Steen with Jet, second to J. Tweedle on Houp, and third to A. R. Hossie with Kosaque. W. Wood showed the

only two-year stallion and was also alone in one-year olds. The same breeders, three-year old mare, Marie, was the only female shown. Champion stallion, Jet.

CENTRAL CANADA (1915)

AGED STALLION—1, W. R. Wilson, on Habluer; 2, T. H. Hassard, on Liquide; 3, A. La Fortune, on Jobard; 4, J. B. Hogate, on Jeantes; 5, Milton Porter, on Kodi.

STALLION, Three Years—1, W. E. Anderson, on Dukedom.

STALLION, Two Years—1, Hogate, on Beauchemier.

BROOD MARE AND FOAL—1 and 2, G. E. Boulter, on Lorene and Lady Belle; 3, Anderson, on Daisy.

FILLY, Two Years—1, Boulter, on Lou Lou; 2, J. E. Arnold, on Hazelthorn.

FILLY, One Year—1, Boulter, on Eloise; 2, Arnold, on Rosealine.

GUELPH (Winter, 1915)

AGED STALLION—1, Hodgkinson & Tisdale, on Ichnobate; 2, T. D. Elliott, on Irade; 3, R. Hamilton & Sons, on Kavaignac; 4, F. J. Sullivan, on Avocation; 5, H. D. Steen, on Jet.

STALLION FOALED IN 1912—1, Hodgkinson & Tisdale, on Molitor.

STALLION FOALED on or After Jan. 1, 1912—1, Hodgkinson & Tisdale, on Niguot; 2, Wm. Pears, on General Cormier; 3, J. B. Hogate, on Beauchemier.

CHAMPION STALLION—Ichnobate.

AGED MARE—1, Hogate, on Lacune; 2, Pears, on Lady Grey; 3, Callender, on Junette.

MARE FOALED on or After Jan. 1, 1913—1 and 2, Pears, on Lady Emresse and Lady Julia.

THREE, THE GET OF SIRE—1 and 2, Pears, on the get of Cormier.

MARE AND TWO OF HER PROGENY—1 and 2, Pears, on the progeny of Julia and Impresse.

CHAMPION MARE—Lacune.

SASKATOON, 1915

AGED STALLION—1, Herman; 2 and 3, J. H. Graham.

STALLION, Three Years—1, Upper Bros.

STALLION, Two Years—1 and 2, Upper.

YEARLING STALLION—1, 2 and 4, Upper; 3, C. D. Roberts.

FOAL OF 1915—1, Roberts; 2, Upper.

CHAMPION STALLION—Herman.
BROOD MARE—1, Upper; 2, Roberts.
YELD MARE—1 and 2, Upper; 3, Roberts.

MARE, Three Years—1, Upper.

FILLY, Two Years—1, Roberts; 2, Upper.

YEARLING FILLY—1 and 2, Upper.

CHAMPION MARE—Upper.

BRANDON (Summer Fair, 1915)

AGED STALLION—1, Bijou, Upper Bros.; 2, Jipara, Reid.

STALLION, Three Years—1, Futurity, Upper; 2, Douglas, W. Ledingham.

STALLION, Two Years—1, Mogul, A. Reid.

STALLION, 1 Year—1, Ilott 2nd, Roberts; 2, Prince Charlie, Upper Bros; 3, Earl of Latons, Ledingham.

CHAMPION STALLION—Bijou.

BROOD MARE, with Foal at Side—1, Marlowette, C. D. Roberts; 2 and 3, Upper Bros., on Quickstep and Prairie-Queen; 4, Queen of Latona, Ledingham.

YELD MARE—1, Rosine, Upper Bros.; 2, Russellette, Roberts; 3, Irene, Upper Bros.; 4, Manetta, Simpson; 5, Merry Win. Reid; 6, Mira, Reid.

FILLY, Three Years—1, Gladys, Reid; 2, Mamie, Upper Bros.; 3, Lady Smith, Simpson; 4, Mayflower, Upper Bros.

FILLY, Two Years—1, Illa of Prairieview, Roberts; 2, Maud of Latona, Ledingham; 3, Quickflight, Upper Bros.

FILLY, One Year—1 and 2, Upper Bros., on Black Beauty and White Sox.

FOAL OF 1915—1, Roberts; 2 and 3, Upper Bros.

CHAMPION MARE—Rosine.

REGINA (Summer Fair, 1915)

AGED STALLIONS—1, Frank J., D. Hepburn; 2, Bijou, Upper Bros.

STALLION, Three Years—1, Futurity, Upper Bros.

STALLION, Two Years—1, Regina Boy, J. McElhinney; 2, McCallum Mac, Upper Bros.; 3, Napoleon of Silver Crest, A. McLaren.

STALLION, One Year—1, Portal

Chief, Upper; 2, Black Knight, Upper; 3, Illot 2nd, C. D. Roberts; 4, Prince Charlie, Upper.
CHAMPION STALLION—Frank J. Reserve, Regina Boy.
BROOD MARE—1, Marlowette, Roberts; 2 and 3, Quickstep and Prairie Queen, Upper; 4, Dorothy, Ruberger.
YELD MARE—1, Rosini, Upper; 2, Russellette, Roberts; 3, 4 and 5, Irene, Marjorie and Leota, all owned by Upper.
FILLY, Three Years—1 and 2, Mamie and Mayflower, Upper.
FILLY, Two Years—1, Quicklight, Upper; 2, Illa of Prairie View, Roberts.
FILLY, One Year—1, Black Beauty, Upper; 2, Susie, Ruberger; 3, White Sox, Upper Bros.
FOAL OF 1915—1, Upper Bros.; 2, Roberts.
CHAMPION FEMALE—Rosine.

CALGARY (Summer Fair)
AGED STALLION—1, Illico, W. B. Thorne; 2, Marathon, E. A. Davenport; 3, Marquis, Upper Bros.
STALLION, Three Years—1, Futurity, Upper Bros.; 2, Joker, Thorne.
STALLION, Two Years—1, Brilliant of Acme, Davenport; 2, Hamilton Bros.
STALLION, One Year—1, Prince Charlie, Upper Bros.; 2, Marquis of Acme, Davenport; 3, Marant of Acme, Davenport; 4, Mint, Thorne.
CHAMPION STALLION—Illico.
BROOD MARE with Foal at Side—1, Mellie, Davenport; 2, Rosebud, Davenport; 3, Ruby, Upper Bros.
FOAL—1 and 2, Davenport; 3, Upper Bros.

CALGARY (Summer Fair)
AGED STALLION—1, Boro Forester II, Countess Bubna; 2, Ossington Boss, T. Rawlinson; 3, Hampton Royal Friar, Rawlinson.
STALLION, Three Years—1, Lorryman, F. Schroeder.
STALLION, Two Years—1, Tuttle Brook Prince, P. M. Bredt.
STALLION, One Year—1, Henley Kohinoor, Rawinson.
BROOD MARE—1, Gay Lass, G. Lee, Warner.
FOAL—Warner.
DRY MARE—1 and 2, Moulton Searchlight and Brunslade Vinia, Bubna.

MARE AND TWO OF HER PROGENY—1, Upper Bros., on progeny of Verla; 2, Davenport, on progeny of Mellie.
DRY MARE—1, 2, 3 and 4—Upper Bros., on Rosine, Irene, Lesta and Verla.
FILLY, Three Years—1, Lily of Acme, Davenport; 2 and 3, Upper Bros., on Mamie and Mayflower.
FILLY, Two Years—1, Brillantine of Acme, Davenport; 2, 3 and 4, Upper Bros., on Quicklight, Jeanette and Sprightly.
FILLY, One Year—1, Maradot of Acme, Davenport; 2, White Sox, Upper Bros.
CHAMPION MARE—Rosine.

LONDON.

STALLION, AGED—1, T. D. Elliott, on Irade; 2 and 3, Hamilton & Son, on Kavignac and Longtemps.
STALLION, Three Years—1, Alex. McNiven.
STALLION, Two Years—1, Guest.
STALLION, One Year—1, Gurney & Son.
CHAMPION STALLION—Irade.
BROOD MARE—1, E. E. Hanmer, on Bien-A-Moi; 2, J. W. Coulter, on Polly; 3, A. W. Dobson, on Karavan; 4, Henderson Bros., on Mary Queen.
MARE, Three Years—1, Gould; 2, Hanmer.
FILLY, YEARLING—1, J. Haas; 2, Dobson.
FOAL—1, Coulter; 2, Hanmer; 3, Henderson; 4, Dobson.
CHAMPION MARE—Kalmouck.

Shires

YEARLING FILLY—1 and 2, Coulee Conqueress and Merion Forest Queen, Warner.
TEAM IN HARNESS—1, Warner.
BEST TWO MARES—1, Bubna; 2, Warner.
CANADIAN NATIONAL
AGED STALLION—1, T. H. Hassard, on Gillibrand Swell, by Brandon Drayman; 2, Johnston Bros., on King Junior by Palterton First King; 3, Jas. Callander, on Verona Leader gy Uncle Sam 4th.
STALLION, Three Years Old—1, J. M. Gardhouse, on Dunsmore Nateby

by Dunsmore Proctor.

STALLION, One Year Old—1, Johnston, on Prince Charles of Lambton by Prince Charles of Waresley.

CHAMPION STALLION—Dunsmore Nateby.

FILLY, Two Years Old—1, Gardhouse, on Heather Belle by Waverley Rex.

BROOD MARE, with Foal by Her Side—1, Johnston, on Denstow Fuschia by Dunsmore Professor.

YELD MARE—1, Gardhouse, on Rokeby Halo by Madresfield Thumper; 2, Johnston, on Gray Fuschia by Proportion.

FOAL of 1915—1, Johnston.

CHAMPION FEMALE—Rokeby Halo.

BEST STRING OF FIVE—Johnston.

LONDON.

STALLION, AGED—1, Johnston Bros., on King Junior; 2, R. E. Kells, on Maplehurst Forest Lad.

STALLION, One Year Old—1, Johnston Bros.

CHAMPION STALLION — King Junior.

BROOD MARE with Foal—1, Johnston Bros., on Dustow Fuchsia; 2, Webster Bros.

FILLY, Three Years Old—1, Webster Bros.

FILLY, Two Years Old—1 and 2, J. Leeson; 3, Webster Bros.

FILLY FOAL—1, Johnston Bros.; 2, Webster Bros.

BEST MARE ANY AGE—Johnston Bros., on Grey Fuchsia.

Shorthorns

CANADIAN NATIONAL, 1915.

BULL, Three Years and Over—1 and 3, J. A. Watt, on Gainford Marquis, and Browndale; 2, A. F. and G. Auld, on Burnbrae Sultan; 4, Jno. Gardhouse, on Lavender Sultan; 5, Kyle Bros., on Nonpareil Ramsden.

BULL, Two Years—1, Watt, on Gainford Perfection; 2, Marquis, on Lancaster Lad; 3, Jno. Watt & Son, on Gainford Select.

BULL, SENIOR YEARLING—1, Robt. Duff, on Augusta's Fairview; 2, Jas. Leask, on Royal Sultan; 3, Geo. D. Fletcher, on Victor Stamford.

BULL, JUNIOR YEARLING—1, Gardhouse, on Cecilia Sultan; 2, Geo. Amos, on Sea Gem's Pride; 3, Geo. Gier, on Escana Champion.

BULL, SENIOR CALF—1, Auld, on Field Marshal; 2, Watt & Son, on Irvinedale Select; 3, Watt, on Lady's Garland; 4 and 5, Mitchell Bros., on Escana Perfection, and Escana Favorite.

BULL, JUNIOR CALF—1, Amos, on Royal Scot; 2, Mitchell, on Escana Bandsman; 3 and 5, Auld, on Gounty Guy, and Commander-in-Chief; 4, Kyle, on Cupbearer.

CHAMPION BULL—Gainford Marquis.

JUNIOR CHAMPION BULL—Cecilia Sultan.

COW, Three Years and Over—1, Auld, on Nonpareil 46th; 2, Kyle, on Lady of the Valley 7th; 3, 4 and 5, Watt, on Thelma 2nd, Sittyton Lady, and Duchess of Gloster 75th.

HEIFER, Two Years—1 and 2, Watt, on Silver Queen, and Ury Queen; 3, Auld, on Mabel Mysie; 4, Kyle, on Village Maid 37th; 5, Gardhouse, on Cecilia Beauty.

HEIFER, SENIOR YEARLING—1, 3 and 4, Auld, on Countess 16th, Rosebud and Eden Mills Wimple; 2, Mitchell, on Escana Duchess; 5, Watt & Son, on Village Bridesmaid.

HEIFER, JUNIOR YEARLING—1 and 2, Watt, on Choice Gem and Village Rose; 3, Auld, on Miss Orange Blossom; 4 and 5, Mitchell, on Escana Duchess 2nd, and Escana Cranberry 2nd.

HEIFER, SENIOR CALF—1, 2 and 6, Watt, on Red Missie 2nd, Countess Selma 4th, and Duchess of Gloster 62nd; 3 and 5, Auld, on Countess Missie, and Queen Elizabeth; 4, Kyle, on Jealousy 7th.

HEIFER, JUNIOR CALF—1 and 5, Mitchell, on Escana Beauty 2nd, and Escana Blossom; 2 and 4, Watt, on Thelma 3rd, and Jealousy 6th; 3, Auld, on Moss Rose 3rd.

COW OR HEIFER (Dual-purpose), Two Years or Over, in Milk—1 and 6, Gardhouse, on Cecilia Rose, and Cecilia Gem; 2, Watt & Son, on Rose Bud 2nd; 3 and 4, Watt, on Thelma 2nd, and Village Queen; 5, J. Brown & Sons, on Royal Mysie's Girl.

SENIOR AND GRAND CHAMPION FEMALE—Silver Queen.

JUNIOR CHAMPION FEMALE—Countess 16th.

GRADED HERD—1 and 2, Watt; 3,

Auld; 4, Kyle; 5, Gardhouse.
 JUNIOR HERD—1, Watt; 2, Auld; 3, Mitchell; 4, Kyle; 5, Gardhouse.
 BREEDER'S HERD—1, Auld; 2, Mitchell; 3, Kyle; 4, Gardhouse.
 BEST FIVE ANIMALS, Get of One Sire—1, Watt; 2, Auld; 3, Mitchell; 4, Kyle; 5, Gardhouse.
 BEST THREE ANIMALS, Get of One Sire—1, Watt; 2, Auld; 3, Mitchell; 4, Kyle; 5, Gardhouse.
 BEST TWO ANIMALS, Progeny of One Cow—1, Watt & Son; 2, Mitchell; 3, Auld; 4, Gardhouse; 5, Kyle.

CANADA CENTRAL.

AGED BULL—1, J. A. Watt, on Browndale; 2, Jno. Gardhouse, on Laveneder Sultan; 3, Kyle Bros., on Nonpareil Ramsden.
 BULL, Two Years—1, J. Watt & Son, on Gainford Select; 2, Frank Buck, on Silver King.
 BULL, JUNIOR YEARLING — 1, Gardhouse, on Cecilia Sultan; 2, Kyle Bros., on Spring Valley Star.
 BULL, SENIOR CALF—1, Watt, on Lady's Garland; 2 and 4, Watt & Son, on Irvinedale Selection, and Irvinedale Select; 3, Kyle Bros., on Spring Valley Dreadnought.
 BULL, JUNIOR CALF—1, Kyle Bros., on Cupbearer; 2 and 3, T. Scobie, on Star of Maple Grove, and Lucky Lad; 4, Buck, on Emperor 4th.
 GRAND CHAMPION BULL—Brown-dale.
 AGED COW—1, Watt, on Duchess of Gloster 78th; 2, Kyle Bros., on Lady of the Valley 7th; 3, Scobie, on Jessie Jones 2nd.
 HEIFER, Two Years—1, Watt, on Ury Queen; 2, Gardhouse, on Cecilia Beauty; 3 and 4, Kyle Bros., on Village Maid 37th, and Meadow Queen.
 HEIFER, SENIOR YEARLING—1, Kyle Bros., on Golden Drop 20th; 2, Watt & Son, on Village Bridesmaid; 3, Watt, on Orange Lady 4th; 4, Gardhouse, on Sultan's Lady.
 HEIFER, JUNIOR YEARLING—1, Watt, on Village Rose; 2, Watt & Son, on Clara of Oak Blu 2nd; 3, Gardhouse, on Cecilia Lavender; 4, Scobie, on Star of Maple Grove 2nd.
 HEIFER, SENIOR CALF—1 and 3, Watt, on Countess Selma 4th and Duchess of Gloster 62nd; 2, Kyle Bros., on Jealousy 7th; 4, Gardhouse, on Blossom's Fragrance.

HEIFER, JUNIOR CALF—1 and 2, Watt, on Ideal Lady and Jealousy 6th; 3, Gardhouse, on Silver Queen; 4, Kyle Bros., on Spring Valley Goldie.
 CHAMPION FEMALE—Duchess of Gloster 78th.
 GRADED HERD—1, Watt; 2, Kyle Bros.; 3, Gardhouse.
 JUNIOR HERD—1, Watt; 2, Kyle Bros.; 3, Gardhouse.
 FOUR CALVES, Bred and Owned by Exhibitor—1, Watt & Son; 2, Kyle Bros.

EDMONTON (Summer Fair, 1915)

AGED BULL—1, Browndale, J. A. Watt; 2, Burnbrae Sultan, A. F. & G. Auld; 3, Oakland Star, J. G. Barron; 4, Doune Companier, A. R. Gillies.
 BULL, Two Years—1, Gainford Perfection, Watt; 2, Fairview Again, Barron; 3, Opportunity, Yule and Bowes.
 SENIOR YEARLING BULL—1, Fairview Jubilee King, Barron; 2, Oak Bluff Captain, Watt; 3, Oak Bluff Judge, Yule and Bowes.
 JUNIOR YEARLING BULL—1, Emma's Prince, Barron; 2, Sylvan Power, Auld; 3, Willow Ridge Marquis, Yule and Bowes.
 BULL, SENIOR CALF—1, Oak Bluff Marshall, Yule and Bowes; 2, Field Marshall, Auld; 3, Lancaster Prince, Yule and Bowes; 4, Ladies Garland, Watt.
 BULL, JUNIOR CALF—1, Country Guy, Auld; 2, Duke Browndale, Watt; 3, Fairview Lavender, Barron; 4, Goldust, Watt.
 JUNIOR CHAMPION BULL—Emma's Prince.
 SENIOR AND GRAND CHAMPION BULL—Gainford Perfection.
 AGED COW—1, Thelma 2nd, Watt; 2, Emma of Oak Bluff, Barron; 3, Nonpareil 46th, Auld; 4, Spring Valley Buckingham, Yule and Bowes; 5, Sittyton Lady, Watt.
 HEIFER, Two Years—1, Silver Queen, Watt; 2, Mable Mysie, Auld; 3, Fairview Baroness Queen, Barron; 4, Ury Queen, Watt; 5, Missie Maid, Yule and Bowes.
 SENIOR YEARLING HEIFER—1, Countess 16th, Auld; 2, Rosebud, Auld; 3, Orange Lady 4th, Watt; 4,

- Duchess of Lancaster, Yule and Bowes.
- JUNIOR YEARLING HEIFER—1, Village Rose, Watt; 2, Miss Orange Blossom, Auld; 3, Choice Gem, Watt; 4, Maple Leaf Baroness; 5, Oak Bluff Melba 3rd, Yule and Bowes.
- SENIOR HEIFER CALF—1, Red Missie 2nd, Watt; 2, Countess Selma 4th, Watt; 3, Countess Missie, Auld; 4, Gracie, Barron; 5, Queen Elizabeth, Auld.
- JUNIOR CALF—1, Lancaster Queen, Yule and Bowes; 2, Thelma 3rd, Watt; 3, Oakland Mysie, Yule and Bowes; 4, Winnifred, Barron.
- JUNIOR CHAMPION FEMALE—Countess 16th.
- SENIOR AND GRAND CHAMPION FEMALE—Silver Queen.
- GRADED HERD—1, Watt; 2, Auld; 3, Barron; 4, Yule and Bowes.
- THREE CALVES—1, Yule and Bowes; 2, Watt; 3, Auld; 4, Barron.
- GET OF SIRE—1, Watt; 2, Barron; 3, Yule and Bowes; 4, Auld.
- PROGENY OF COW—1, Watt; 2, Yule and Bowes; 3, Auld; 4, Barron.
- BRANDON (Summer Fair, 1915)
- AGED BULL—1, Oakland Star, J. G. Barron; 2, Browndale, J. A. Watt; 3, Burnbrae Sultan, A. F. and G. Auld; 4, Huntleywood 8th, Wm. Lelond.
- BULL, Two Years—1, Gainford Perfection, Watt; 2, Fairview Again, Barron; 3, Opportunity, Yule and Bowes.
- SENIOR YEARLING BULL—1, Oak Bluff Judge, Yule and Bowes; 2, Fairview Jubilee King, Barron; 3, Oak Bluff Captain, Watt; 4, Knight of the Garter, Watt.
- JUNIOR YEARLING BULL—1, Emma's Prince, Barron; 2, William Ridge Marquis, Yule and Bowes; 3, Sylvan Power, A. F. and G. Auld; 4, Fancy Lord, Miller; 5, Fair Sultan, Yule and Bowes.
- SENIOR BULL CALF—1, Oak Bluff Marshal, Yule and Bowes; 2, Field Marshall, A. F. and G. Auld; 3, Lancaster Prince, Yule and Bowes; 4, Ladies' Garland, Watt.
- JUNIOR BULL CALF—1, Fairview Lavender, Barron; 2, Duke Browndale, Watt; 3, Commander-in-Chief, A. F. and G. Auld; 4, Scottish Marquis, Yule and Bowes; 5, Gold Dust, Watt.
- GRAND CHAMPION BULL—Gainford Perfection.
- JUNIOR CHAMPION BULL—Emma's Prince.
- AGED COW—1, Emma of Oak Bluff, Barron; 2, Sittyton Lady, Watt; 3, Spring Valley Buckingham, Yule and Bowes; 4, Nonpareil 46th, A. F. and G. Auld; 5, Thelma 2nd, Watt.
- HEIFER, Two Years—1, Silver Queen, Watt; 2, Ury Queen, Watt; 3, Mabel Missie, A. F. and G. Auld; 4, Fairview Baroness Queen, Barron; 5, Missie's Maid, Yule and Bowes.
- SENIOR, YEARLING HEIFER—1, Countess 16th, A. F. and G. Auld; 2, Duchess of Lancaster 15th, Yule and Bowes; 3, Fairview Jubilee Queen 3rd, Barron; 4, Orange Lady 4th, Watt; 5, Lavender 45th, Barron.
- JUNIOR YEARLING HEIFER—1, Choice Gem, Watt; 2, Village Rose, Watt; 3, Miss Orange Blossom, A. F. and G. Auld; 4, Oak Bluff Melba, Yule and Bowes.
- SENIOR HEIFER CALF—1, Countess Selma 4th, Watt; 2, Red Missie 2nd, Watt; 3, Countess Missie, A. F. and G. Auld; 4, Queen Elizabeth, A. F. and G. Auld; 5, Gracie, Barron.
- JUNIOR HEIFER CALF—1, Oakland Mysie, Yule and Bowes; 2, Lancaster Queen 2nd, Yule and Bowes; 3, Winnifred, Barron; 4, Thelma 3rd, Watt; 5, Kilblean Beauty 25th, A. F. and G. Auld.
- GRAND CHAMPION FEMALE—Silver Queen.
- GRADED HERD—1 and 4, Watt; 2, Barron; 3, Auld.
- JUNIOR HERD—1, Auld; 2, Barron; 3, Watt; 4, Yule and Bowes.
- CALF HERD—1, Auld; 2, Barron; 3, Lelond.
- GET OF SIRE—1 and 4, Watt; 2, Barron; 3, Yule and Bowes; 5, Auld.
- PROGENY OF COW—1, Watt; 2, Auld; 3 and 4, Barron.
- REGINA (Summer Fair)
- AGED BULL—1, Browndale, J. A. Watt; 2, Burnbrae Sultan, A. F. and G. Auld; 3, Oakland Star, Barron.
- BULL Two Years—1, Gainford Perfection, Watt; 2, Fairview Again, J. G. Barron; 3, Opportunity, Yule & Bowes; 4, Oak Bluff Victor, E. B. Cutler.

- BULL, SENIOR YEARLING — 1, Fairview Jubilee King, Barron; 2, Oak Bluff Judge, Yule & Bowes; 3, Knight of the Garter, Watt; 4, Oak Bluff Captain, Watt.
- BULL, JUNIOR YEARLING—1, Emma's Prince, Barron; 2, Sylvan Power, Auld; 3, Willow Ridge Marquis, Yule & Bowes.
- SENIOR BULL CALF—1, Oak Bluff Marshall, Yule & Bowes; 2, Field Marshall, Auld; 3, Ladies' Garland, Watt; 4, Lancaster Prince, Yule & Bowes.
- JUNIOR CALF—1, Barron: 2 and 3, Auld; 4, Watt.
- JUNIOR CHAMPION BULL—Oak Bluff Marshall.
- SENIOR AND GRAND CHAMPION BULL—Gainford Perfection.
- AGED COW—1, Nonpareil 46th, Auld; 2, Thelma 2nd, Watt; 3, Spring Valley Buckingham, Yule and Bowes; 4, Emma of Oak Bluff, Barron; 5, Sittyton Lady, Watt.
- HEIFER, Two Years—1, Silver Queen, Watt; 2, Fairview Baroness, Barron; 3, Ury Queen, Watt; 4, Missie's Maid, Yule & Bowes; 5, Mable Mysie, Auld.
- HEIFER, SENIOR YEARLING—1, Countess 16th, Auld; 2, Miss Clipper 3rd, J. W. Barnett; 3, Duchess of Lancaster 5th, Yule & Bowes; 4, Rose-i-Bud, Auld.
- HEIFER, JUNIOR YEARLING—1, Choice Gem, Watt; 2, Miss Orange Blossom, Auld; 3, Oak Bluff Melba, Yule & Bowes; 4, Village Rose, Watt.
- SENIOR HEIFER CALF—1, Countess Thelma 4th, Watt; 2, Countess Missie, Auld; 3, Red Missie 2nd, Watt; 4, Queen Elizabeth, Auld.
- JUNIOR HEIFER CALF—1, Lancaster Queen 2nd, Yule & Bowes; 2, Winnifred, Barron; 3, Kilbean Beauty, Auld; 4, Oakland Mysie, Yule & Bowes.
- JUNIOR CHAMPION FEMALE—Countess 16th.
- SENIOR AND GRAND CHAMPION —Silver Queen.
- GRADED HERD—1, Watt; 2, Auld; 3, Barron; 4, Yule & Bowes.
- FOUR CALVES—1, Auld; 2, Barron; 3, Barnett.
- THREE, GET OF ONE SIRE—1, Barron; 2, Auld; 3, Barnett.
- SASKATOON, 1915
- AGED BULL—1, J. A. Watt; 2, A. F. and G. Auld; 3, J. G. Barron.
- BULL, Two Years—1, Watt; 2, Barron; 3, Yule & Bowes.
- BULL, SENIOR YEARLING—1, Barron; 2, Watt; 3, Yule & Bowes.
- BULL, JUNIOR YEARLING—1, Barron; 2, Auld; 3, Yule & Bowes.
- BULL, SENIOR CALF—1, Yule & Bowes; 2, Auld; 3, Yule & Bowes; 4, Watt.
- BULL, JUNIOR CALF—1, Auld; 2, Watt; 3, Barron; 4, Yule & Bowes.
- AGED COW—1, Barron; 2, Yule & Bowes; 3, Auld; 4, Watt.
- COW IN MILK—1 and 2, Watt; 3 and 4, Yule & Bowes.
- HEIFER, Two Years—1 and 3, Watt; 2, Auld; 4, Barron.
- HEIFER, SENIOR YEARLING—1, 2 and 4, Auld; 3, Watt.
- HEIFER, JUNIOR YEARLING—1 and 2, Watt; 3, Auld; 4, Barron.
- SENIOR HEIFER CALF—1, Barron; 2 and 3, Watt; 4, Auld.
- JUNIOR HEIFER CALF—1 and 3, Yule & Bowes; 2, Watt; 4, Barron.
- JUNIOR CHAMPION BULL—Emma's Prince, Barron.
- SENIOR AND GRAND CHAMPION BULL—Gainford Perfection, Watt.
- JUNIOR CHAMPION FEMALE—1, Countess 16th, Auld.
- SENIOR AND GRAND CHAMPION FEMALE—Silver Queen, Watt.
- GRADED HERD—1, Watt; 2, Auld; 3, Barron; 4, Yule & Bowes.
- JUNIOR HERD—1, Auld; 2, Watt; 3, Barron.
- THREE, GET OF SIRE—1, Watt; 2, Barron; 3, Yule & Bowes.
- TWO, PROGENY OF COW—1, Watt; 2, Auld; 3, Barron.
- CALGARY (Summer Fair)
- BULL, Two Years—1, Opportunity, P. M. Bredt; 2, Matchless Hero, H. S. Currie.
- SR. YEARLING BULL—1, Bold Boy, Currie; 2, Oak Bluff Judge, Yule & Bowes; 3, Reciprocate, Mrs. Bredt; 4, Woodlands Tom, Mrs. Bredt.
- JUNIOR YEARLING BULL—1, Willow Ridge Marquis, Currie; 2, Fair Sultan, Yule & Bowes; 3, Ythan Lad, Currie; 4 and 5, Norman Boy, and Flower King, Mrs. Bredt.
- SENIOR BULL CALF—1, Oak Bluff

- Marshall, Yule & Bowes; 2, Lancaster Prince, Yule & Bowes; 3, Ailsa 4th, Geo. Sangster, De Winton.
- JUNIOR BULL CALF—1, Scottish Marquis, Yule & Bowes.
- CHAMPION BULL—Opportunity, Bredt.
- COW, Three Years or Over—1, Spring Valley Buckingham, Yule & Bowes.
- HEIFER, Two Years—1, Missie's Maid, Yule & Bowes.
- SENIOR YEARLING HEIFER—1, Duchess of Lancaster 15th, Yule & Bowes; 2, Oak Bluff Fancy, Yule & Bowes.
- JUNIOR YEARLING HEIFER—1, Oak Bluff Melba; 2, May Violet 4th, Yule & Bowes.
- SENIOR HEIFER CALF—1, 2 and 3, Yule & Bowes.
- JUNIOR HEIFER CALF—1 and 2, Yule & Bowes.
- CHAMPION FEMALE—Duchess of Lancaster 15th.
- RESERVE—Spring Valley Buckingham.
- THREE, GET OF SIRE—1, Yule & Bowes, on get of Missie Prince.
- TWO, PROGENY OF COW—1, Yule & Bowes.
- HERD—1 and 2, Yule & Bowes.
- BEST CANADIAN-BRED BULL—1, Machless Hero, Currie; 2, Oak Bluff Marshall, Yule & Bowes.
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- SHORTHORNS AT LONDON
- AGED BULLS—1, J. A. Watt, Gainford Marquis; 2, A. F. and G. Auld, on Burnbrae Sultan.
- BULL, Two Years Old—1, Watt, on Gainford Perfection; 2, D. A. Graham, on Canadian Statesman.
- BULL, SR. YEARLING—1, Robt. Duff, on Fairview Agusta.
- BULL, JR. YEARLING—1 and 2, Auld; 3, Mitchell Bros.
- BULL, SR. CALF—1, Auld; 2, R. & S. Nicolson; 3, Mitchell.
- BULL, JR. CALF—1 and 3, Auld; 2, Mitchell; 4, Nicolson.
- CHAMPION BULL—Gainford Marquis.
- COW, Three Years—1, Auld Nonpariel 46th; 2 and 3, Watt, on Sittyton Lady 3rd and Thelma 2nd.
- COW IN MILK—1, Watt; 2 and 3, Graham.
- HEIFER, Two Years—1, Watt, on Silver Queen; 2, Auld, on Mabel Mysie; 3, Graham.
- HEIFER, SR. YEARLING—1, 3 and 4, Auld; 2, Mitchell.
- JR. YEARLING HEIFER—1, Auld; 2 and 4, Watt; 3, Mitchell Bros.
- SR. HEIFER—1, Watt; 2 and 3, Auld; 4, Nicolson.
- HEIFER JR. CALF—1, Mitchell; 2, Watt; 3 and 4, Auld.
- CHAMPION FEMALE—Silver Queen.
- GRADED HERD—1, Watt; 2, Auld.
- JR. HERD—1, Auld; 2, Mitchell; 3, Watt.
- GET OF SIRE—1, Watt; 2, Auld.
- PROGENY OF COW—1, Watt; 2, Auld.

Herefords

- CANADIAN NATIONAL
- BULL, Three Years and Over—1, Jas. Page, on Bonnie Brae 31st; 2, W. Readhead, on Picton; 3, E. Reynolds, on Brenda Boy.
- BULL, Two Years—1, Clifford, on Lord Fairfax; 2, Readhead, on Bonnie Ingleside 7th.
- BULL, SENIOR YEARLING—1, L. D. Clifford, on Alvin Fairfax.
- BULL, JUNIOR YEARLING—1, 2 and 3, Reynolds, on Brae Real 3rd. Royal Prince and Dandy Jack.
- BULL, SENIOR CALF—1 and 2, W. H. & J. S. Hunter, on Prince, and Kitchener; 3 and 4, Clifford, on Refiner 56th, and Refiner 52nd.
- BULL, JUNIOR CALF—1, Page, on Brae Real 4th; 2, Hunter, on McGuire; 3, Readhead, on Brookdale Lad; 4, Clifford, on Lord Fairfax 2nd.
- GRAND CHAMPION BULL—Bonnie Brae 31st.
- JUNIOR CHAMPION BULL—Alvin Fairfax.
- COW, Three Years and Over—1 and 2, Clifford, on Miss Brae 26th, and Perfection Lass; 3, Page, on Miss Brae 40th; 4, Readhead, on Rubella Ingleside 33rd.
- HEIFER, Two Years—1, Page, on Miss Brae 50th; 2 and 4, Clifford, on Bonnie Queen, and Miss Princess 41st; 3, Reynolds, on Canadian Lassie; 5, Readhead, on Dimple.
- HEIFER, SENIOR YEARLING—1 and 3, Page, on Miss Brae Real 3rd,

- and Miss Dale 2nd; 2, Clifford, on Della Fairfax; 4, Hunter, on Miss Armour.
- HEIFER, JUNIOR YEARLING—1, Page, on Miss Brae Real 2nd; 2, Clifford, on Miss Brae 81st; 3, Hunter, on Mary Mischief; 4, Readhead, on Laura B.
- HEIFER, SENIOR CALF—1, Hunter, on Maid Marion; 2, Clifford, on Miss Brae 96th; 3, Readhead, on Ruby 3rd; 4, Page, on Miss Brae Real 6th.
- HEIFER, JUNIOR CALF—1 and 3, Hunter, on Princess Patricia, and Dearie; 2, Clifford, on May Queen 7th; 4, Page, on Miss Brae Real 10th.
- SENIOR AND GRAND CHAMPION COW—Miss Brae 26th.
- JUNIOR CHAMPION FEMALE—Miss Brae Real 3rd.
- GRADED HERD—1, Page; 2, Clifford; 3, Readhead.
- JUNIOR HERD—1, Clifford; 2, Page; 3, Hunter.
- BREEDER'S HERD—1, Clifford; 2, Page; 3, Hunter.
- BEST FIVE ANIMALS, Get of One Sire—1, Page; 2, Clifford; 3, Hunter; 4, Readhead.
- BEST TWO ANIMALS, Progeny of One Cow—1, Page; 2, Clifford; 3, Readhead; 4, Hunter.
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- OTTAWA, 1915
- AGED BULL—1, Jas. Page, on Bonny Brae 31st; 2, W. H. Hunter.
- BULL, Two Years—1, Hunter.
- BULL, One Year—1, Hunter.
- BULL, SENIOR CALF—1, Page, on Brae Real 4th; 2 and 3, Hunter, on Mons and Palmero.
- BULL, JUNIOR CALF—1 and 2, Page, on Brae Real 5th, and Brae Real 6th; 3, Hunter, on Panama.
- CHAMPION BULL—Bonnie Brae 31st.
- COW, Three Years and Over—1, Page, on Miss Brae 40th; 2 and 3, Hunter, on Gladys, and Marion.
- HEIFER, Two Years—1, Page, on Miss Brae 50th; 2 and 3, Hunter, on Nancy and Miss Brae.
- HEIFER, SENIOR YEARLING—1 and 2, Page, on Miss Brae Real 3rd, and Miss Dale 2nd; 3, Hunter, on Mary Mischief.
- HEIFER, JUNIOR YEARLING—1, Page, on Miss Brae Real 2nd; 2, Hunter, on Lady Grey.
- HEIFER, SENIOR CALF—1, Page, on Miss Brae Real 6th; 2, Hunter, on Miss Lady Brae.
- HEIFER, JUNIOR CALF—1, Page, on Miss Brae Real 10th; 2, Hunter, on Twin.
- CHAMPION FEMALE—Miss Brae 50th.
- GRADED HERD—1, Page.
- JUNIOR HERD—1, Page; 2, Hunter.
- FOUR CALVES, Bred and Owned by Exhibitor—1, Page; 2, Hunter.
- FOUR ANIMALS, Get of One Sire—1, Page.
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- REGINA (Summer Fair, 1915)
- AGED BULL—1, Bonnie Brae 31st, Jas. Page; 2, Perfect Fairfax, J. A. Chapman; 3, Paul Mack, Arm River Stock Farm.
- BULL, Two Years—1, Lord Fairfax, L. O. Clifford.
- BULL, SENIOR YEARLING—1, Alvin Fairfax, Clifford; 2, Perfection Lad, Chapman.
- BULL, JUNIOR YEARLING—1, Lawrence, Chapman; 2, Carroll King, Chapman.
- BULL CALF, SENIOR—1, Lord Mack, Arm River Stock Farm; 2, Refner 56th, Clifford; 3, Roseland Prince, Chapman.
- BULL CALF, JUNIOR—1, Brae Real 4th, Page; 2, Beau Lad, Chapman; 3, Brae Real 5th, Page.
- CHAMPION BULL—Bonnie Brae 31st.
- AGED COW—1, Perfection Lass, Clifford; 2, Miss Armour Fairfax, Chapman; 3, Bella 2nd, Chapman; 4, Miss Brae 26th, Clifford; 5, Miss Brae 40th, Page; 6, Queen, Chapman.
- HEIFER, Two Years—1, Miss Brae 50th, Page; 2, Mage Fairfax, Chapman; 3, Gladys Real, Chapman.
- SR. YEARLING HEIFER—1, Della Fairfax, Clifford; 2, Miss Brae Real 3rd, Page; 3, Miss Dale 2nd, Page; 4, Viola, Arm River Stock Farm.
- JR. YEARLING HEIFER—1, Beau Fairy, Chapman; 2, Miss Brae 81st, Clifford; 3, Miss Brae Real 2nd, Page.
- SR. HEIFER CALF—1, Beau Belle, Chapman; 2, Miss Brae 95th, Clifford; 3, Miss Brae 96th, Clifford; 4, Beau Lass, Chapman.
- JR. HEIFER CALF—1, Beau Mage, Chapman; 2, May Queen 7th, Clifford; 3, Beau Fairy 2nd, Chapman; 4, Miss Brae Real 9th, Page.
- BULL AND FOUR FEMALES,

Owned by One Exhibitor—1, Clifford; 2, Chapman; 3, Page.
 FOUR CALVES—1, Chapman; 2, Clifford; 3, Page.
 THREE, GET OF SIRE—1, Chapman; 2, Clifford; 3, Page.
 CHAMPION FEMALE—Beau Fairy.
 RESERVE—Perfection Lass.

SASKATOON (Summer, 1915)

AGED BULLS—1, Jas. Page; 2, J. A. Chapman; 3, Arm River Stock Farm.
 BULL, Two Years—1, L. O. Clifford.
 SR. YEARLING BULL—1, Clifford; 2, Chapman.
 JR. YEARLING BULL—1 and 2, Chapman.
 SR. BULL CALF—1, Clifford; 2, J. I. Moffatt, Carroll, Man.; 3, Arm River Stock Farm.
 JR. BULL CALF—1 and 3, Page; 2, Chapman.
 CHAMPION BULL—Page.
 AGED COW—1 and 3, Chapman; 2 and 4, Clifford.
 HEIFER, Two Years—1, Page; 2 and 3, Chapman.
 SR. YEARLING HEIFER—1, Clifford; 2 and 3, Page; 4, Arm River Stock Farm.
 JR. YEARLING HEIFER—1, Chapman; 2, Clifford; 3, Page.
 SR. HEIFER CALF—1 and 3, Chapman; 2, Clifford.
 JR. HEIFER CALF—1 and 3, Chapman; 2, Clifford.
 CHAMPION FEMALE AND RESERVE—Chapman.
 GRADED HERD—1, Chapman; 2, Page.
 JUNIOR HERD—1, Chapman; 2, Clifford; 3, Page.
 GET OF SIRE—1, Page; 2, Chapman; 3, Clifford.
 PROGENY OF COW—1, Page; 2, Clifford; 3, Chapman.

EDMONTON FAIR, 1915

AGED BULL—1, Bonny Briar 31st, Jas. Page; 2, Perfect Fairfax, J. A. Chapman; 3, Beau Perfection 11th, Frank Collicutt; 4, Bonny Brae 25th, Smith.
 BULL, Two Years—1, Lord Fairfax, L. O. Clifford.
 SR. YEARLING BULL—1, Alvin Fairfax, Clifford; 2, Perfection Lad, Chapman; 3, Fairfax Perfection, Collicutt.
 JR. YEARLING BULL—1, Lawrence,

Chapman; 2, Carroll King, Chapman.
 SR. BULL CALF—1, Advance, Moffatt; 2, Refiner 56th, Clifford; 3, Willow Spring Doubter, Collicutt; 4, Refiner 51st, Clifford; 5, Roseland Prince, Chapman.

JR. BULL CALF—1, Greenwood Fairfax, V. W. Smith; 2, Brae Real 4th, Page; 3, Beau Lad, Chapman; 4, Brae Real 5th, Page.
 JR. CHAMPION BULL—Alvin Fairfax.

SR. AND GRAND CHAMPION BULL—Bonny Brae 25th.

AGED COW—1, Miss Armour Fairfax, Chapman; 2, Perfection Lass, Clifford; 3, Rella 2nd, Chapman; 4, Miss Brae 26th, Clifford; 5, Sally, Collicutt.

HEIFER, Two Years—1, Miss Brae 50th, Page; 2, Mage Fairfax, Chapman; 3, Gladys Real, Chapman; 4, May Queen, Smith.

SR. YEARLING HEIFER—1, Della Fairfax, Clifford; 2, Miss Brae Real 3rd, Page; 3, Miss Dale 2nd, Page.

JR. YEARLING HEIFER—1, Beau Fairy, Chapman; 2, Miss Brae Real 2nd, Page; 3, Miss Brae 81st, Clifford; 4, Willow Spring Gossip, Collicutt.

SR. HEIFER CALF—1, Beau Belle, Chapman; 2, Miss Brae 95th, Clifford; 3, Miss Brae Real 6th, Page; 4, Beau Lass, Chapman; 5, Miss Brae Real 7th, Page.

JR. HEIFER CALF—1, Beau Fairy 2nd, Chapman; 2, May Queen 7th, Clifford; 3, Beau Mage, Chapman; 4, Miss Brae Real 9th, Page.

JR. CHAMPION HEIFER—Beau Fairy.

SR. AND GRAND CHAMPION FEMALE—Miss Armour, Fairfax.
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 GRADED HERD—1, Chapman; 2, Page.

JUNIOR HERD—1, Chapman; 2, Clifford; 3, Page.

THREE, Get of One Sire—1, Page; 2, Chapman; 3, Clifford.

TWO, PROGENY OF COW—1, Page; 2, Clifford; 3, Chapman.

BRANDON (Summer Fair, 1915)

AGED BULL—1, Bonnie Brae 31st, Jas. Page; 2, Perfect Fairfax, J. I. Moffatt; 3, Generation, Jones Bros.
 BULL, Two Years—Lord Fairfax, L. O. Clifford.

- SR. YEARLING BULL—1, Perfection Lad, J. A. Chapman; 2, Alvin Fairfax, Chapman.
- JR. YEARLING BULL—1, Lawrence, Chapman; 2, Carroll King, Chapman.
- SR. BULL CALF—1, Advance, Mof-fat; 2, Refiner 56th, Clifford; 3, Polled Everett, Jones Bros.; 4, Rose-land Prince, Chapman.
- JR. BULL CALF—1 and 4, Chapman; 2 and 3, Page.
- JUNIOR CHAMPION BULL—Perfection Lad.
- SENIOR AND GRAND CHAMPION BULL—Bonnie Brae 31st.
- AGED COW—1, Miss Armour Fairfax, Chapman; 2, Rella 2nd, Chapman; 3, Perfection Lass, Clifford; 4, Miss Brae 26th, Clifford; 5, Queen, Chapman.
- HEIFER, Two Years—1, Patra Fairfax, Clifford; 2, Maggie Fairfax, Chapman; 3, Miss Brae 50th, Page; 4, Gladys Real, Chapman.
- SR. YEARLING HEIFER—1, Della Fairfax, Clifford; 2, Miss Brae Real 3rd, Page; 3, Miss Dale 2nd, Page; 4, Beau Virgie, Chapman.
- JR. YEARLING HEIFER—1, Beau Fairy, Chapman; 2, Miss Brae Real 2nd, Page; 3, Miss Brae 81st, Clifford; 4, Polled Mattie, Jones Bros.
- SR. HEIFER CALF—1 and 2, Clifford; 3 and 4, Chapman; 5, Page.
- JR. HEIFER CALF—1 and 3, Chapman; 2, Clifford; 4, Page.
- SR. CHAMPION FEMALE—Miss Armour Fairfax, Chapman.
- JR. AND GRAND CHAMPION FEMALE—Beau Fairy, Chapman.
- GRADED HERD—1, Chapman; 2, Clifford; 3, Page.
- YOUNG HERD—1, Chapman; 2, Clifford; 3 and 4, Page.
- BEST TWO CALVES Under One Year—1, Clifford; 2, Chapman; 3, Page.
- PROGENY OF COW—1 and 4, Chapman; 2, Clifford; 3, Page.
- GET OF SIRE—1, Clifford; 2, Chapman; 3 and 4, Page.
- CALGARY (Summer Fair)
- AGED BULL—1, Bonnie Brae 31st, James Page; 2, Beau Perfection 2nd, Frank Collicut; 3, Drum Major, Jones.
- BULL, Two Years—1, Lord Fairfax, L. O. Clifford; 2, Daysland King, Collicut; 3, Alberta Don, Boggs.
- SR. YEARLING BULL—1, Fairfax Perfection, Collicut; 2, Alvin Fairfax, Clifford.
- JR. YEARLING BULL—1, Western King, Jones.
- SR. BULL CALF—1, Alberta Don 2nd, O. A. Boggs; 2, Refiner 56th, Clifford; 3, Willow Springs Doubter, Collicut.
- JR. BULL CALF—1, Brae Real 4th; 2, Brae Real 5th, Page.
- CHAMPION BULL—Lord Fairfax.
- RESERVE—Bonnie Brae 31st.
- AGED COW—1, Miss Brae 26th; 2, Perfection Lass, Clifford; 3, Sally, Collicut; 4, Miss Brae 40th, Page.
- HEIFER, Two Years—1, Patra Fairfax, Clifford; 2, Miss Brae 50th, Page.
- SR. YEARLING HEIFER—1, Della Fairfax, Clifford; 2, Miss Brae Real 3rd, Page; 3, Miss Dale 2nd, Page.
- JR. YEARLING HEIFER—1, Miss Brae 81st, Clifford; 2, Miss Brae Real 2nd, Page; 3, Collicut.
- SR. HEIFER CALF—1, Clifford; 2 and 3, Page.
- JR. HEIFER CALF—1, Collicut; 2, Clifford; 3, Page.
- CHAMPION FEMALE—Patra Fairfax.
- HERD—1, Clifford; 2, Page.
- GET OF SIRE—Clifford.
- PROGENY OF COW—Clifford.

Aberdeen Angus

- CANADIAN NATIONAL
- BULL, Three Years and Over—1, Jno. Lowe, on Black Abbott Prince; 2, Jas. Bowman, on Beauty's Irwin; 3, Bowman, on Young Leroy.
- BULL, Two Years—1, Leask & Sons, on Middlebrook Prince 4th.
- BULL, SR. YEARLING—1, Thos. Broadfoot, on Balmedie Proud Elgin; 2, J. D. Larkin, on Bravo's Prince of Larkin Farm.
- BULL, JR. YEARLING—1, Thos. Broadfoot, on Balmedie Guy; 2, Larkin, on Justice of Larkin Farm.
- SR. BULL CALF—1, Lowe, on Middlebrook Abbott 2nd; 2, Bowman, on Elm Park Puck; 3, Larkin, on Brigadier of Larkin Farm; 4, Bowman, on Elm Park Kelso.
- JR. BULL CALF—1, Lowe, on Middlebrook Rover 5th; 2, Larkin, on Viscount of Larkin Farm; 3, Bow-

- man, on Elm Park Wizard 5th.
GRAND CHAMPION BULL—Black-Abbott Prince.
JUNIOR CHAMPION BULL—Balmedie Proud Elgin.
COW, Three Years and Over—1 and 2, Bowman, on Elm Park Rosebud 11th, and Elm Park Witch 2nd; 3 and 4, Larkin, on Pride of Glen Rose, and Everlasting.
HEIFER, Two Years—1 and 2, Bowman, on Elm Park Beauty 8th, and Elm Park Rosebud 17th; 3 and 4, Larkin, on Stumpie of Glencairn, and Lady Cheerful of Glencairn.
SR. YEARLING HEIFER—1 and 2, Broadfoot, on Balmedie Pride 4th, and Balmedie Fergus Beauty; 3 and 4, Lowe, on Middlebrook Pride 11th, and Middlebrook Beauty 6th.
JR. YEARLING HEIFER—1, Bowman, on Elm Park Keepsake 17th; 2, Larkin, on Stumpie of Larkin Farm; 3, Bowman, on Elm Park Rosebud 20th; 4, Larkin, on Primrose of Larkin Farm.
SR. HEIFER CALF—1 and 2, Larkin, on Lady Cheerful of Larkin Farm, and Rosalind of Larkin Farm; 3, Bowman, on Emmeline of Larkin Farm; 4, Lowe, on Middlebrook Pride 15th.
JR. HEIFER CALF—1, Lowe, on Middlebrook Pride 16th; 2, Bowman, on Elm Park Rosebud 23rd; 3, Larkin, on Stumpie of Larkin Farm 3rd.
THREE ANIMALS, Get of One Sire—1, Broadfoot; 2 and 3, Bowman; 4, Lowe.
TWO ANIMALS, Progeny of One Cow—1 and 2, Bowman; 3, Broadfoot; 4, Larkin.
FOUR CALVES—1, Lowe; 2, Larkin; 3, Bowman.
GRADED HERD—1 and 2, Bowman; 3, Larkin.
JUNIOR HERD—1, Broadfoot; 2, Bowman; 3, Lowe; 4, Larkin.
BREEDER'S HERD—1, Broadfoot; 2, Bowman; 3, Lowe.
SR. CHAMPION FEMALE—Elm Park Beauty 8th.
JR. AND GRAND CHAMPION FEMALE—Pride 4th.
FIVE ANIMALS, the Get of One Sire—1, Bowman; 2, Broadfoot; 3, Larkin, on Elm Park Wizard 5th.
GRAND CHAMPION BULL—Black-Abbott Prince.
BULL, Two Years—1, David N. Doods, on Balmedie King 5th.
BULL, SR. YEARLING—1, Larkin, on Bravo's Prince of Larkin Farm.
BULL, JR. YEARLING—1, Wm. Channon & Son, on Elm Park Pat; 2, Larkin, on Justice of Larkin Farm; 3, McLeod, on Bingo Chief.
BULL, SR. CALF—1, Lowe, on Middle Brook Abbott 2nd; 2, Larkin, on Brigadier of Larkin Farm; 3, McLeod, on Middlebrook King 5th.
BULL JR. CALF—1, Lowe, on Middle Brook Rover 5th; 2, Larkin, on Viscount of Larkin Farm; 3, McLeod, on Middle Brook King 6th.
CHAMPION BULL—Black Abbott Prince.
AGED COW—1 and 2, Larkin, on Pride of Glen Rose and Everlasting; 3, Channon, on Lady Clara 2nd.
HEIFER, Two Years—1 and 2, Larkin, on Stumper of Glencairn and Lady Cheerful of Glencairn.
HEIFER, SR. YEARLING—1 and 2, Lowe, on Middle Pride 11th and Middle Brook Beauty 6th; 3, Channon, on Lillian of Sunny Acres.
HEIFER, JR. YEARLING—1 and 2, Larkin, on Stumpie of Larkin Farm and Primerose of Larkin Farm; 3, Channon, on Lucy Black of Sunny Acres.
HEIFER, SR. CALF—1 and 3, Larkin, on Roseline of Larkin Farm and Lady Cheerful of Larkin Farm; 2, Low, on Middle Brook Pride 15th.
HEIFER, JR. CALF—1, Lowe; 2 and 3, Channon.
CHAMPION FEMALE—Pride of Glenrose.
GRADED HERD—1, Larkin; 2, McLeod; 3, Dodds.
JUNIOR HERD—1, Lowe; 2, Larkin; 3, Channon.
GET OF SIRE—1, McLeod.
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- CALGARY (Summer Fair)**
AGED BULL—1, E. P. Ringleader 7th, L. McComb; 2, Elm Park Mailbag, Lew Hutchinson; 3, Dakota Blackman 3rd, W. R. Stewart.
BULL, Two Years—1, Just Pride of Glencarnock, Richardson.
BULL, SR. YEARLING—1, Duhamel Isadore, Hutchinson; 2, Duhamel Kaiser, Hutchinson.
- OTTAWA CAN. CENTRAL, 1915**
AGED BULLS—1, Jno. Lowe, on Black

- JR. YEARLING BULL—1 and 2, Duhamel Tango, and Duhamel Islander, Hutchinson; 3, Pride of Bowden, C. H. Richardson.
- SR. BULL CALF—Black Mac 4th, McComb.
- JR. BULL CALF—Black Don, McComb; 2, M. B. Warrior, Stewart; 3, Duhamel Woodchuck, Hutchinson.
- CHAMPION BULL—E. P. Ringleader 7th.
- RESERVE—Duhamel Isadore.
- AGED COW—1, Isobel, Hutchinson; 2, Madam Queen, Stewart; 3, Lady Lacombe 2nd, McComb.
- HEIFER, Two Years—1, M. B. Flower 2nd, Stewart; 2, Princess Mildred, Hutchinson; 3, Fuzzeta 2nd, McComb.
- SR. YEARLING HEIFER—1, M. B. Pearl, Stewart.
- JR. YEARLING HEIFER—1, Duhamel Theodore, Hutchinson; 2, Everose, Hutchinson; 3, Bowden Lady Bug, Richardson.
- SR. HEIFER CALF—1, Stewart; 2, Richardson; 3, Hutchinson.
- JR. HEIFER CALF—1, McComb; 2, Richardson; 3, Stewart.
- CHAMPION FEMALE—Isobel, Hutchinson.
- HERD—1 and 2, Hutchinson.
- THREE, GET OF SIRE—1, Hutchinson.
- TWO, PROGENY OF COW—McComb.
- EDMONTON (Summer Fair, 1915)
- AGED BULLS—1, Evreaux of Harviestoun, J. D. McGregor; 2 and 3, Beauty's Erwin and Young Leroy, Jas. Bowman; 4, E. P. Mailbag, Lew Hutchinson; 5, Dakota Blackman, W. R. Stewart.
- BULL, Two Years—1, E. P. Wizard, Bowman; 2, Duhamel Isadore, Hutchinson.
- BULL, SR. YEARLING—1, Enjoiner of Glencarnock, McGregor; 2, Duhamel Kaiser, Hutchinson.
- BULL, JR. YEARLING—1, Evictor of Gwenmaur, McGregor; 2, Ensign, McGregor; 3, E. P. Wizard 4th, Bowman; 4, Duhamel Tango, Hutchinson.
- BULL, SR. CALF—1, Elm Park Beater, Bowman; 2, Pride Lad of Gwenmar, McGregor; 3, E. P. Kelso, Bowman; 4, Marshall of Glencarnock, McGregor.
- JR. BULL CALF—1, Bowman; 2, McGregor; 3, Meadow Brook Rosedale, Stewart; 4, Meadow Brook Derby, Stewart.
- JR. CHAMPION BULL—Enjoiner of Glencarnock.
- SR. AND GRAND CHAMPION BULL—Evreaux of Harviestoun.
- AGED COW—1, Key of Heather, McGregor; 2, E. P. Rosebud 15th, Bowman; 3, E. P. Rosebud 11th, Bowman; 4, Isobel, Hutchinson.
- HEIFER, Two Years—1, Rosebud 17th, Bowman; 2, Glencarnock Elcona, McGregor; 3, Beauty 8th, Bowman; 4, Princess Gwen, Hutchinson.
- SR. YEARLING HEIFER—1, Lucretia of Glencarnock, McGregor; 2, Meadow Brook Pearl, Stewart.
- JR. YEARLING HEIFER—1, E. P. Keepsake 17th; 2, Pride of Glen carnock, McGregor; 3, Glencarnock Islay 3rd, McGregor; 4, E. P. Rosebud, Bowman.
- SR. HEIFER CALF—1, Pure Pride of Gwenmar 2nd, McGregor; 2, E. P. Rosebud 21st, Bowman; 3, Evacote of Gwenmar, McGregor; 4, Emmeline of Larkin Farm, Bowman.
- JR. HEIFER CALF—1, Bowman; 2, Stewart.
- JR. CHAMPION FEMALE—E. P. Keepsake 17th.
- SR. AND GRAND CHAMPION FEMALE—Key of Heather.
- GRADED HERD—1, McGregor; 2, Bowman; 3, Hutchinson; 4, Stewart.
- JR. HERD—1, McGregor; 2, Bowman; 3, Hutchinson; 4, Stewart.
- THREE, GET OF SIRE—1 and 4, Bowman; 2 and 3, McGregor; 5, Hutchinson.
- TWO, PROGENY OF COW—1 and 2, Bowman; 3, Stewart.
- SASKATOON, 1915
- AGED BULL—1, J. D. McGregor; 2 and 3, Jas. Bowman.
- BULL, Two Years—Bowman.
- BULL, SR. YEARLING—1, McGregor.
- BULL, JR. YEARLING—1 and 2, McGregor; 3, Bowman.
- BULL, SR. CALF—1 and 3, McGregor; 2, Bowman.
- BULL, JR. CALF—1, McGregor; 2, Bowman.
- CHAMPION BULL—Evreaux of Harviestoun.
- AGED COW—1, 3 and 4, Bowman; 2, McGregor.

HEIFER, Two Years—1 and 2, Bowman; 3, McGregor.
 HEIFER, SR. YEARLING—1 and 3, Bowman; 2 and 4, McGregor.
 SR. HEIFER CALF—1 and 3, McGregor; 2, Bowman.
 JR. HEIFER CALF—1, Bowman.
 CHAMPION COW—E. P. Rosebud 15th, Bowman.
 GRADED HERD—1 and 3, Bowman; 2, McGregor.
 JR. HERD—1, McGregor; 2, Bowman.
 THREE, GET OF SIRE—1 and 3, Bowman; 2 and 4, McGregor.
 TWO, PROGENY OF COW—1 and 2, Bowman.

BRANDON (Summer, 1915)

AGED BULL—1, Evreaux of Harviestoun, J. D. McGregor; 2, Young Leroy, Jas. Bowman; 3, Beauty's Erwin.
 BULL, Two Years—1, Roseneath Ring-leader, Jas. Turner; 2, Elm Park Wizard 3rd, Bowman.
 SR. YEARLING BULL—Enjoiner of Glencarnock, McGregor.
 JR. YEARLING BULL—1, Ensign of Glencarnock, McGregor; 2, Evictor of Gwenmar, McGregor; 3, Cowan Park Victor, Porterfield; 4, Elma Park Wizard, Bowman; 5, Enig of Gwenmar, McGregor.
 SR. BULL CALF—1, Marshal of Glencarnock, McGregor; 2, Pride's Lad of Gwenmar, McGregor; 3, Elm Park Kelso, Bowman; 4, Elm Park Puck, Bowman; 5, Heatherman of Gwenmar, McGregor.
 JR. BULL CALF—1, Rosadore of Glencarnock, McGregor; 2, Pathfinder of Gwenmar, McGregor; 3, Ashlar of Gwenmar 2nd, McGregor; 4, Glen Soutirs Emperor, Bennet; 5, Elm Park Wizard 5th, Bowman.
 GRAND CHAMPION BULL—Evreaux of Harviestoun.
 JR. CHAMPION BULL—Enjoiner of Glencarnock.
 AGED COW—1, Key of Heather 2nd, McGregor; 2, Elm Park Rosebud 11th, Bowman; 3, Elm Park Rosebud 15th, Bowman; 4, Elm Park Witch 2nd, Bowman; 5, Our Pretty Rose, McGregor.
 HEIFER, Two Years—1, Elm Park

Beauty 8th, Bowman; 2, Elm Park Rosebud 17th, Bowman; 3, Eileen of Glencarnock, McGregor; 4, Glencarnock Elcorina, McGregor.
 SR. YEARLING HEIFER—1, Lucretia of Glencarnock 2nd, McGregor; 2, Pride of Gwenmar, McGregor.
 JR. YEARLING HEIFER—1, Elm Park Keepsake 17th, Bowman; 2, Pride of Glencarnock, McGregor; 3, Glencarnock Isla 3rd, McGregor; 4, Elm Park Rosebud 20th, Bowman; 5, Queen Mother of Glencarnock 3rd, McGregor.
 SR. HEIFER CALF—1, Pure Pride of Gwenmar 2nd, McGregor; 2, Emmeline of Larkin Farm, Bowman; 3, Evocate of Owenmar, McGregor; 4, Elm Park Rosebud 21st, Bowman.
 JR. HEIFER CALF—1, Elm Park Rosebud 21st, Bowman.
 JR. HEIFER CALF—1, Elm Park Rosebud 23rd, Bowman; 2, Pride 7th, Bennest.
 JR. CHAMPION FEMALE—E. P. Keepsake 17th.
 SR. AND GRAND CHAMPION FEMALE—Key of Heather.
 SENIOR HERD—1, McGregor; 2, Bowman.
 JR. HERD—1 and 2, McGregor; 3, Bowman.
 THREE, GET OF SIRE—1, McGregor; 2, Bowman.
 TWO, PROGENY OF COW—1, Bowman; 2 and 3, McGregor.

REGINA (Summer Fair, 1915)

The contest for honors in Aberdeen-Angus at Regina was entirely between J. D. McGregor, Brandon, and Jas. Bowman, Guelph, Ont. The placing was practically the same as at Brandon. In the aged cow class, two of Bowman's cows were reversed in second and third position. Junior female championship went to Bowman's junior yearling heifer, Elm Park Keepsake 17th. McGregor's aged bull, Evreaux of Harviestoun, was made champion, and also won the prize for the best animal of the breed in the show. The aged cow, Key of Heather, owned by McGregor, was female champion.

Holsteins

CANADIAN NATIONAL

AGED BULL—1, Haley Bros., on Sir Belle Fayne; 2, G. A. Brethen, on

Hillcrest Ormsby De Kol; 3, Fred Row, on Prince Abbekerk Mercena; 4, A. Watson & Sons, on Homestead

- Colantha Prince Canary; 5, Sir Henry Pellatt, on Segis De Kol; 6, L. H. Lipsit, on Findeine King May Fayne.
- BULL, Two Years—1, W. G. Bailey, on Lakeview Dutchland Hengerveld 2nd; 2, Manor Farm, on King Segis Pontiac Posch; 3, Norman P. Clarkson, on Prince Mercena Ormsby; 4, Hulet, on Prince Col. Abbekerk; 5, Dymont, on Riverside Pontiac Beets.
- BULL, One Year—1, A. E. Hulet, on Woodlawn Count Canary; 2, Haley Bros., on Colantha Fayne Butter Baron; 3, Brethren, on Hillcrest Hengeveld Ormsby; 4, Prouse, on Meadowview King Abb; 5, Robins, on Sir Calamity Mercena Scott; 6, Robins, on Sir Pontiac Pearl.
- BULL, SR. CALF—1, Haley Bros., on Prince Fayne Harland; 2, Hulet, on Korndyke Paul; 3, Row, on Prince Mercena Alf.; 4, R. J. Kelly, on King Pontiac Lad; 5, Hulet, on Shadelawn Mercena Posch; 6, Pellatt, on Segis Schuiling Prince.
- BULL, JR. CALF—1, Haley Bros., on Kitchener Gans; 2, Hulet, on Bonheur Korndyke King; 3, Prouse, on Meadowview Dot Abbekerk; 4, Lipsit, on Forest Ridge Fayne Artis; 5, Pellatt, on Osprey Posch; 6, R. M. Holthy, on Roan De Kol Segis.
- GRAND CHAMPION BULL—Sir Belle Fayne.
- JR. CHAMPION BULL—Prince Fayne Harland.
- COW, Four Years and Over, in Milk—1, F. B. Robins, on Belle Tensen; 2, Brethren, on Raywerd Count De Kol Lady; 3, Hulet, on Annette Abbekerk; 4, Robins, on Queen Wilhelmina; 5, Haley Bros., on Lady Francis Schuiling.
- COW, Three Years Old, in Milk—1, Robins, on Glenwood Pledge Butter Girl; 2, Hulet, on Pauline Colantha Mercena; 3, Haley Bros., on Ethel Mercedes Posch; 4, Manor Farm, on Manor P. H. Flower; 5, Kettle, on Lady Mercena Schuiling.
- COW, Three Years and Upwards, Not in Milk—1, Hulet, on Rosa Bonheur Flower; 2, Haley Bros., on Colantha De Boer; 3, R. J. Kelly, on Howertie Col. Posch; 4, Haley Bros., on Grace Fayne Homewood; 5, Brethren, on Hillcrest Hengerveld Lassie; 6, Hicks, on Lilly F. De Kol.
- HEIFER, Two Years, in Milk—1, Hicks, on Faforit Verbelle May; 2, Haley Bros., on Aaggie Toitilla Fayne; 3, Haley Bros., on Nettie Fayne 2nd; 4, Hulet, on Lady Pauline Colantha; 5, Haley Bros., on Colantha Fayne Dewdrop.
- HEIFER, Two Years Old, Not in Milk—1, Pellatt, on Lucy Pietertje; 2, Hicks, on Faforit Netherland Lyons; 3, Brethren, on Hillcrest King Pontiac Countess; 4, Haley Bros., on Daisy Fayne 2nd; 5, Hulet, on Lady Keyes Mercena; 6, Dymont, on Echo Pietertje De Kol.
- HEIFER, SR. YEARLING—1, Haley Bros., on Miss Aggie Fayne; 2, Holtby, on Fayne Josco Segis; 3, Hulet, on Lodga Veeman Mercena 2nd; 4, Manor Farm, on Manor P. H. Artalisea; 5, Hicks, on Lady Newton Faforit; 6, Lipsit, on F. R. S. Axie.
- HEIFER, JR. YEARLING—1, Hulet, on Countess Ladoga Ormsby; 2, Cooper, on Nettie Tensen Hengerveld; 3, Prouse, on Queen Artis Bell; 4, Lipsit, on Forest Ridge Fayne Calamity; 5, Haley Bros., on Queen Colantha Logue; 6, Snyder, on Pauline Calamity Hengerveld.
- HEIFER, SR. CALF—1, Hicks, on Lilly De Kol Segis; 2, Hulet, on Pauline Colantha Sylvia; 3, Haley Bros., on Pauline Baroness; 4, Lipsit; 5, Hulet, on Shadelawn Mercena Queen; 6, Brethren, on Hillcrest Echo Lassie.
- HEIFER, JR. CALF—1, Lipsit, on Forest Ridge Fayne Jewel; 2, Haley Bros., on Bessie Butter Baroness; 3, Brethren, on Hillcrest Pontiac Echo; 4, Chambers, on Fairview Mechthilde; 5, Dymont, on Beauty Hash Beets; 6, Hicks, on Pauline Canary Segis.
- SR. AND GRAND CHAMPION FEMALE—Rosa Bonheur Flower.
- JR. CHAMPION FEMALE—Miss Aaggie Fayne.
- THREE ANIMALS, THE GET OF SIRE—1, Haley Bros.; 2, Hulet; 3, Hicks; 4, Lipsit; 5, Brethren.
- GRADED HERD—1, Haley Bros.; 2, Brethren; 3, Hulet; 4, Manor Farm; 5, Robins.
- JR. HERD—1, Haley Bros.; 2, Hulet; 3, Brethren; 4, Lipsit; 5, Shillington.
- BREEDER'S HERD, One Bull and Four Females, All Under One Year—1, Haley Bros.; 2, Hulet; 3, Lipsit; 4, Brethren; 5, Kettle; 6, Dymont.

CENTRAL CANADA, 1915

AGED BULL—1, Haley Bros., on Sir Belle Fayne; 2, G. A. Brethen, on Hillcrest Ormsby; 3, Richard Hall, Colony Canary Ragapple; 4, D. A. McPhee, on Pietertje De Kol Beauty.

BULL, Two Years—1, F. S. Caldwell, on Orvilla Butter Boy; 2, A. E. Hulet, on Prince Colanthus Abbekerk; 3, Paul, on King Segis Beets Walker; 4, Wm. Manning & Sons, on Sunnybrook George; 6, Stevens, on Fafortit Schuiling Posch.

BULL, One Year—1, Hulet, on Woodlawn Count Canary; 2, Haley Bros., on Colantha Fayne Butter Baron; 3, Brethen, on Hillcrest Hengerveld Ormsby; 4, Kelly.

BULL, SR. CALF—1 and 5, Haley Bros., on Prince Fayne Harland and Baron Brook De Kol; 2 and 4, Hulet, on Korndyke Paul and Shadelawn Mercena Posch; 3, McPhee, on Roxie's Sir Posch.

BULL, JR. CALF—1, Haley Bros., on Kitchener Ganó; 2, Hulet, on Bonheur Korndyke King; 3, Brethen, on Hillcrest May Echo Butter Boy; 4 and 5, McPhee, on Crystal Spring Korndyke and Hector De Kol of Crystal Spring.

GRAND CHAMPION BULL — Sir Belle Fayne.

AGED COW, in Milk—1, Brethen, on Rauwerd Count De Kol Lady Pauline; 2, Caldwell, on Polly Merton; 3, Craig, on Lyla of Pleasant Valley; 4, Hulet, on Annette Abbekerk; 5, Haley Bros., on Lady Frances Schuiling.

COW, Three Years—1 and 4, Hulet, on Rosa Bonheur Flower and Pauline Colantha Mercena; 2, 3 and 5, Haley Bros., on Colantha De Boer, Grace Fayne Homewood, and Ethel Mercedes Posch.

DRY COWS, Three Years and Over—1, Hulet, on Korndyke Abberkerk Pauline; 3, Brethen, on Hillcrest Hengerveld Lassie; 4, Stevens, on Brookdale Buttercup Netherland.

HEIFER Two Years, in Milk—1 and 2, Haley Bros., on Aggie Tostilla Fayne and Nettie Fayne 2nd; 3, Hulet, on Lady Pauline Colantha; 4, Brethen, on Lucy May Echo; 5, Stevens, on Rhoda Beets Pietertje.

DRY HEIFER, Two Years—1 and 5, Brethen, on Hillcrest Korndyke Pontiac Countess and Hillcrest May

Echo Pietertje; 2, Stevens, on Pietertje Beets Rhode; 3, Haley Bros., on Daisy Fayne 2nd; 4, Hulet, on Lady Keys Mercena.

HEIFER, SR. YEARLING—1, Haley Bros., on Miss Aggie Fayne; 2, Hulet, on Ladoga Verman Mercena 2nd; 3 and 4, McPhee, on Guitty of Crystal Spring and Lillie of Crystal Spring; 5, Brethen, on Hillcrest Varkelle Echo.

HEIFER, JR. YEARLING—1, Hulet, on Countess Ladoga Ormsby; 2, McPhee, on Hazel of Crystal Spring; 3, Brethen, on Hillcrest Sadie Belle; 4, Stevens, on Queen Korndyke Belle; 5, Stevens, on Pauline Pet Posch.

HEIFER, SR. CALF—1 and 5, McPhee, on Spinky Wayne of Crystal Spring and Beauty De Kol of Crystal Spring; 2, Hulet, on Shadelawn Lassie; 3, Haley Bros., on Pauline Baroness; 4, Brethen, on Hillcrest Echo Lassie.

HEIFER, JR. CALF—1 and 4, Haley Bros., on Bessie Butter Baroness and Lady Belle Fayne; 2, Brethen, on Hillcrest May Echo Belle; 3, McPhee, on Clothilds Spinky of Crystal Spring.

CHAMPION FEMALE—Hulet, on Rosa Bonheur Flower.

GRADED HERD—1, Haley Bros.; 2, Brethen; 3, Hulet; 4, McPhee.

JR. HERD—1, Haley Bros.; 2, Hulet; 3, McPhee.

FOUR ANIMALS, GET OF ONE SIRE—1 and 4, Haley Bros; 2, Brethen; 3, McPhee.

BRANDON (Summer Fair, 1915)

BULL, Three Years and Over—1, Count Tensen A. Geo. Bevington; 2, Sir Belle Petertje, A. B. Potter; 3, Dots Abbekerk, Prouse; 4, Prince de Kol Merton, Hamilton Bros.

BULL, Two Years—1, Sir Fayne of Golden West, J. A. Laycock; 2, Korndyke Pontiac, Laycock; 3, Prince Veeman Corinne, Lyttel; 4, Glenlea Ormsby Hengerveld, Glene & Sons.

BULL, One Year—1, Meadowview King Abbekerk, G. T. Prouse; 2, Bonnie Brae Korndyke, Laycock; 3, Sir De Kol Paladin, Potter; 4, Sir Francy Lindsay, Bevington.

BULL CALF, SR.—1, Bonnie Brae Pallestine, Laycock; 2, Francy Schraeter, Bevington; 3, Meadowview King de

- Kol, Prouse; 4, Colney Major Posch Tensen, Bevington.
- BULL CALF, JR.—1, Meadowview Dot Abbekerk, Prouse; 2, Lord Francis, Bevington; 3, Posch of Bonnie Brae, Laycock; 4, Prince de Kol Merton, Jr., Hamilton Bros.
- GRAND CHAMPION BULL—Count Tensen A.
- JR. CHAMPION—Bonnie Brae Korndyke.
- COW, Four Years and Over—1, Molly of Bayham, Prouse; 2, Jacoba Johanna, Bevington; 3, Ruby Jean, Laycock; 4, Princess Holdenby de Kol, Laycock.
- COW, Three Years—1, Ione Mercena Posch 2nd, Bevington; 2, Lady Lillian Bess, Prouse; 3, Lady Princess Fayne, Laycock; 4, Lady Johanna Dewdrop, Laycock.
- HEIFER, Two Years—1, Jessie Francy, Bevington; 2, Aaggie Teake Posch, Glennie and Sons; 3, Lady Jewel Pride, Prouse; 4, Maud Dewdrop Fayne, Laycock.
- HEIFER, One Year—1, Kathleen Francy de Kol, Bevington; 2, Patricia Posch, Bevington; 3, Daisy Woodlawn Dewdrop, Prouse; 4, Queen Artist Bell, Prouse.
- HEIFER CALF, SR.—1, Jacoba Tensen, Bevington; 2, Tensen Burke, Bevington; 3, Lady Jewel Pallestine, Laycock; 4, Princess Rideau Calamity, Laycock.
- HEIFER CALF, JR.—1, Gretchen, Faforit Veeman, Bevington; 2, Tosco Pontiac of Bonnie Brae, Laycock; 3, Belle Guillemette, Potter; 4, Meadowview Jean de Kol, Prouse.
- JR. CHAMPION FEMALE—Kathleen Francy de Kol, Bevington.
- SR. AND GRAND CHAMPION FEMALE—Molly of Bayham, Prouse.
- GRADED HERD—1, Bevington; 2, Laycock; 3, Prouse.
- YOUNG HERD—1, Prouse; 2, Bevington; 3, Laycock.
- THREE, GET OF SIRE—1, Prouse; 2 and 3, Bevington.
- REGINA (Summer Fair, 1915)
- AGED BULL—1, Count Tensen A, Geo. Bevington; 2, Dots Abbekerk, Geo. T. Prouse; 3, Sir B. Pietertjie, A. B. Potter.
- BULL, Two Years Old—1, Korndyke Posch Pontiac, J. H. Laycock; 2, Sir Fayne of Golden West, Laycock.
- SR. YEARLING BULL—1, Bonnie Brae Korndyke, Laycock; 2, Meadowview King, Geo. T. Prouse; 3, Count Canary Alexander, Bevington; 4, Segiononis Korndyke, Laycock.
- JR. YEARLING BULL—1, Sir Francy Lindly, Bevington; 2, Sir Dekol Paladdin, Potter; 3, Nellie's Rideau Dekol, Laycock.
- SR. CALF—1, Bonnie Brae Pallistine, Laycock; 2, Francy Schroeder, Bevington; 3, Sir Evergreen Banks, Laycock; 4, Colony Major Posch Tensen, Bevington.
- JR. CALF—1, Prouse; 2, Lord Frances, Bevington; 3, Posch of Bonnie Brae, Laycock; 4, Netherland Senaca Chief, Bevington.
- GRAND CHAMPION BULL—Count Tensen A.
- JR. CHAMPION BULL—Bonnie Brae Korndyke.
- AGED COW—1, Jacoba Johanna, Bevington; 2, Ruby Jean, Laycock; 3, Vida Princess Pauline, Prouse; 4, Princess Holdenby Dekol, Laycock; 5, Madeline Dekol, Potter.
- HEIFER, Two Years Old—1, Jessie Francy, Bevington; 2, Maud Dewdrop Fayne, Laycock; 3, Lady Jewel Pride, Prouse; 4, Annie Primrose of Lyn, Laycock.
- SR. YEARLING HEIFER—1, Patricia Posch, Bevington; 2, Daisy Woodlawn Dewdrop, Prouse; 3, Mercedes Droidu Dekol, Bevington; 4, Almira Affle, Potter; 5, Bellflower Pietertje Beauty 3rd, Laycock.
- JR. YEARLING HEIFER—1, Kathleen Francy Dekol, Bevington; 2, Fairview Artis Bell, Prouse; 3, Fannie Maud, Potter; 4, Carrie Bell Calamity, Laycock.
- SR. HEIFER CALF—1, Jacoba Tensen, Bevington; 2, Pearl Mercena 2nd, Bevington; 3, Tensen Burke, Bevington; 4, Dandy Colantha, Prouse.
- JR. HEIFER CALF—1, Gretchen Teferot Vermen, Bevington; 2, Tosco Pontiac of Bonny Brae, Laycock; 3, Meadowview Jean Dekol, Prouse.
- FEMALE, Any Age, Shown by Amateur—1, Bevington; 2, Prouse.
- SR. CHAMPION FEMALE—Jacoba Johanna.
- JR. AND GRAND CHAMPION—Jacoba Tensen.
- GRADED HERD—1, Bevington; 2, Prouse; 3, Laycock.

THREE, GET OF SIRE—1, Prouse;
2, Bevington; 3, Laycock.

CALGARY (Summer Fair)

BULL, Three Years or Over—1, Sir Admiral Ormsby 2nd, Carlyle Bros.; 2, Count Tensen A, Geo. Bevington; 3, Sir Posch de Kol Mercena, J. H. Laycock.

BULL, Two Years—1, Sir Fayne of Golden West, Laycock; 2, Korndyke Posch Pontiac, Laycock; 3, Tidy Calamity Sarcastic, I. Hambly and Sons.

SR. YEARLING—1, Bonnie Brae Korndyke, Laycock; 2, Count Canary Alexandra, Bevington; 3, Segis Ononis Korndyke, Laycock.

JR. YEARLING—1, Sir Francy de Kol, Bevington; 2, Prince Posch Butter Boy, Hambly and Sons; 3, L. E. S. Korndyke Count, P. Pallesen.

SR. BULL CALF—1, Bonnie Brae Palestine, Laycock; 2, Francy Shroster, Bevington; 3, Bevington.

JR. BULL CALF—1, Bevington; 2, Albert Ormsby, Carlyle Bros.; 3, Posch of Bonnie Brae, Laycock.

CHAMPION BULL—Sir Admiral Ormsby 2nd.

RESERVE—Count Tensen A.

COW, Four Years and Over—1, Jacoba Johanna, Bevington; 2, Princess Holdenby de Kol, Laycock; 3, Ruby Jean, Laycock; 4, Molly of Bayham Mercedes, Laycock.

COW, Three Years—1, Iona Mercena Posch 2nd, Bevington; 2, Aconeth Fayne, Pallesen; 4, Lady Johanna Dewdrop, Laycock.

HEIFER, Two Years—1, Maud Dewdrop Fayne, Laycock; 2, Muriel Ormsby, Carlyle Bros.; 3, Princess of Winterburn, Bevington.

SR. YEARLING—1, Dorinda Mercedes de Kol Bevington; 2, Francy Rhoda Pontiac, Pallesen; 3, Bell Flower Pietertje, Laycock; 4, Teake Pride Fayne, Pallesen.

JR. YEARLING—1, Alice Francy Favorit, Bevington; 2, Calgary Korndyke Pontias, Hambly and Sons; 3, Muriel Burnside 2nd, Carlyle Bros.; 4, Ruth Francy de Kol, Pallesen.

SR. HEIFER CALF—1, Jowka Tensen, Bevington; 2, Lady Jewel Palestine, Laycock; 3, Princess Rideau Calamity, Laycock.

JR. HEIFER CALF—1, Lucy Queen Ormsby, Carlyle Bros.; 2, Susan

Ormsby, Carlyle Bros.; 3, Bell Flower Pontiac o fBonnie Brae, Laycock.

CHAMPION FEMALE—Jacoba Johanna.

HERD, Bull and Four Females, Any Age—1, Bevington; 2, Laycock.

HERD, Three Animals, Get of One Sire—1, Bevington; 2, Carlyle Bros.

HERD, Bull and Three Females, Under Two Years—1, Laycock; 2, Carlyle Bros.

TWO, Progeny of One Cow—1, Bevington; 2, Carlyle Bros.

EDMONTON (Summer Fair, 1915)

AGED BULL—1, Count Tensen A, Geo. Bevington; 2, Sir Bell Pietertje, Bevington; 3, Dot's Abbeckerk, Geo. T. Prouse; 4, King Hengerveld, Eckert.

BULL, Two Years—1, Korndyke Posch Pontiac, J. H. Laycock; 2, Sir Fayne of Golden West, Laycock; 3, Principal Dekol, Duke of Sutherland; 4, Tidy, Calamity Sarcastic, H. Hambly.

SR. YEARLING BULL—1, Bonny Brae Korndyke, Laycock; 2, Meadow View King, Abbeckerk, Prouse; 3, Segis Ononis Korndyke, Laycock.

JR. YEARLING BULL—1, Sir Francy Tindly, Bevington; 2, Nelly Rideau DeKol, Laycock; 3, Prince Posch Butter Boy, Hambly; 4, Eckert; 5, Angerveld Kent, Bell.

SR. CALF BULL—1, Col. Major Posch Tensen, Bevington; 2, Fancy Schroter, Bevington; 3, Bonny Brae Palestine, Laycock; 4, Meadow View King DeKol, Prouse; 5, Duke of Sutherland.

JR. BULL CALF—1, Prouse; 2, Bevington; 3, Duke of Sutherland; 4, Bell; 5, Prouse.

SR. AND GRAND CHAMPION BULL—Count Tensen A.

JR. CHAMPION BULL—Bonny Brae Korndyke.

AGED COW—1, Jacoba Johanna, Bevington; 2, Princess Holdenby DeKol, Laycock; 3, Ruby Jean, Laycock; 4, Molly Bayham Mercedes, Laycock; 5, Vida Princess Pauline, Prouse.

HEIFER, Two Years—1, Lady Fairmont Canary, Bevington; 2, Lady Jewel Pride, Prouse; 3, Annie Primrose of Lyn, Laycock; 4, Mundella Kent, Bell; 5, Nettie, Bell.

SR. YEARLING HEIFER—1, Patricia Posch, Bevington; 2, Carman Korndyke Beauty, Laycock; 3, Mercedes

- Dorinda E. DeKol, Bevington; 4, Dairy Woodlawn Dewdrop, Prouse; 5, Bell Flower Puterys Beauty 3rd, Laycock.
- JR. YEARLING HEIFER—1, Rosa Bohien Tensen, Bevington; 2, Calgary Korndyke Pontiac, Hambly; 3, Meadowview Bess, Prouse; 4, Queen Artis Bell, Prouse; 5, Korndyke Aggie Wayne, Laycock.
- SR. HEIFER CALF—1 and 3, Bevington; 2 and 5, Laycock; 4, Bell.
- JR. HEIFER—1, Bevington; 2, Laycock; 3, Prouse; 4, Hambly; 5, Bell.
- JR. CHAMPION FEMALE—Jacoba Tensen.
- SR. AND GRAND CHAMPION FEMALE—Jacoba Johanna.
- GRADED HERD—1, Bevington; 2, Laycock; 3, Prouse; 4, Bell.
- JR. HERD—1, Bevington; 2, Laycock; 3, Prouse; 4, Duke of Sutherland.
- TWO. PROGENY OF COW—1, Bevington; 2, Prouse; 3, Hambly; 4, Duke of Sutherland.

SASKATOON.

- AGED BULL—1 and 2, Geo. Bevington; 3, Geo. T. Prouse.
- BULL, Two Years—1 and 2, J. H. Laycock.
- SR. YEARLING BULL—1 and 3, Laycock; 2, Prouse.
- JR. YEARLING BULL—1, Bevington; 2, Laycock.
- SR. BULL CALF—1, Laycock; 2 and 3, Bevington.
- JR. BULL CALF—1, Bevington; 2 and 3, Prouse.
- GRAND CHAMPION BULL—Count Tensen A.
- JR. CHAMPION BULL—Bonnie Brae Palistine.
- AGED COW—1, Prouse; 2, Bevington; 3 and 4, Laycock.
- HEIFER, Two Years—1, Prouse; 2, Bevington; 3 and 4, Laycock.
- SR. YEARLING HEIFER—1, Prouse; 2 and 3, Bevington; 4, Laycock.
- JR. YEARLING HEIFER—1 and 3, Bevington; 2, Prouse; 4, Laycock.
- SR. HEIFER CALF—1 and 4, Bevington; 2 and 3, Laycock.
- JR. HEIFER CALF—1, Bevington; 2, Laycock; 3, Prouse.
- JR. CHAMPION FEMALE—Kathleen Francy DeKol, Bevington.
- SR. AND GRAND CHAMPION FEMALE—Molly of Bayham, Prouse.
- GRADED HERD—1, Bevington; 2, Prouse; 3, Laycock.
- FOUR CALVES—1, Bevington; 2, Laycock; 3, Prouse.
- TWO, Progeny of Cow—1, Prouse; 2, Laycock.

LONDON.

- BULL, AGED—1, Fred Row, on Prince Abbekerk Mereena; 2, L. H. Lipsit, on Findeine King May Fayne; 3, Geo. Prouse, on Dot's Abbekerk; 4, C. C. Kettle, on Grace Fayne 2nd Sir Mercena.
- BULL, Two Years Old—1, Manor Farm, on King Segis Pontiac Posch.
- BULL, One Year Old—1, Arbogast Bros., on King Segis Alcartra Calamity; 2, C. C. Haviland, on Canary Trinton Segis; 3, Prouse, on Meadowview King Abbekerk; 4, Kettle, on Noble Fayne Schuiling; 5, C. E. Trebilcock.
- BULL, SR. CALF—1 and 3, Row; 2, Lipsit; 4 and 5, Kettle.
- BULL, JR. CALF—1 and 4, E. Snyder; 2, Cline & Carrol; 3, Lipsit; 5, Prouse.
- CHAMPION BULL—Prince Abbekerk Mercena.
- COW, AGED—1, R. J. Kelly; 2, Gooderham; 3, Arbogast Bros.; 4, Prouse; 5, Snyder.
- COW, Three Years Old—1 and 3, Gooderham; 2, Arbogast; 4, Kettle.
- HEIFER, Two Years Old—1 and 2, Manor Farm; 3, Lipsit; 4, Snyder; 5, Prouse.
- HEIFER, YEARLING—1, Prouse; 2, Shearer; 3 and 5, Snyder; 4, Lipsit.
- SR. CALVES—1, Kettle; 2, Shearer; 3, Cline & Carrol; 4, Arbogast; 5, Row.
- JR. CALF—1, Kettle; 2, 3 and 4, Lipsit; 5, Snyder.
- CHAMPION FEMALE—Kelly, on Homestead Howtje Calamity.
- GRADTD HERD—1, Manor Farm; 2, Prouse; 3, Snyder; 4, Kettle.
- CALF HERD—1, Kettle; 2, Lipsit; 3, Ross; 4, Snyder.

Ayrshires

CANADIAN NATIONAL

AGED BULL—1, R. R. Ness, on Hobsland Masterpiece; 2, Alex. Hume, on Hillside Peter Pan; 3, Daurie Bros., on Tam O'Menie; 4, Wm. Stewart & Sons, on Springhill Cashier; 5, A. S. Turner & Son, on Netherton King Theodore.

BULL, Two Years Old—1, Senator Owens, on Netherton Lochinvar; 2, Sunnybrook Enterprise, E. D. Hilliker; 3, Macoun, on Silver King of Springbank.

YEARLING BULL—1, Laurie Bros., on Fairview Milkman; 2, Hilliker, on Prince Fortune of Sunnybrook; 3, Tran, on Duchess Heir o' Hickory Hill; 4, Hume, on Gay Lad of Ayrmount.

BULL, SR. CALF—1, Ness, on Burnside Invincible Masterpiece; 2, Turner & Son, on Springbank Scottie; 3, Owens, on Champion of Riverside 15th; 4, Hilliker, on Snow King.

BULL, JR. CALF—1, Turner & Son, on Heather King of Springbank; 2, Owens, on Champion of Riverside 20th; 3, W. H. Tran, on White Sam; 4, Ness, on Burnside Zomo-Sal Masterpiece.

GRAND CHAMPION BULL—Hobsland Masterpiece.

JR. CHAMPION BULL—Burnside Invincible Masterpiece.

AGED COW, in Milk—1, Owens, on Duchess of Montebello; 2, Hume, on Bellsland Nan 4th; 3, Turner & Son, on Mountain Lass; 4, Ness, on Tereran Heather Bell.

COW, Three Years Old, in Milk—1 and 2, Owens, on White Violet of Riverside, and Bertha of Montebello; 3, Turner & Son, on Queen Floss of Springbank; 4, Laurie Bros., on Topsy of Gladen Hill.

COW, Three Years Old and Over, in Calf, Not Milking—1 and 3, Ness, on Auchenbrain Hattie 6th, and Broomhill Flora 2nd; 2, Turner & Son, on Snowdrop; 4, Hume, on Spicy Lass.

HEIFER, Two Years Old—1, Ness, on Dalffible Jemima Jane 2nd; 2, Hilliker, on Bessie of Mapledale; 3, Turner & Son, on Doreen of Springbank; 4, Hume, on Humeshaugh Spicy Kate.

HEIFER, SR. YEARLING, Not in Milk—1 and 3, Ness, on Burnside

Maggie Finlayston 5th, and Burnside Spottie 2nd; 2, Turner & Son, on Lola of Springbank; 4, Owens, on Dawn 2nd of Riverside.

HEIFER, JR. YEARLING, Not in Milk—1, Turner & Son, on Briery of Springbank 3rd; 2, Owens, on Betsy of Riverside; 3, Laurie Bros., on Fanny of Gladden Hill; 4, Hume, on Humeshaugh Nan 2nd.

HEIFER, SR. CALF—1, Hume, on Humeshaugh Perfect Lady; 2, Ness, on Burnside Pearl Lusitania; 3, Turner & Son, on Springbank Josie; 4, Stewart & Sons, on Sprightly's Dolly of Menie.

HEIFER, JR. CALF—1, Hilliker, on Maria of Sunnybrook; 2, Turner & Son, on Springbank Jeanette; 3, Owens, on White Heather of Riverside.

HEIFER, Two Years, Out of Milk—1, Ness, on Dalffible Jessie Drummond 3rd; 2, Turner & Son, on Dora of Sunnybrook; 3, Hilliker, on Trixy of Mapledale 2nd; 4, Stewart & Sons, on Ayrshire Mary of Menie.

SR. AND GRAND CHAMPION FEMALE—Auchenbrain Hattie 6th.

JR. CHAMPION FEMALE—Burnside Maggie Finlayston 5th.

GRADED HERD—1, Ness; 2, Owens; 3, Hume; 4, Turner & Son.

JR. HERD—1, Ness; 2, Turner & Son; 3, Owens; 4, Laurie Bros.

BREEDER'S HERD—1, Ness; 2, Turner & Son; 3, Owens; 4, Laurie Bros.; 5, Tran.

CENTRAL CANADA, 1915

AGED BULL—1, R. R. Ness, on Hobsland Masterpiece; 2, D. M. Watt, on Whitehall King of Hearts; 3, Geo. H. Montgomery, on Auchenbrain Sea Foam; 4, J. P. Cavers, on Hobsland Bonnie Boy.

BULL, Two Years—, Senator Owens, on Netherton Lochinvar; 2, Tuttle, on Springburn Emblem; 3, Robert Doig, on Victor; 4, D. T. Ness.

BULL, One Year—1, J. H. Black, on Hobsland Piecemeal; 2, D. T. Ness, on Barwey's Flashlight; 3, Owens, on Vaudrueil Pride 19th; 4, Montgomery, on Lakeside Spicy Hero.

BULL, SR. CALF—1, Robert Leishman, on Hobsland Landlord; 2, R. R. Ness, on Burnside Invincible

- Masterpiece; 3, Jno. W. Logan, on Sunnyside Masterpiece; 4, Black, on Willowhaugh Just Right.
- BULL, JR. CALF—1, R. R. Ness, on Burnside Zomo-Sal Masterpiece; 2, Doig, on Sunrise Masterpiece; 3, Owens, on Riverside Champion 20th; 4, MacFarlane, on Mack of Kelso.
- COW, Four Years and Over—1, Owens, on Duchess of Monte Bello; 2 and 4, R. R. Ness, on Tererran Heather Bell, and Catlin's Derby 2nd; 3, D. T. Ness, on Lochfergus Catherine; 5, Watt, on Barcheskie Cinderella.
- COW, Three Years—1, Logan, on Sunnyside Governess; 2, D. T. Ness, on Rising Star; 3, Cavers, on Mary Blossom; 4, Owens, on White Violet of Riverside; 5, Black, on Craighbrae Lady Jean.
- COW, Three Years and Over, Canadian-bred—1, D. T. Ness, on Burnside Pearl 4th; 2, Logan, on Sunnyside Bell; 3, Owens, on Flossie of Riverside; 4 and 5, Doig, on Tidy of Mirabel and Blossom Again; 6, R. R. Ness, on Burnside Lady Lucky.
- COW, Three Years and Over, Dry—1, R. R. Ness, on Auchenbrain Hattie 6th; 2, MacFarlane, on Lady Mary of Kelso; 3, Owens, on Topsy of Riverside; 4, Doig, on Daisy of Riverside.
- HEIFER, Two Years, in Milk—1, R. R. Ness, on Dalffibble Jemima Jane 2nd; 2, Cavers, on Ryanogue Geneva; 3, Montgomery, on Lakeside Butterfly; 4, Owens, on Primrose of Riverside; 5, Watt, on Stockwood Floss; 6, D. T. Ness, on Edgewood Verlena.
- HEIFER, Two Years, Dry—1, D. T. Ness, on Maple Valley Violo; 2, R. R. Ness, on Dalffibble Jessie Drummond 3rd; 3, Logan, on Sunnyside Maggie; 4, Owens, on Trim of Riverside.
- HEIFER, One Year—1, 3 and 4, R. R. Ness, on Burnside Maggie Finlayston 5th, Burnside Lucky Darling, and Burnside Spottie 2nd; 2, Owens, on Dawn 2nd of Riverside; 5, Montgomery on Lakeside Susan.
- HEIFER, SR. CALF—1 and 2, R. R. Ness, on Burnside Pearl Lusitania, and Burnside Tiperary Blossom; 3, McFarlane, on Pickens' Missie of Kelso; 4, Logan, on Sunnyside Fanny; 5, Cavers, on Rosleaf's Fancy.
- HEIFER, JR. CALF—1, Logan, on Sunnyside Mancy; 2, D. T. Ness, on Burnside Barbara; 4, Owens, on White Heather of Riverside.
- CHAMPION FEMALE—Auchenbrain Hattie 6th.
- GRADED HERD—1, R. R. Ness; 2, Owens; 3, D. T. Ness.
- JR. HERD—1, R. R. Ness; 2, D. T. Ness; 3, Owens.
- GET OF SIRE—1, R. R. Ness; 2, Logan; 3, Owens; 4, D. T. Ness.
- BRANDON (Summer, 1915)
- BULL, Three Years and Over—1, Morton Mains Planet, Roland Ness; 2, Burnside Lucky Sensier, Ness.
- BULL, Two Years—1, Greenhill Rising Star, Wm. Braid; 2, Rob Roy of Relwood, Ness; 3, Springfield Chief, Ness; 4, Sir Ivanhoe Laurie, Geo. Bevington.
- BULL, One Year—1, Logan Braes of Menie, Braid; 2, Lakeview Sensier, Ness; 3, Sunnybrook Prince, Bryce; 4, Sunnybrook Chief, R. H. Bryce.
- BULL CALF, SR.—1, Burnside Masterman, Ness; 2, Greenhill Barney, Braid; 3, Lakeview White Prince, Ness; 4, Lakeview Radiant, Ness.
- BULL CALF, JR.—1, Burnside Master Heather, Ness; 2, Greenhill Hercules, Braid; 3, Greenhill Victor, Braid; 4, Lakeview Now-like-me, Ness.
- GRAND CHAMPION BULL—Morton Mains Planet.
- JR. CHAMPION BULL—Burnside Masterman.
- COW, Four Years and Over—1, Burnside Tena, Ness; 2, Barcheski Lily 12th, Ness; 3, Howies Orange Lily, Ness; 4, Bonnie Brae Gypsy Queen, Braid.
- COW, Three Years—1, Lakeview Mull, Ness; 2, Burnside Rose Mac 2nd, Ness; 3, Rosie of Meadowdale, Braid.
- HEIFER, Two Years—1, Humshaugh Snowdrop, Braid; 2, Lakeview Princess, Ness; 3, Lakeview Lady Maud, Ness; 4, Lakeview Miss Prim, Ness.
- HEIFER, One Year—1, Greenhill Daisy, Braid; 2, Lakeview Winnifred, Ness; 3, Lakeview White Craig, Ness; 4, Lakeview Claribella, Ness.
- HEIFER CALF, SR.—1, Burnside Lady Laurier, Ness; 2, Greenhill Lizzie, Braid; 3, Lakeview Brown Bell, Ness; 4, Lakeview Elfrieda, Ness.
- HEIFER CALF, JR.—1, Greenhill Sunbeam, Braid; 2, Greenhill Heather-

- bloom, Braid; 3, Lakeview Annie, Ness; 4, Lakeview Flirt, Ness.
- JR. CHAMPION FEMALE—Greenhill Daisy.
- SR. AND GRAND CHAMPION FEMALE—Burnside Tena.
- SR. HERD—1, Ness; 2, Braid.
- YOUNG HERD—1, Ness; 2, Braid.
- GET OF SIRE—1 and 2, Ness.
- PROGENY OF COW—1, Ness; 2, Braid.
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- CALGARY (Summer Fair)
- BULL, Three Years or Over—1, Morton Mains Planet, Roland Ness; 2, Burnside Lucky Sensier, Ness; 3, Willowmoor, Laycock and McDonald.
- BULL, Two Years—1, Morton Mains Sensier, Ness; 2, Rob Roy of Rilwood, Ness; 3, Sir Ivanhoe Lawrie, George Bevington.
- BULL, SR. YEARLING—1, Springfield Chief, Laycock and McDonald; 2, Lakeview Sensier, Ness; 3, Springfield Hero, Laycock and McDonald.
- BULL, JR. YEARLING—1, General of Battle River, A. C. Anderson; 2, Howie of Glenburn, Ness; 3, Brave of Battle River, Anderson.
- SR. BULL CALF—1, Burnside Masterman, Ness; 2, Springfield Pride, Laycock and McDonald; 3, Springfield Shamrock, Laycock and McDonald.
- JR. BULL CALF—1, King of Battle River, Anderson; 2, Burnside Master Heather, Ness; 3, Lakeview Lucky Sandy, Ness.
- CHAMPION BULL—Morton Mains Planet.
- RESERVE—Morton Mains Sensier, Ness.
- COW, Four Years and Over—1, Sessnessock Pansy, Ness; 2, Barcheskic Lily, Ness; 3, Howie's Orange Lily, Ness; 4, Burnside Clara, Ness.
- COW, Three Years—1, Burnside Rose Mae, Ness; 2, Burnside Missie Lake, Ness; 3, Lakeside Mull, Ness.
- HEIFER, Two Years—1, Lakeview Princess, Ness; 2, Lakeview Orange Lily, Ness; 3, Lakeview Lady Maud, Ness; 4, Springfield Beauty, Laycock and McDonald.
- HEIFER, SR. YEARLING—1, Lakeview Irene, Ness; 2, Lakeview White Craig, Ness; 3, Ness.
- HEIFER, JR. YEARLING—1, Beauty of Battle River, Anderson; 2, Lakeview Winnifred, Ness; 3, Lakeview Clarabella, Ness; 4, Lakeview Quees Bess, Ness.
- SR. HEIFER CALF—1, Burnside Lady Laurier, Ness; 2, Lakeview Brown Spots, Ness; 3, Burnside Dhalia, Ness.
- JR. HEIFER CALF—1, Lakeview Flirt, Ness; 2, Springfield Ida, Laycock and McDonald; 3, Springfield Lucy, Laycock and McDonald.
- HERD, Bull and Four Females, Any Age—1, Ness.
- HERD, Three Animals the Get of One Sire—1, Anderson.
- TWO CALVES Under One Year Old, Bred and Owned by Exhibitor—1, Ness; 2, Laycock and McDonald.
- HERD, Bull and Three Females, Under Two Years—1, Ness.
- TWO, the Progeny of One Cow—1, Ness; 2, Anderson.
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- REGINA (Summer, 1915)
- It was R. Ness all the way in Ayrshires at Regina. The only competitor to meet this Alberta herd was F. H. O. Harrison, Pense, Sask., whose cattle were not in show condition. Harrison won third on senior yearling bull, and third on junior yearling heifer. Ness won first, second and third in all other classes in which he exhibited, including both championships. Male championship went to his aged bull Morton Mains Planet, and highest female honors to Burnside Tena, his aged cow. Ness also won all the groups.
- (See Brandon List).
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- EDMONTON (Summer)
- Only exhibitor, Roland Ness, De Winton, Alta.
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- AYRSHIRES—London
- AGED BULL—1, Alex. Hume, on Hillside Peter Pan; 2, Wm. Stewart, on Springhill Cashier; 3, A. S. Turner, on Nether-ton King Theodore.
- BULL, Two Years Old—1, Chas. Macoun, on Silver King of Springhill; 2, E. D. Hilliker, on Sunnybrook Enterprise.
- BULL, YEARLING—1, Hilliker, on Prince Fortune of Sunnybrook; 2, Hume, on Gay Lad of Ayrmont; 3, McConnell & Ferguson.
- BULL, SR. CALF—1 and 2, Turner; 3, Hilliker; 4, Hume.
- BULL, JR. CALF—1, Turner; 2, Hume; 3 and 4, Stewart.

- CHAMPION BRED—Hillside Peter Pan.
- AGED COW—1, Hume, on Bellsland Nan 4th; 2 and 3, Turner, on Mountain Lass, and Snowdrop; 4, Hume, on Spicy Lass.
- COW, Three Years Old—1 and 4, Turner, on Queen Floss of Springbank, and Flossie of Springbank; 2 and 3, Hume, on Humeshaugh Kate, and Humeshaugh Helen.
- HEIFER, Two Years Old—1, Hume, on Humeshaugh Spicy Kate; 2 and 3, Hilliker, on Bessie of Mapledale, and Trixy of Mapledale; 4, Turner, on Doreen of Springbank.
- HEIFER, YEARLING—1, 2 and 4, Turner; 3, Stewart.
- HEIFER, SR. CALF—1, Hume; 2, Turner; 3, Hilliker; 4, Stewart.
- HEIFER, JR. CALF—1 and 3, Hilliker; 2 and 4, Turner.
- CHAMPION COW—Bellsland Nan 4th.
- GRADED HERD—1, Hume; 2, Turner; 3, Hilliker.
- JR. HERD—1, Hilliker; 2, Turner; 3, Hume.
- CALF HERD—1, Turner; 2, Hilliker; 3, Hume.
- GET OF SIRE—1 and 3, Turner; 2, Hume.
- PRODUCE OF COW—1, Hume; 2, Turner; 3, Hilliker.

Jerseys

CANADIAN NATIONAL

- AGED BULL—1 and 4, R. J. Fleming, on Clyptha's Majesty, and Calendar; 2, R. H. Bull & Son, on Sultan's Raleigh; 3, Herbert Colton, on Brampton Mayor Lisa.
- BULL, Two Years Old—1, 3 and 4, Bull, on Brampton Burma Knight, Brampton Golden Noble and Brampton Royal Favor; 2, Fleming, on Clyptha's Knight.
- YEARLING BULL—1, 2 and 4, Bull, on Brampton Rochette's Heir, Brampton Bright Don and Brampton Bright Boy; 3, Colton, on Brampton Gumboe Prince.
- BULL, SR. CALF—1, 2 and 4, Bull, on Brampton Radiator, Brampton Astor, and Brampton Stockwell Boy; 3, Fleming, on Hermoine's Warrior.
- BULL, JR. CALF—1, Bull, on Brampton Simeon; 2, Fleming, on Leenidas of Meadowbrook; 3, Colton, on Brampton Beresford.
- GD. CHAMPION BULL—Brampton Burina Knight.
- JR. CHAMPION BULL—Brampton Rochette's Heir.
- COW, Four Years Old and Over, in Milk—1, 2 and 4, Bull, on Brampton Vixen, Brampton Patricia and Brampton Marcia; 3, Fleming, on Belle of Jersey.
- COW, Three Years Old, in Milk—1 and 2, Bull, on Brampton Judy's Sultan and Brampton Dandy Dear; 3, Fleming, on Carnation Best; 4, Colton, on Brampton Weld Queen.
- COW, Three Years Old and Over, in Calf, Not Milking—1 and 4, Bull, on Brampton Lady Alice, and Brampton Faithful; 2 and 3, Fleming, on Evelyne and Combination's Dark Buttercup.
- HEIFER, Two Years—1, Fleming, on Aurea's Pride; 2 and 3, Bull, on Brampton Bess Bevan, and Brampton Stockwell Rose; 4, Colton, on Brampton Lady Keggan.
- HEIFER, SR. YEARLING—1, Nichols, on Mabel's Poet's Snowdrop; 2, Fleming, on Syra's Patrician; 3 and 4, Bull, on Brampton Canadian Rose, and Brampton Athletic Girl.
- HEIFER, JR. YEARLING—1 and 3, Bull, on Brampton Majorie H., and Brampton Stockwell Fern; 2 and 4, Fleming, on Oxford Brightness of Oaklands and Violet of Meadowbrook.
- HEIFER, SR. CALF—1 and 2, Bull, on Brampton Silver Beach, and Brampton Dark Rose; 3 and 4, Fleming, on Kardista of Meadowbrook, and Lady Love of Meadowbrook.
- HEIFER, JR. CALF—1 and 3, Fleming, on Clyptha 3rd of Meadowbrook, and Fairy's Cowslip of Meadowbrook; 2, Bull, on Brampton Silver Victress.
- SR. AND GD. CHAMPION FEMALE—Brampton Vixen.
- JR. CHAMPION FEMALE—Mabel's Poet's Snowdrop.
- GRADED HERD—1 and 3, Bull; 2 and 4, Fleming.
- JR. HERD—1 and 3, Bull; 2 and 4, Fleming.
- THREE ANIMALS, Get of One Sire—1, Fleming; 2, 3 and 4, Bull.

TWO ANIMALS, Progeny of One Cow, Progeny Owned by Exhibitor—1 and 3, Fleming; 2 and 4, Bull.

CALGARY (Summer Fair)

BULL, Three Years or Over—1, Brampton Sir Roblin, B. H. Bull & Sons; 2, Dolly Fox, Harper & Sons; 3, Pet's Kentucky Wonder, Harper.

BULL, Two Years—1, Brampton High Ferns Noble, Bull; 2, Harper; 3, Dentonias Butter Boy, E. W. Shenfield.

BULL, JR. YEARLING—1, Harper; 2, Brampton Conscript, Bull; 3, Alberta Chief Shenfield.

BULL CALF, SR.—1, Brampton Bright Togo, Bull; 2, Brampton Royal Combine, Bull; 3, Brampton Safety Shot, Bull.

BULL CALF, JR.—1, Brampton Blue Boy, Bull; 2, Harper; 3, Bowden Blue F. Jolly, Shenfield.

CHAMPION BULL—Brampton High Ferns Noble.

COW, Four Years and Over—1, Brampton Marcia, Bull; 2, Brampton Bright Lass, Bull; 3, Harper; 4, Effie's Rose, Bull.

COW, Three Years—1, Brampton Othello Queen, Bull; 2, Harper; 3, Brampton Wild Queen, Bull; 4, Butter Cup, Shenfield.

HEIFER, Two Years—1, Brampton Amelia, Bull; 2, Harper; 3, Harper.

HEIFER, SR. YEARLING—1, Brampton Tiddy Agatha, Bull; 2, Harper; 3, Brampton Trim Princess, Bull; 4, Harper.

HEIFER, JR. YEARLING—1, Lily of Woodview, Bull; 2, Brampton Pretty Cora, Bull; 3, Queen of Dentonia, Shenfield; 4, Helen of Alberta, Shenfield.

SR. HEIFER CALF—1, Brampton Bright Mary, Bull; 2, Brampton Nellie, Bull; 3, Bowden Chief, Shenfield.

JR. HEIFER CALF—Brampton Bright Polly, Bull; 2, Henty of Bowden, Shenfield; 3, Dentonia's Lassie, Shenfield.

HERD BULL AND FOUR FEMALES—1, Bull; 2, Harper.

CHAMPION FEMALE — Brampton Amelia.

CENTRAL CANADA, 1915

AGED BULLS—1 and 3, R. J. Fleming, on Clyptha's Majesty and Cal-

endar; 2, B. H. Bull & Sons, on Sultan's Raleigh.

BULL, Two Years—1 and 3, Bull, on Brampton Burma Knight and Brampton Golden Noble; 2, Fleming, on Clyptha's Knight.

YEARLING BULL—1, 2 and 3, Bull, on Brampton Rochette's Heir, Brampton Bright Boy, and Brampton Hazel Lad; 4, Jas. W. Pyke, on Lord Torono.

BULL, SR. CALF—1 and 4, Bull, on Brampton Radiator, and Brampton Stockwell Boy; 2 and 3, Fleming, on Hermione's Warrior and Shylock of Meadowbrook.

BULL, JR. CALF—1 and 3, Fleming, on Leonidas of Meadowbrook, and Cleon of Meadowbrook; 2, Bull, on Brampton Simeon.

CHAMPION BULL—Brampton Rochelle's Heir.

AGED COW—1 and 3, Fleming, on Combination Dark Buttercup and Evelyn; 2, 4 and 5, Bull, on Brampton Patricia, Brampton Marcia and Maitland's B.

COW, Three Years—1 and 2, Bull, on Brampton Judy's Sultanna and Brampton Dandy Dear; 3 and 4, Fleming, on Carnation Bess, and My Brunette 10th.

HEIFER, Two Years—1 and 3, Bull, on Brampton Bess Bevan and Brampton Bright Annie; 2 and 4, Fleming, on Aurea's Pride and Atora.

HEIFER, One Year—1 and 3, Fleming, on Syra's Patrician and Oxford Brightness; 2, Bull, on Brampton Stockwell Fern.

HEIFER, SR. CALF—1 and 2, Bull, on Brampton Silver Beach and Brampton Dark Rose; 3, Fleming, on Lady's Dove.

HEIFER, JR. CALF—1, Bull, on Brampton Bright Blanche; 2 and 3, Fleming, on Clyptha's 3rd, and Fairy's Cowslip.

CHAMPION FEMALE—Fleming, on Combination Dark Buttercup.

HERD, One Bull and Four Females, Over One Year—1, Bull; 2, Fleming.

LONDON

BULL, AGED—1, B. H. Bull & Son, on Fern's Noble.

BULL, Two Years—1, Bull, on Royal Favorite; 2, Jno. Pringle, on Oakland's Noble Eminent; 3, Bull.

- BULL, Eighteen Months—1, Bull; 2, Mrs. Lawrence.
- BULL, Twelve Months—1 and 2, Bull; 3, W. H. Robinson; 4, Mrs. Lawrence.
- BULL, Six Months—1, 3 and 4, Pringle; 2, Bull.
- SR. CHAMPION—Bull, on Royal Favorite.
- JR. AND GR. CHAMPION—Bull, on Brampton Bright Dot.
- COW, AGED—1 and 4, Pringle, on Vixen and Happiness; 2 and 3, Bull, on Brampton Remembrance, and Macosta.
- COW, AGED, DRY—1, Bull, on Rosy Scarborough; 2 and 3, Pringle, on Oxford Jetsam and Her Ladyship; 4, Bull.
- COW, Three Years—1, H. A. Little, on Autatone; 2 and 4, Pringle, on Faithful and Mayoress; 3, Bull.
- COW, Three Years, Dry—1 and 2, Pringle, on Seaside Lass, and Lady Aldan.
- HEIFER, Two Years, in Milk—1, 3 and 4, Pringle, on Lady Aldan A, Bright Granddaughter and Etty; 2, H. A. Little, on Pallas Fancy.
- HEIFER, Two Years, Dry—1 and 2, Pringle; 3, Bull.
- HEIFER, Eighteen Months—1 and 4, Bull; 2 and 3, Pringle.
- HEIFER, Twelve Months—1, Pringle; 2 and 3, Bull.
- HEIFER, Six Months—1 and 4, Bull; 2 and 3, Pringle.
- CALF, Under Six Months—1 and 4, Bull; 2 and 3, Pringle.
- SR. AND GRAND CHAMPION FEMALE—Pringle, on Vixen.
- JR. CHAMPION—Pringle, on Marjorie.
- AGED HERD—1, Pringle; 2, Bull.
- YOUNG HERD—1, Bull; 2, Pringle.
- GET OF SIRE—1, Bull; 2, Pringle.
- PROGENY OF COW—1, Pringle; 2, Bull.

Spray Mixtures in Small Quantities

SPRAY	INGREDIENT	STANDARD FORMULA	REDUCED FORMULA
Bordeaux Mixture	Quicklime.....	4 pounds.....	1½ tablespoons.
	Copper Sulphate (Crystals)	4 pounds	1 tablespoon.
	Water.....	50 gallons.....	4 quarts.
Kerosene Emulsion (Dilute 1 to 15 or 20)	Kerosene.....	2 gallons.....	1 pint.
	Water.....	1 gallon.....	½ pint.
	Hard Soap.....	½ pound.....	1 cubic inch.
Ammoniacal Copper Carbonate	Copper Carbonate.....	6 ounces.....	2 teaspoons.
	Ammonia.....	3 pints.....	2 fluid ounces.
	Water.....	50 gallons.....	2 gallons.
Arsenate of Lead	Lead Arsenate (Paste)	3 to 20 pounds (according to plant)	1 tablespoon.
	Water (or Bordeaux Mixture)	100 gallons.....	1 gallon
Paris Green	Paris Green.....	1 pound.....	1 teaspoon.
	Water (or Bordeaux Mixture)	200 to 300 gallons.	3 gallons.
Pyrethrum in Water	Quicklime (Unnecessary if Bordeaux is used)	2 pounds.....	3 teaspoons.
	Pyrethrum Powder.....	1 ounce.....	1 teaspoon.
Poisoned Bran Mash	Water (Warm).....	2 to 3 gallons.....	2 quarts.
	Bran, Middlings (or Coarse Flour).....	50 pounds.....	1 quart.
	Molasses.....	2 quarts.....	1 tablespoon.
	Paris Green.....	1 pound.....	1 teaspoon.
	Water.....	To make a paste.	1 cup.

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Dairy Test at Guelph, Ont. 1915

All post office addresses are Ontario unless otherwise stated.

Name of Cow	Owner	Lbs. of Milk.	% Fat.	Total Points
HOLSTEINS				
Highland Ladoga Mercena—Jas. Currie, Mount Elgin.....		257.4	3.6	298.8
Maud Snowball—W. H. Cherry, Hagersville		231.1	3.7	276.8
Korndyke Abberkerk Pauline—Rettie Bros, Burgessville..		215.4	4.	274.3
Pauline Colantha Posch—A. E. Hulet, Norwich		221.2	3.7	248.9
Ladoga Ada Veeman—A. E. Hulet, Norwich		214.8	3.7	258.9
Cow, 36 MONTHS AND UNDER 48 MONTHS				
Colantha Butter Girl (champion)—M. H. Haley, Springford		187.4	5.3	302.1
Pontiac Atlas Francy—Rettie Bros.		183.2	4.2	242.7
Favorite Beauty Posch—W. H. Cherry, Hagersville		185.9	3.8	230.2
Nancy Burton Posch—M. L. Haley, Springford		205.	3.3	221.8
Bessie Bella Banks—Fred W. Lea, Springford		192.8	3.4	215.7
Cow, 36 MONTHS				
Fayne Segis DeKol—R. M. Holtby, Port Perry		199.9	3.3	217.9
Daisy Fayne 2nd—M. H. Haley, Springford		166.4	4.	210.
Calamity Conucopia—M. McDowell, Oxford Centre		148.8	3.9	186.8
Princess Francy Posch—Rettie Bros.		133.0	4.3	180.6
Presulla Sarcastic—W. H. Cherry, Hagersville		138.6	4.	179.6
Lady Kergis Mercena—A. E. Hulet, Norwich		147.2	3.1	151.7
Bonnie Stapel Echo—Hiram Dyment, Dundas		136.6	3.4	151.3
SHORTHORNS				
Cows				
Royal Princess—J. W. Jackson, Woodstock		152.4	4.6	217.6
Hysey—A. Stevenson, Attwood		165.5	3.7	199.2
HEIFER, UNDER 36 MONTHS				
Butterfly Rose (second prize)—J. W. Jackson, Woodstock..		80.1	4.1	99.1
Kelly Queen (third prize)—Jno. Kelly, Shakespeare		74.1	4.1	99.1
Ayrshires				
Cows				
Lady Jane—A. S. Turner & Son, Ryckman's Corners.....		194.4	4.2	262.2
Dewdrop of Marie—Wm. Stewart, Campbellford		152.7	4.8	224.9
Scotia's Nancy 2nd—Jno. McKee, Norwich		152.1	4.7	223.3
Glenshamrock Canty Again—A. Hume & Co., Campbellford		161.1	4.4	222.3
Spicy Lass—Alex. Hume & Co., Campbellford		170.4	4.1	220.2
Whitehill Whiterose 3rd—A. S. Turner		162.9	4.2	216.
Violet Craigielea—H. C. Hammil, Markham		181.2	3.6	212.6
HEIFER, 36 MONTHS AND UNDER 48 MONTHS				
Gem of Craigielea—H. C. Hammil, Markham		124.9	3.9	157.9
Queen Jessie of Brookside—Jno. McKee, Norwich		130.4	3.7	156.3
Spick of Springbank 2nd—Jno. McKee, Norwich		112.0	4.4	154.7
Douglas Scottie Sarah—Jno. McKee, Norwich		110.4	4.2	142.1
Brighton Brae Tina 2nd—M. Dyment, Brantford		109.4	3.8	136.4
HEIFER, UNDER 36 MONTHS				
Susanna Evergreen—E. B. Palmer, Norwich		147.6	4.3	197.1
Blue Bell Craigielea—H. C. Hammil		141.2	4.3	192.4
Brierie Craigielea—H. C. Hammil		121.2	4.3	164.7
Dairymaid of Hickory Hill—N. Dyment		128.2	3.9	161.4
Lady Jewel of Springbank—A. S. Turner		124.	3.9	156.4
Queen—F. H. Harris, Mount Elgin		112.4	3.9	144.2
JERSEYS				
Cows				
Rioter's Peony—Ira Nicols, Woodstock		124.9	4.1	161.9
HEIFER, 36 MONTHS AND UNDER 48 MONTHS				
Flora Glen Boyle—D. A. Boyle, Woodstock		111.9	5.1	179.3
Sunny Brae's Ruba—Ira Nicols, Woodstock		90.9	5.2	154.5

Table of Weights and Measures.

WEIGHTS AND MEASURES

Imperial Measures of Capacity.

5 ounces of water.....	1 gill
4 gills.....	1 pint
2 pints.....	1 quart
4 quarts.....	1 gallon
2 gallons.....	1 peck
4 pecks.....	1 bushel

ENGLISH LINEAR

12 inches.....	equals 1 ft.
3 feet.....	equals 1 yd.
5½ yards.....	equals 1 rod
16½ feet.....	equals 1 rod
320 rods.....	equals 1 mile
5280 feet.....	equals 1 mile
1760 yards.....	equals 1 mile

SURFACE OR SQUARE

144 sq. in.....	equals 1 sq. ft.
9 sq. ft.....	equals 1 sq. yd.
30¼ sq. yds.....	equals 1 sq. rod
272¼ sq. ft.....	equals 1 sq. rod
160 sq. rods.....	equals 1 acre
4840 sq. yds.....	equals 1 acre
43,560 sq. feet.....	equals 1 acre
640 acres.....	equals 1 sq. mile

VOLUME OR CUBIC

8728 cu. in.....	equals 1 cu. ft.
91 cu. in.....	equals 1 cu. yd.
4 cord wood.....	equals a pile 4x4x8 ft— 128 cu. ft.
1 perch masonry equals a pile 16½x1 ½x1 ft—24¾ cu. ft.	

LIQUID

4 gills.....	equal 1 pint
2 pints.....	equal 1 quart
4 quarts.....	equal 1 gallon (U.S. 231 cu. in.)
4 quarts.....	equal 1 gallon (Eng. 277.27 cu. in.)
31½ gallons	equal 1 barrel
2 barrels.....	equal 1 hogshead
63 gallons.....	equal 1 hogshead
2 hogsheads.....	equal 1 pipe or butt

DRY

2 pints.....	equal 1 quart
8 quarts.....	equal 1 peck
4 pecks.....	equal 1 bushel
1 bushel.....	equal 2150.42 cu. in.

COMMERCIAL

437.5 grains.....	equal 1 ounce— oz.
16 ounces—(7000 grains)	equal 1 pound —lb.
28 pounds.....	equal 1 quarter —qtr.
4 quarters—(112 lbs.)...	equal 1 hundred weight— cwt.
20 cwt. (2240 lbs.).....	equal 1 long ton
2000 lbs.....	equal 1 short ton.
2204.6 lbs.....	equal 1 metric ton

Legal Weight in Dominion of Canada

Weight per bushel

Wheat.....	60
Oats.....	34
Barley.....	48
Rye.....	56
Buckwheat.....	49
Flax.....	56
Indian Corn.....	56
Peas.....	60
Beans.....	60
Beets.....	60
Carrots.....	60
Eggs, 1½ lbs. per standard dozen.	
Castor Beans.....	40
Clover Seed.....	60
Hemp Seed.....	44
Onions.....	50
Parsnips.....	60
Potatoes.....	60
Turnips.....	60
Timothy seed.....	48
Blue Grass Seed.....	14
Lime.....	70
Butuminous coal.....	70

AVERAGE WEIGHTS OF ONE PECK VEGETABLES, ETC.

Apples.....	10 lbs.
Broad Beans.....	9 lbs.
Currants.....	14 lbs.
Green Peas.....	8 lbs.
Gooseberries.....	14 lbs.
Kidney Beans.....	10 lbs.
Onions.....	16 lbs.
Pears.....	12 lbs.
Plums.....	14 lbs.
Potatoes.....	14 lbs.
Raspberry.....	12 lbs.
Strawberry.....	12 lbs.
Swede Turnips.....	12 lbs.
White Turnips.....	12 lbs.

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H p Braces
Lock Each
Separate
Rafter

Each
Separate
Rafter
Locked at
Ridge with
Double
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ITS GREATER PROTECTION—**

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BARN S

Strength?—Abundance of it. Unyielding strength at every joint. See those Pedlar "Wardle Patent" Steel Braces set in snug to EVERY post. Notice those double sets of braces not on some but EVERY rafter, both at ridge and hip. The Pedlar Barn brings farmers a new realization of dominant strength that means years of greater service.

Protection?—Put your confidence in protection such as this. Protection from weather, lightning, fire and decay. Roofed with the big generous size "George" Steel Shingles which lock tight on all four sides into one complete sheet of steel, or in 28 gauge "Perfect" Corrugated Galvanized Iron. Wind nor rain cannot get beneath them to rot and decay your roof. The walls are covered with 28 gauge corrugated iron. Many other weather-proof and wear-resisting features and accessories exclusive with the Pedlar Barn.

Roominess?—Just see that clear, broad sweep of space from wall to wall and floor to roof. Greater roominess at every point. Perfect freedom in the hip. Every inch of space conveniently usable. Your hay fork operates in either hip or in the ridge, as you desire. That's Pedlar roominess.

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