CANADA AGRICULTURE

COVER PHOTO: Typical cattle displayed in the Canadian Livestock Showcase at the Central Experimental Farm, Ottawa.

PHOTO DE LA COUVERTURE: Exposition permanente de bovins de boucherie à la Ferme expérimentale centrale, Ottawa.

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Contributors, namely, professional personnel in the Department's Research, Economics, Health of Animals, and Production-Marketing Branches, Special Act Administrations (PFRA, etc.), and the Farm Credit Corporation are invited to submit their articles in either English or French.

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THE KENNEDY ROUND

HOW IT AFFECTS CANADIAN AGRICULTURE

Prior to the Kennedy Round there had been five major rounds of tariff negotiations held under the auspices of the General Agreement on Tariffs and Trade (GATT), the last being the "Dillon Round" of 1960. The sixth, and by far the most important, round of multilateral tariff negotiations, the Kennedy Round, commenced on May 6, 1964 and was formally concluded on June 30, 1967.

Over fifty nations, including some thirty new or developing countries, took part. As in all previous multilateral negotiations under GATT, the Kennedy Round was conducted on the basis of the most-favored-nation principle. That is, all tariff and trade concessions granted by any participating country are automatically and unconditionally extended to all other countries entitled to most-favored-nation tariff treatment.

Prior to the start of the negotiations it was agreed that the negotiations would proceed as far as possible on the basis of cutting all tariffs in half. It was recognized from the outset that such linear tariff cuts would not however be appropriate in Canada's case in view of this country's special trade and economic structure in which our exports are heavily weighted by basic raw materials and foodstuffs while our imports are largely made up of highly manufactured products. Canada therefore participated on the basis of offering tariff concessions equivalent, in terms of their effects on trade, to the benefits it obtained from all the other participating countries.

EARL W. STEWART

In order to broadly assess the results of the Kennedy Round negotiations as they affect Canadian agriculture, it is necessary to place them against the background of the size and pattern of our agricultural trade. The annual value of Canada's agricultural exports is about $1,800 million. Approximately

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LA NÉGOCIATION KENNEDY

SES RÉPERCUSSIONS SUR L'AGRICULTURE CANADIENNE

Avant la Négociation Kennedy, il s'est tenu cinq importantes négociations sous les auspices de l'Accord général sur les tarifs douaniers et le commerce (GATT), la dernière ayant été la Négociation Dillon, en 1960. La sixième, de beaucoup la plus importante, a été la Négociation Kennedy portant sur des ententes tarifaires multilatérales; commencée le 6 mai 1964, elle s'est offciellement terminée le 30 juin 1967.

Plus de cinquante nations, y compris une trentaine de pays nombreux ou en voie de développement, y ont pris part. Comme toutes les négociations multilatérales précédentes entreprises dans les cadres du GATT, la négociation Kennedy s'est faite sur la base du principe de la nation la plus favorisée. Dans ce cas, toutes les concessions tarifaires ou commerciales accordées par n'importe quelle nation participante se trouve automatiquement et inconditionnellement consentie à tous les autres pays ayant droit aux avantages tarifaires de la nation la plus favorisée.

Avant le début des pourparlers, il avait été entendu que cette négociation viserait autant que possible à réduire tous les tarifs de moitié. On avait cependant reconnu dès le commencement que des réductions linéaires du tarif comme celles-là ne seraient pas appropriées à l'égard du Canada en raison du commerce spécial et de la structure économique de ce pays, ou les exportations sont en grande partie composées de matières premières et de produits alimentaires, tandis que les importations s'y composent en grande partie de produits hautement manufacturés. Le Canada a donc participé aux ententes en offrant des concessions tarifaires équivalant, quant à leur effet sur le commerce, aux bénéfices obtenus de tous les autres pays qui y prenaient part.

EARL W. STEWART

Pour estimer globalement les résultats de la Négociation Kennedy, quant à ses répercussions sur l'agriculture canadienne, il est nécessaire de les étudier à la lumière du volume et du type de notre commerce agricole. La valeur annuelle des exportations agricoles du Canada est d'environ 1,800 millions de dollars. Le

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Press Conference/Conférence de presse

$1,200 million of these exports is accounted for by wheat, wheat flour and coarse grains. The largest component is wheat which amounts to about $1,000 million.

Agricultural products other than cereals make up about $600 million in exports. About half of this now enters world markets free of duty and was not affected by the negotiations. The balance, some $300 million of exports sold largely to the United States, represents that export volume of non-cereal products on which tariffs and other barriers to trade were subject

blé, la farine de blé et les céréales fourragères représentent environ 1,200 millions de dollars de ces exportations. A elles seules, les exportations de blé (les plus considérables) s'élèvent à environ un milliard de dollars.

Les produits agricoles autres que les céréales forment environ 600 millions de dollars de nos exportations. A peu près la moitié de cette quantité entre en franchise sur les marchés mondiaux et n'a donc pas été touchée par les négociations. Le reste, soit quelque 300 millions de dollars en exportations surtout aux États-Unis, représente le volume des produits non céréaliers sur lesquels les tarifs et les autres entraves commerciales étaient sujets à des ententes dans la négociation Kennedy. Des concessions tarifaires avantageant le Canada ont été négociées sur environ 110 millions de dollars dans ce secteur d'exportations. Tout compte fait, on peut dire que, sur des exportations agricoles totales de 1,800 millions de dollars, les négociations ont accordé des avantages sur environ $1,110 millions, soit 62 p. 100.

Par ailleurs, nos importations agricoles s'élèvent à environ un milliard de dollars. Présentement, une valeur de près de 500 millions de dollars de ces produits entrent en franchise au Canada, soit la moitié des États-Unis et la moitié des pays du Commonwealth. Les importations de sucre et de céréales de provende (en grande partie du maïs) n'ont pas été incluses dans la négociation. Le volume des importations imposables sur lesquelles on pouvait offrir des réductions tarifaires était donc d'environ 240 millions de dollars, et le Canada en a consenti sur 120 millions de dollars en faveur de produits agricoles des régions tempérées, plus 50 millions de dollars pour les produits tropicaux. A ces chiffres, bien entendu, il faut ajouter la valeur des engagements des exportateurs en vue de fournir du blé dans l'écart des prix et de participer au programme d'aide alimentaire faisant partie de la nouvelle entente sur les céréales, si l'on veut déterminer la contribution globale du Canada aux négociations.

Les cultivateurs canadiens bénéficient aussi, bien entendu, de réductions tarifaires sur des articles qui entrent dans leur prix de revient (coût de production).

Presque tout l'équipement et les fournitures agricoles sont déjà autorisés à entrer en franchise au Canada. Toutefois, en raison de réductions tarifaires consenties par le Canada sur un certain nombre d'articles manufacturés, dans les cadres de la négociation Kennedy, on s'attend à de nouvelles réductions du coût de production en faveur des cultivateurs canadiens.

NÉGOCIATIONS CANADA-ÉTATS-UNIS

A cause de leur position dominante dans le commerce d'exportation du Canada, les négociations canadiennes à l'égard des produits agricoles autres que les céréales ont été effectuées surtout avec les États-Unis. Les négociations avec les autres pays, principalement avec la Communauté économique

to negotiation in the Kennedy Round. Tariff concessions of benefit to Canada were negotiated on about $110 million of this volume. In total then, of $1,800 million of Canadian agricultural exports, benefits were received as a result of the negotiations on about $1,110 million or 62 per cent.

On the import side, agricultural products amount to about $1,000 million. Nearly $500 million of this enters Canada duty-free at the present time, half from the United States and half from Commonwealth countries. Imports of sugar and coarse grains (largely corn) did not form part of the negotiations. The volume of dutiable imports remaining for possible tariff reductions was therefore about $240 million and Canada made tariff concessions on $120 million of it for temperate agricultural products and on another $50 million for tropical products. To these figures of course, must be added the value of exporter commitments to supply wheat within the price range and to participate in a food aid program as part of the new cereals agreement, in order to determine the overall Canadian contribution to the negotiations.

Canadian farmers also benefit, of course, by reduction in tariffs on items which make up their costs.

Most farm equipment and supplies already are permitted duty-free entry into Canada. However, as a result of reductions made in the Canadian tariff on a number of manufactured items in the Kennedy Round, further cost reductions of benefit to Canadian farmers are expected.

CANADA-UNITED STATES NEGOTIATIONS

As a result of their dominant position in Canada's export trade, the Canadian negotiations on agricultural products other than cereals were conducted largely with the United States. Negotiations with other countries, principally the European Economic Community, the Nordic countries, Japan and Switzerland, because of the nature of Canadian agricultural exports to these countries, focused mainly on a few individual commodities in contrast to the broad coverage of the negotiations with the U.S.A. Tariff reductions of benefit to Canada from these other countries cover trade amounting to about $15 million.

The total of Canada's dutiable agricultural exports to the U.S.A. in 1966 amounted to about $225 million. The U.S.A. has cut tariffs by an average of 60 per cent on about $95 million including $29 million on which the tariff has been cut to zero.

Here are the major products (exports from Canada of $1 million or over in 1966) on which U.S.A. tariff cuts were negotiated:

Free entry: Maple sugar and maple syrup, fresh apples, fresh raspberries, turnips, a number of grass and forage seeds, cattle hides and skins, bran, shorts and middlings, brewers' grains, grain screenings and other grain milling by-products and animal feeds.

50 per cent tariff reduction: Fresh and frozen pork, dairy cattle, fresh and frozen blueberries, currant and

européenne, les pays nordiques, le Japon et la Suisse, à cause de la nature des exportations agricoles canadiennes à ces pays, ont porté surtout sur quelques produits particuliers, ce qui a fait contraste avec le vaste domaine des négociations menées avec les États-Unis. Les réductions tarifaires consenties par ces autres pays en faveur du Canada couvrent un commerce s'élevant à 15 millions de dollars environ.

En 1966, les exportations de produits agricoles imposables, faites par le Canada aux États-Unis, se sont élevées à 225 millions de dollars. Les États-Unis ont réduit les tarifs d'environ 60 p. 100 sur à peu près 95 millions de dollars, y compris 29 millions de dollars sur lesquels l'entrée en franchise a été consentie

Voici les principaux produits (exportations canadiennes de un million de dollars ou plus, en 1966) sur lesquels les États-Unis ont consenti des réductions tarifaires:

Entrée en franchise: Sucre et sirop d'érable; pommes fraîches; framboises fraîches; rutabagas; un certain nombre de semences fourragères et de graminées; peaux et cuirs de bovins; son, gru rouge et gru blanc; drêches de brasserie; criblures de céréales, autres issues de meunerie et aliments pour bestiaux.

Réduction tarifaire de 50 p. 100: Porc frais et congelé; bovins laitiers; bleuets frais et congelés; confitures et gelées de cassis et de fruits; carottes fraîches; autres semences de plantes fourragères et de graminées; graines de moutarde et de tournesol.

La plupart des 130 millions de dollars d'exportations imposables du Canada aux États-Unis, sur lesquels on n'a pas négocié de réductions tarifaires, comprennent les bovins de boucherie vivants, le bœuf frais et congelé, les céréales fourragères (de provende), les pommes de terre et le porc fumé. On n'a pas réduit non plus les tarifs sur les produits correspondants importés au Canada.

Pour ce qui a trait aux négociations tarifaires du Canada, la plupart des réductions ont été faites à la suite d'ententes avec les États-Unis et, en dehors des produits tropicaux, les tarifs n'ont été réduits que sur un petit nombre de produits après ententes avec les autres pays. Bien entendu, cet état de choses illustre le faible commerce agricole (autre que celui des céréales) qui se fait avec ces pays.

Les plus gros articles d'importation sur lesquels le Canada a consenti des réductions tarifaires en faveur des États-Unis sont les jus d'agrumes (oranges, citrons et pamplemousses), le porc frais, les semences de plantes fourragères et de graminées, les pommes, les aliments du bétail, les tabacs pour capes de cigares, le houblon, les graisses animales, les légumes déshydratés, certains légumes frais et certains autres produits comme le riz, les raisins et le café conditionné.

Les résultats généraux des ententes entre le Canada et les États-Unis à la suite de la Négociation Kennedy permettront à environ 30 p. 100 des exportations agricoles canadiennes d'entrer éventuellement en franchise aux États-Unis, tandis que les droits sur le

The Kennedy Round was discussed at the recent Agricultural Outlook Conference in Ottawa. At the conference were (above left to right): W. M. Miner, Trade and Commerce; E. W. Stewart, Agriculture; D. B. Laughton (Trade and Commerce); J. MacNaught (Trade and Commerce); W. E. Jarvis (Agriculture) and D. Kirk (Canadian Federation of Agriculture).

berry jams and jellies, fresh carrots, other grass and forage seeds, mustard seed and sunflower seed.

Most of the $130 million of Canadian dutiable exports to the U.S.A. on which tariff reductions were not negotiated comprised live beef cattle, fresh and frozen beef, coarse grains, potatoes and cured pork. Nor were tariffs reduced on the corresponding products imported into Canada.

On the Canadian tariff side of the negotiations, most of the reductions made were also a result of negotiations with the U.S.A. and apart from tropical products, tariffs were reduced on only a small number of products as a result of agreements with other countries. This of course reflects the small agricultural trade (other than grains) with these countries.

The largest import items on which reductions in the Canadian tariff were made vis-à-vis the U.S.A. relate to citrus juices, fresh pork, grass and forage seeds, apples, feeds, cigar wrapper tobacco, hops, animal fats, dried végetables, certain fresh vegetables and a number of other products such as rice, raisins, and processed coffee.

As a general outcome of the Canada-U.S.A. negotiations in the Kennedy Round, about 30 per cent of Canadian agricultural exports to the U.S.A., will eventually enter duty-free and the average U.S. duty on the balance of our agricultural exports will be only about six per cent.

On the Canadian side, the average rate on dutiable agricultural imports from the U.S.A. will be about nine per cent after full implementation of the Kennedy Round results, with about 45 per cent of U.S. exports entering Canada duty-free.

UNITED KINGDOM

In the United Kingdom market the main results of the negotiations were an improved position for wheat on the one hand and on the other hand a narrowing of the preference enjoyed by Canadian exports on about $70 million or about 45 per cent of our preferential trade. The most important products in terms of export value affected are soybean oilcake and meal, soybeans, fancy meats, dried beans, tomato juice, canned and frozen corn and tobacco. The narrowing of the Commonwealth preference by 25 per cent on tobacco is contingent upon the U.S. eliminating the American Selling Price system of valuation on certain chemicals.

The general level of the preference remaining on most of our agricultural exports to Britain, after full implementation of the negotiated MFN rates, will be about 10 per cent.

CEREALS AGREEMENT

The negotiations on wheat in the Kennedy Round have led to an increase of 21¢ per bushel in the

La négociation Kennedy fut discutée à la récente Conference sur les prévisions agricoles, à Ottawa. De gauche à droite: W. M. Miner, Commerce; E. W. Stewart, Agriculture; D. B. Laughton, Commerce; J. MacNaught, Commerce; W. E. Jarvis, Agriculture et D. Kirk, Fédération canadienne de l'agriculture.

reste de nos exportations agricoles ne sera que d'environ 6 p. 100.

Du côté des concessions canadiennes, le taux moyen sur les importations provenant des États-Unis ne sera que d'environ 9 p. 100 quand les résultats de la Négociation Kennedy seront tous en vigueur, et près de 45 p. 100 des exportations américaines entreront en franchise au Canada.

GRANDE-BRETAGNE

Les principaux résultats des négociations sur le marché du Royaume-Uni ont été d'améliorer la position du blé d'une part, et, d'autre part, de restreindre la préférence dont jouissent les exportations canadiennes à environ 70 millions de dollars, soit à peu près 45 p. 100 de notre commerce préférentiel. Les principaux produits touchés par ces ententes sont, d'après leur valeur à l'exportation, les tourteaux et la farine de soja, les fèves soja, les haricots secs, les jus de tomates, le maïs en conserve ou congelé et le tabac. Le rétrécissement de 25 p. 100 imposé à la préférence accordée au tabac produit dans le Commonwealth correspond à l'élimination par les États-Unis du système de prix de vente américain d'après l'évaluation pour certains produits chimiques.

Le niveau général de la préférence qui restera sur la plupart de nos exportations agricoles à la Grande-Bretagne, après la mise en vigueur complète des taux négociés pour la nation la plus favorisée, sera d'environ 10 p. 100.

ENTENTE SUR LES CÉRÉALES

Les ententes conclues pour le blé à la suite de la Négociation Kennedy ont fait augmenter de 21c. le boisseau le prix minimum pour cette céréale, comparativement à celui qui avait été fixé par l'Entente internationale sur le blé. Contrairement à l'Entente internationale sur le blé qui ne spécifiait un prix minimum et un prix maximum que pour le blé du Nord nº 1, la liste se rapportant à l'entente sur les céréales de la Négociation Kennedy identifie dix catégories principales avec des prix minimums et maximums convenus. De plus, le blé roux dur d'hiver de la catégorie nº 2 des États-Unis a été choisi comme norme de base au lieu de la catégorie nº 1 du Nord pour laquelle avait opté l'Entente internationale sur

minimum price for wheat over that set under the existing International Wheat Agreement. In contrast to the International Wheat Agreement, which specified a maximum and minimum price only for No. 1 Northern, the schedule in the Kennedy Round Cereals Agreement identifies 10 major grades of wheat with agreed minimums and maximums. In addition, U.S. No. 2 hard red winter wheat was chosen for the base grade instead of No. 1 Northern as in the IWA. The price ranges for other wheats have been related to this base (f.o.b. Gulf ports). The resulting minimum for No. 1 Northern in store at the Lakehead, using current freight rates, would be $1.95½ and the maximum $2.38½ per bushel.

FOOD AID

The nations participating in the Kennedy Round Cereals Agreement (Argentina, Australia, Canada, United States, the EEC, Britain, Japan, Denmark, Sweden, Switzerland, Norway and Finland) each accepted a commitment to contribute to a 4.5 million metric ton per year multilateral food aid program for grains. All members of the Agreement, including the grain-importing countries, have undertaken to provide a specified quantity of grain, either in kind or through a cash contribution for the purchase of grains. Each donor country may specify a recipient country or countries for its contribution. It has been agreed that preference will be given to developing countries as a source for the purchase of grains from cash contributions.

Canada's undertaking to donate half a million tons a year, 11 per cent of the total, is the second largest single-country contribution.

STAGING OF TARIFF CUTS

In general, the tariff reductions will be phased over a period of four years. There are two alternative general rules which cover the minimum rate for implementation of the staged reductions. The first is that one-fifth of the total reduction would be introduced on January 1 of each year from 1968 to 1972. The second rule provides that two-fifths of each reduction be introduced on July 1, 1968 with the remaining three-fifths being implemented in three equal amounts on January 1, 1970, 1971 and 1972. Among the major participants, the U.S. is expected to follow the first rule, that is make their first cut on January 1, 1968, while the EEC, Britain and other European countries and Japan will likely adopt the second alternative and make a two-fifths cut on July 1, 1968.

Canada traditionally has not staged tariff reductions in previous negotiations and again a few of the concessions will be implemented in a single step. Reductions which are not implemented in one step will be staged over a period not exceeding four years beginning January 1, 1968 as explained above. Precise information about the staging of the reductions will be made public later. ●

le blé. Les variations de prix pour les autres blés correspondent au prix de base (f. à b. les ports du Golfe). Il en résulte que le prix minimum pour le blé du Nord nº 1 entreposé à la tête des Lacs, aux taux de fret courants, serait de $1.95½ et le prix maximum de $2.38½ le boisseau.

AIDE ALIMENTAIRE

Les nations qui participaient à l'entente sur les céréales de la Négociation Kennedy (Argentine, Australie, Canada, États-Unis, CEE, Grande-Bretagne, Japon, Danemark, Suède, Suisse, Norvège et Finlande) ont toutes accepté de contribuer 4.5 millions de tonnes métriques de céréales par année au programme multilatéral d'aide alimentaire. Tous les membres de l'entente, y compris les pays importateurs de céréales, se sont engagés à fournir une quantité de céréales déterminée, soit en nature, soit au moyen d'une contribution en espèces pour l'achat de céréales. Chaque pays donateur peut désigner le ou les pays devant recevoir sa contribution. Il a été accepté d'accorder la préférence aux pays en voie de développement pour y faire l'achat des céréales avec les contributions en espèces.

L'engagement pris par le Canada de donner un demi-million de tonnes par année, soit 11 p. 100 de tous les dons, en fait le deuxième des plus importants fournisseurs.

ÉTAPES DE L'APPLICATION DES RÉDUCTIONS TARIFAIRES

Généralement, les réductions tarifaires entreront graduellement en vigueur durant une période de quatre ans. On a le choix de l'une des alternatives suivantes pour procéder à la mise en vigueur des réductions par étapes: la première exige qu'un cinquième des réductions entrent en vigueur au 1er janvier de chaque année de 1968 à 1972; le deuxième veut que les deux cinquièmes de chaque réduction soient introduits au 1er juillet 1968 et que les trois autres cinquièmes soient partagés en trois parties égales pour entrer en vigueur au 1er janvier des années 1970, 1971 et 1972. Parmi les principaux pays participants, les États-Unis sont censés suivre la première alternative pour faire leur première réduction tarifaire au 1er janvier 1968, tandis que la CEE, la Grande-Bretagne, les autres pays européens et le Japon adopteront vraisemblablement la deuxième alternative en procédant à une réduction des deux cinquièmes le 1er juillet 1968.

Traditionnellement, le Canada n'a pas accepté de réductions tarifaires par étapes au cours des négociations antérieures, et, de nouveau, quelques-unes de ses concessions seront mises en vigueur en un seul coup. Les réductions qui ne seront pas faites en une seule fois le seront par étapes durant une période ne dépassant pas quatre années à partir du 1er janvier 1968, tel qu'il a été expliqué plus haut. On publiera plus tard des renseignements précis sur les étapes de ces réductions. ●

W. JAMES WHITE

MILK PRODUCTION RECORDS

Dairy farmers who use milk production records are found to be more progressive than non-users. This is the finding revealed in a Canada-wide survey conducted on all manufacturing milk and cream producers registered with the Agricultural Stabilization Board which drew 76,112 replies. This response represents slightly over half of all farmers in this group. Fluid milk producers were not included in the survey.

In this study, we found that milk producers who kept records under Record of Performance (R.O.P.) and Dairy Herd Improvement Association (D.H.I.A.) programs are typically the more progressive, more efficient and larger farmers. These farmers tend to have larger investments in land and buildings; have increased the size of their farms more since 1964 and grow larger acreages of crops and pasture. They milk more cows; produce more milk; keep larger numbers of animals of all types; hire more labor; work less away from home; are slightly younger and use more modern dairy techniques than the majority who do not keep milk production records. The analysis did not take into account other record keeping systems which some farmers no doubt kept.

The analysis on milk production recording falls into three parts. First, the present use of milk recording for Canada and the provinces. Second, the relationship between certain farm characteristics and the use of milk production records. Finally, a comparison of users and non-users of milk production records.

PRESENT USE OF MILK RECORDING

Findings show that 6 percent of those farmers who replied to the survey, use either R.O.P. or D.H.I.A. recording programs at present.

In Table 1 large variations are shown in the use of milk recording. In Prince Edward Island 14 percent of the farms surveyed keep records. In New Brunswick, Ontario, Quebec and British Columbia 7 percent of the farmers use milk records. Only one farmer in twenty-five indicated he was using either of the programs in Nova Scotia, Manitoba, Saskatchewan and Alberta.

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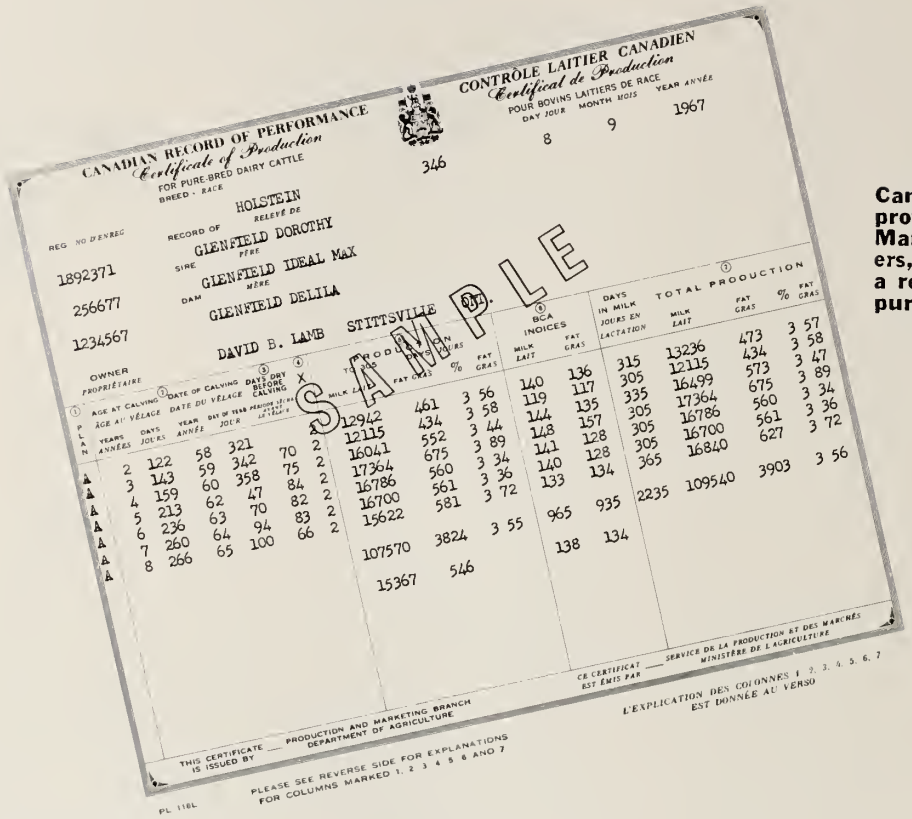

Canadian Certificate of Production provided by the Production and Marketing Branch, CDA, to farmers, so that they can maintain a record of performance for their pure-bred dairy cattle.

FACTORS RELATED TO USE OF MILK PRODUCTION RECORDS

The relationship between the use of milk records and specific factors such as the number of cows milked, the share of total income received from dairy sales, the outlet to which milk is sold and the operator's age are important.

In every province more of the farmers with large herds use R.O.P. or D.H.I.A. than with small herds. The finding that owners of larger farms are more likely to keep records than smaller farm owners is not surprising as most farmers with a small number of cows milking probably do not consider it worth the effort to be bothered keeping production records.

There is a positive relationship between keeping milk records and the proportion of farm income which comes from dairy sales. The larger the share of income a farmer derives from his dairy sales the more likely he is to use herd testing. Despite this relationship, the majority of farmers who receive over three quarters of their income from sales of dairy products do not keep records of their milk production.

Only about one in twenty-five Canadian cream producers use R.O.P. or D.H.I.A. milk records. This is a much lower percentage than producers who sell their milk for manufacturing or processing purposes.

COMPARISON OF USERS AND NON-USERS OF MILK RECORDING

When the farmers are divided into two groups on the basis of whether or not they keep milk production records, they are found to differ in terms of a number of farm and personal characteristics.

In general, farmers who keep milk production records, tend to have a larger investment in land and buildings, operate larger farms, have increased their acreage slightly more since 1964 and have more acres in both crops and pasture.

The average investment in land and buildings by farmers who keep milk records is $25,400 compared to $21,500 for non-users. This relationship is the same in every province except Alberta where the average investment is practically the same for both groups.

The average farm size is larger for non-users on a national basis, but only because of the large differences in Alberta and B.C. In the other seven provinces the users of milk records have a larger average number of acres. This same relationship existed in 1964. The change in farm size, on a percentage basis, indicates that record users have expanded slightly more than non-users.

Farmers who use milk production records tend to have larger numbers of calves, steers, cows, hogs and sheep than do non-users. This finding was consistent for each type of livestock in every province.

Farmers who keep records milk more cows than their counterparts who don't keep records. The average number of cows milked by all record users was 17 in 1966, up slightly from 16 in 1964. The comparable figures for non-users were 12 and 11. In

P.E.I., Ontario and Alberta the record keepers milk at least fifty percent more cows than non-users. In Manitoba, Saskatchewan, and Quebec the differences are less pronounced.

Those farmers who report using milk records have on the average, a much larger number of registered cows, than non-users. The national averages are 15 and 8 respectively. This is the ratio in most provinces. In New Brunswick the difference is more pronounced while in Manitoba and Saskatchewan the difference is relatively small. Ontario record users have the highest average number of registered cows, 20 per farm.

The answers on the number of pounds of milk or cream or both sold indicates that farmers who use milk records have considerably larger sales of both milk and cream in every province. The national averages are 163,172 pounds of milk and 2,093 pounds of cream for record keepers. The comparable non-user figures are 96,603 and 1,471 pounds. Increased sales are also related to greater average production per cow on record user's farms. The data suggest that production per cow is 19 percent higher on farms where records are kept.

The farmers who use milk records tend to utilize more labor than non-users. This labor comes from three sources, family help, hired labor and own time spent on the farm.

The average number of days of labor hired during the previous year is much higher for milk record users than for non-users. The national averages are 63 and 34 days respectively. Nova Scotian farmers who keep milk records, reported 93 days of labor hired compared to only 38 in Saskatchewan.

Questionnaire response suggests that about 70 percent of all dairy farmers do not work off their farms. The average number of days worked off the farm is calculated for all farmers who have an off-farm job. The non-users tend to work slightly more days at their non-farm jobs. The national averages are 32 days and 28 days respectively. In British Columbia, Manitoba and Alberta this trend is reversed. The provincial averages vary from a high of 84 for users in B.C. to a low of 9 in Saskatchewan. The comparable non-user averages are 70 and 10.

Farmers who use milk testing tend to be slightly younger than non-users. The national averages are 45 and 48 years respectively.

Farmers who use milk records use more modern dairy practices and techniques such as artificial insemination, pipeline milkers, bulk tanks, can coolers or milking machines. Up-to-date methods are used by a larger percentage of those who keep milk records than those who do not. This relationship is consistent in all provinces. Record users tend to be more progressive, more efficient, larger farmers who are more effectively utilizing modern technology. ●

TABLE 1—USE OF MILK PRODUCTION RECORDS, CANADA AND PROVINCES 1966.

	Number in Sample	Percentage of Sample
Canada	3,980	6
Prince Edward Island	134	14
Nova Scotia	40	4
New Brunswick	81	7
Quebec	1,827	7
Ontario	1,066	7
Manitoba	173	4
Saskatchewan	302	4
Alberta	329	4
British Columbia	27	7

TABLE 2—AVERAGE NUMBER OF COWS BEING MILKED ON USER AND NON-USER FARMS, JUNE 1966.

	Users	Non-Users
Canada	17	12
Prince Edward Island	13	8
Nova Scotia	9	6
New Brunswick	11	8
Quebec	18	15
Ontario	23	14
Manitoba	8	7
Saskatchewan	6	5
Alberta	12	7
British Columbia	*	8

* number of replies less than 25.

F. G. PROUDFOOT

Poultry research at the CDA Research Station, Kentville, N.S., may be classified in two areas. The first is the best type of environment for the various strains of poultry (an environment that suits one strain is not necessarily suitable to another strain). The second area is set up to find treatments which will keep fertile eggs alive longer and to improve fertilizing capacity of the semen.

The author is Head, Poultry Genetics Section, CDA Research Station, Kentville, Nova Scotia.

POULTRY RESEARCH IN THE ATLANTIC PROVINCES

BIO-ECONOMIC EXPERIMENTATION

We are using large groups to get more precise results. A computer is used to process data. This program utilizes 12,000 to 14,000 birds a year and is designed to evaluate both egg and meat production stocks. In both parts of the program cost items are restricted to the cost of day-old chicks, feed, grit and calcium supplement. Revenue consists of returns from the sale of poultry meat and eggs. A range of pricing systems is used, including the price prevailing during any specific experiment. This economic evaluation is required by the industry to determine the practicability of a particular environmental treatment and to evaluate different strain response.

About 2,500 to 3,000 female birds of five commercial egg production strains are maintained from year to year to study the effects of a combination of environmental treatments. These studies currently consist of a variety of photoperiods and nutrient intake restrictions.

Our results on light treatment effects indicate that the 14-hour constant day-length photoperiod is superior, or at least equal to a wide variety of other day-lengths for maximum egg production. The response of some strains to day-length treatments is different to others and so requires special treatment.

We have failed to demonstrate any economic advantages for restricted feed intake during the rearing period, compared with full feeding. But, there is some evidence that different strains may vary in their response to feed treatment.

The recently initiated parent-broiler meat production project is unique. It is integrated so that different parental strain combinations are not only evaluated on the merits of their own performance, under different management treatments, but also on the basis of hatchability of eggs produced and subsequent performance of their broiler progeny.

We expect that results from this research will provide the information necessary for a bio-economic evaluation of different strain response to a wide range of housing and management treatments. This background information will be helpful to poultry breeders in the development of special strains fitted to particular environments designed to provide optimum returns.

PHYSIOLOGY OF REPRODUCTION

Small improvements in the hatchability of chicken and turkey eggs can result in large economic gains because of the large numbers of chicks and poults hatched annually in Canada.

Poultry breeders and chick hatchery operators are frequently handicapped by the decline in hatchability associated with the length of time eggs are stored before incubation. In 1962, research was initiated to investigate the cause of this decline and to develop storage techniques which would minimize the reduction in hatchability. We discovered that enclosing the egg pack in a sealed plastic film effec-

tively inhibited dehydration and resulted in a marked improvement in the preservation of hatchability.

We continued the work with a number of different plastic films, some of which were gas impermeable. Working with oxygen, carbon dioxide, nitrogen and air packs, we discovered that nitrogen gas could be used to extend the practical storage time from 21 to 28 days. An oxygen storage atmosphere was highly detrimental when 'hatching eggs' were held in it for more than a few days. Carbon dioxide in high concentrations was detrimental to embryo viability and became deadly after 21 days' storage time.

A study of the effects of storage temperature revealed that 60°F was superior to 52°F if eggs are held up to seven days. But, for longer storage times, the lower temperature resulted in the best preservation of hatchability. We also found that if eggs are to be stored for periods exceeding 14 days, hatchability can be improved by turning the eggs daily and by prewarming the eggs for 18 hours at 75°F prior to setting in the incubator.

Recent experimentation at Kentville provides evidence that hatching eggs should be packed with the small end up for optimum hatchability rather than in the customary small end down position.

Fowl semen is collected and held for several hours in atmospheres made up of different gases. In our studies at Kentville, we discovered that when the semen was stored in an oxygen gaseous environment, it was markedly superior in fertilizing capacity to that stored in carbon dioxide, nitrogen and air at 50°F. Subsequently, we found that sperm can be held without loss of viability for 15 hours when an oxygen atmosphere is used with the proper combination of storage tube size, semen surface area and semen depth. The use of oxygen apparently improved the metabolic efficiency of the spermatozoa. Also, we are conducting limited research on the preservation of fowl semen in the solid or frozen state but to date results have been unsuccessful.

The foregoing is an outline of poultry research being conducted at Kentville where an attempt has been made to build flexibility into the long-term research program. Frequently, the impact of economic change can result in a change in the direction of the genotypic development of the fowl and in the environment in which it functions. Results obtained from a specific experiment really represent a sampling of strains and environmental treatments at one point in time.

The Department's poultry research program for the Atlantic Provinces is now being concentrated at the Kentville Research Station. It is expected, however, that some poultry experimentation will be continued at the CDA Research Station, St. John's West, Newfoundland, which will be closely coordinated with the Kentville program. ●


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Fig. 1—One of two large test houses used for adult research populations, equipped with light trapped ventilation openings.

Fig. 2—Measuring egg weight and albumen height of eggs collected from different strains of birds maintained under different management regimes.

Fig. 3—Flushing an experimental egg package enclosed in Cryovac film with nitrogen gas to prolong storage life.

Fig. 4—Avian semen was successfully stored for 15 hours at 50°F in the third vial left in an oxygen atmosphere. Other semen containers proved inadequate as it was found that the right combination of atmospheric volume, semen surface and depth is critical.

THE INTRODUCED SKIPPER BUTTERFLY

A. P. ARTHUR

POTENTIAL PEST OF HAY AND PASTURE CROP

Many kinds of insects that are, or threaten to become, agricultural pests in Canada originated in other countries. One of these is the small, orange-red skipper butterfly, known scientifically as *Thymelicus lineola* (Ochs.). The caterpillar of this butterfly feeds on the leaves of several kinds of our hay and pasture grasses. In Ontario, this insect has caused extensive damage in the Clinton (Huron County) and Durham–Markham (Grey County) areas. The first time this insect was found in North America was at London, (Middlesex County) Ontario, in 1910, when the butterflies were captured near a garbage dump. Possibly eggs of this insect were in hay used to pack china or other merchandise shipped from Europe and later discarded on the dump. By 1927 the butterflies were present in the Detroit area and were very abundant in Wayne County, Michigan in 1930.

No one in Canada worried about this insect until 1956 when it was reported as being abundant in the Markham area. Mr. Neal Aldcorn of Priceville (Grey County) was pasturing cattle and sheep on 30 to 40 acres. During the early summer he kept the stock in the front of the area, and planned to pasture them in the back during mid-June and July. When he went to open the gates in mid-June, the grass in the back looked as though the livestock had already been there. Examination showed that most of the grass had been eaten and thousands of light green caterpillars and chrysalids were present. A sample of these was reared to the adult stage by Dr. David Pengelly of the University of Guelph and was identified as the introduced skipper. Surveys made by Dr. Pengelly in 1958 showed that this insect was present throughout southern Ontario west of a line between Whitby (Ontario County) in the south and Midland (Simcoe County) in the North. Surveys conducted in 1965 by the CDA Research Institute, Belleville, Ont., showed that the skipper had spread as far east as Ottawa and as far north as Sudbury with some infestations at Sault Ste. Marie and Fort William.

Some infestations are known to be present at Lanoraie and Montreal in Quebec; Edmundston in New Brunswick; Halifax in Nova Scotia; and Terrace in British Columbia. Local infestations have also been recorded from seven states in northeastern United States.

The continued presence of this skipper in the Sudbury area since 1961 indicates that it is cold-hardy and will probably not be confined to southern Ontario by the low winter temperatures prevalent elsewhere in Canada. If you have not seen this insect this year, you probably will within the next few years.

The butterflies have orange-red wings with a thin dark border. The wing-span is about 3/4 of an inch. In southern Ontario they are on the wing from the last week in June until mid-July. During this period they can be found congregating around damp spots on side roads or in pastures, or flitting between flowers.

The females lay their eggs under the leaf sheaths of timothy (*Phleum pratense* L.) and red top (*Agrostis alba* L.) usually along the middle section of the stem. The small caterpillars begin to move within the eggs two to three weeks later, but the eggs do not hatch until the following spring. In the spring the small, greenish caterpillars feed on the leaves of many kinds of grasses, in addition to those of timothy and red top.

At first, the caterpillars are greenish with black heads and two whitish stripes down their backs. In the older caterpillars, the whitish stripes on the body continue onto the head, which is greenish. Each small caterpillar draws the edges of a blade of grass together with 3 or 4 strands of silk and when it is not feeding it

The author is an entomologist with the CDA Research Institute, Belleville, Ont.

Fig. 1—Introduced skipper butterfly, with wings closed, on timothy head

Fig. 2—Skipper eggs on sheath of timothy leaf which has been removed from stem

Fig. 3—Large skipper caterpillar. Note light stripes on head as well as body

Fig. 4—An adult of the parasite *Stenichneumon scutellator* attacking a skipper chrysalid

remains within the tunnel thus formed. The small caterpillars chew notches in the leaves, or they may remove portions of the leaves leaving part of the mid-vein. When one leaf has been eaten the caterpillar moves to another leaf and makes a new and larger tunnel. Many older larvae do not make tunnels.

By mid-June the full grown caterpillars are about one inch long. At this time each one ties itself onto a grass stem, or to the underside of a weed leaf near the ground, and changes to a chrysalid. The chrysalid is also green with whitish stripes. In about two weeks the butterfly emerges.

Part of our work at the Belleville Research Institute has been the investigation of ways to control this pest. We have visted the Aldcorn farm and various others in Grey County each year since 1959. In 1961 more than 150 caterpillars were collected on a square yard of pasture on the Aldcorn farm. Every blade of many kinds of grass had been eaten and grass plants were becoming scarce. The caterpillars formed their chrysalids on the undersides of bladder campion and blue-weed leaves growing in the pasture. A field of timothy in the same area contained as many as 225 caterpillars per square yard. The timothy had grown tall and had headed out, but every leaf had been eaten.

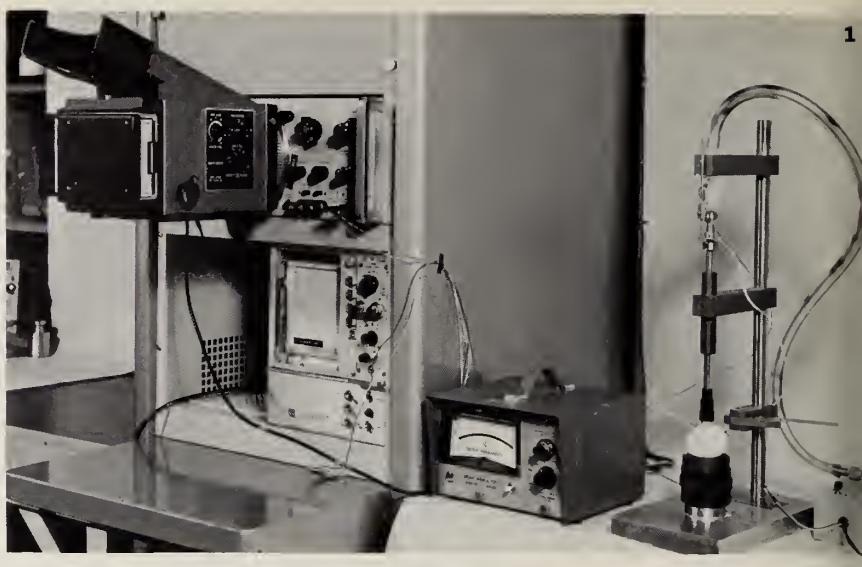
A few weeks later the radiators of many cars, especially those driven through damp areas on side-roads, became overheated. Examination showed that the front grills were clogged with the bodies of skipper butterflies. It became common practice to place a fine wire screen in front of the grill during the butterfly season. There has been a general decline in the skipper population in Grey County since 1962. However, certain fields or pastures can be found where large numbers are present.

The knowledge of the habits of the pest gained through field observation and experimentation since 1959 enables us to make the following suggestions on its control: As the eggs are laid in standing hay, cutting the hay by the last week of June, before the butterflies are on the wing, will greatly decrease the number of eggs which are laid in a given field. Pastures that are not used for grazing, or fields that are not mowed, serve as incubation areas where high populations of the skipper can build up to invade the surrounding areas. If all grasslands were placed on short rotation with other crops, an increase of the pest population would be prevented.

Many insecticides, especially the residual hydrocarbons, cannot be used to spray the caterpillars because of the danger of contaminating milk or meat, if animals are pastured on sprayed areas or fed crops from these areas. Various commercial preparations (Thuricide 90TS, or Biotrol BTB) of an insect disease organism *Bacillus thuringiensis* will kill the skipper caterpillars. This type of spray does not kill the caterpillars for as long as four days after application, but they feed very little after being sprayed. The above sprays, Thuricide 90TS, at the rate of one pint per acre, or Biotrol BTB at the rate of $7\frac{1}{2}$ ounces per acre are harmless to warm-blooded animals, birds, and most of the beneficial insects, and are expected to be available to Canadian farmers in the near future.

The skipper has not been a serious pest in Europe. The reasons for its relative scarcity are not known but probably the intensive cultivation of European farms and the presence of natural enemies have kept the population at a low level. One European parasitic fly, *Stenichneumon scutellator*, is known to attack the chrysalid and is being investigated prior to possible release in this country.

P. W. VOISEY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In developing new foods or processes for preparing foods, scientists are faced with problems of measuring texture.

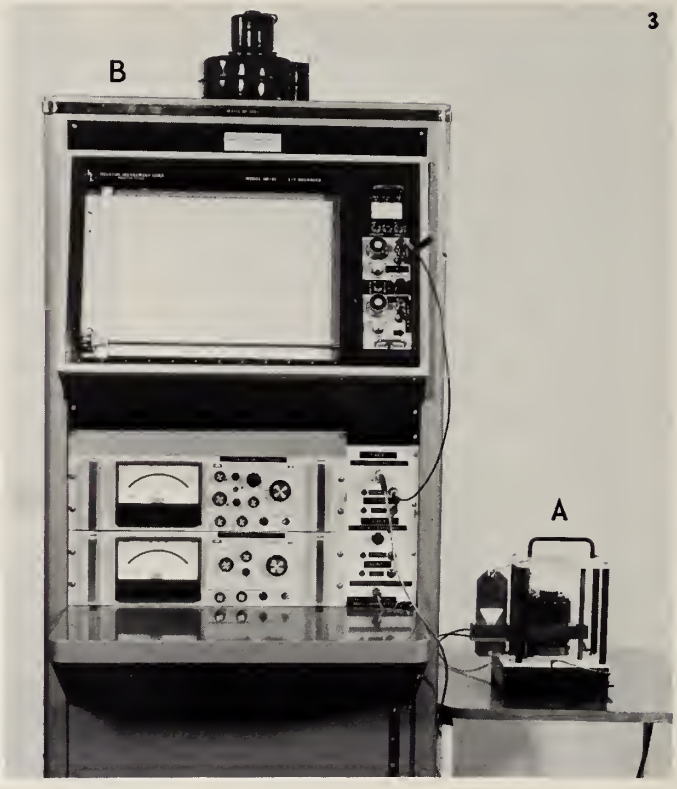
Texture measurement is important because along with taste and odor it is a vital test in determining how consumers will like a certain food.

A common method of testing food is by using a group of trained observers called a taste panel, but this is both expensive and time consuming. In addition, the results from a taste panel require skilled analysis.

Our Engineering Research Service has developed several mechanical instruments to measure the texture of a wide variety of foods. Many of these machines are helping food scientists of CDA Food Research Institute complete research more efficiently and are allowing new foods and processes to be tested faster.

Determining the texture and therefore the tenderness of meat is important because of all foods consumed in quantity, meat requires the most chewing. The machine developed to test texture works this way: It cuts a sample of meat in half; this simulates the action of teeth, as if they were biting through the meat. The force required to cut the sample is recorded by sensitive electronic apparatus. Preliminary work has shown that the instrument is sensitive enough to measure the differences in texture between wieners from the same packet.

During manufacture of cottage cheese the firmness of the curds must be controlled accurately. Formerly firmness was measured by squeezing the curds by hand. Now, curd firmness is measured by a machine. Three wires are forced through a sample of curds held in a slotted container. The force on the wires during this process is recorded. We have found this is a precise way of measuring firmness. Scientists can now study the effect of different processes on the texture of cottage cheese.



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Sweet table corn tenderness is measured by forcing a tiny punch through the skin on the crown of several kernels. The force exerted is recorded by electronic devices. In a recent experiment, we found that the instrument could grade corn as accurately as an observer with many years experience in judging corn tenderness. But at present the equipment is only suitable for laboratory use, and is not suitable to grade corn in the field.

The quality of wheat flour is of major interest to Canadian farmers. CDA researchers are developing new varieties which must be tested. One drawback in the past was that in the early stages of a breeding program there was very little wheat of a new variety.

The author is instrumentation engineer, Engineering Research Service, CDA Research Branch, Ottawa.

MEASUREMENT O

Fig. 1—Measuring the strength of an eggshell under the impact of falling weight.

Fig. 2—Measuring tenderness of corn.

Fig. 3—(A) Instrument for measuring meat tenderness; (B) Electronic recording system.

This made it difficult to evaluate flour by the many tests it must survive to become acceptable.

One important test was measurement of the strength of the dough by recording the power required to mix flour and water together. The results told the researcher how the dough develops and whether the flour is suitable for making bread or cakes and what additives would be required. Also new baking processes are being used now which rely on the power absorbed by the dough to control mixing in the bakery. Thus the behaviour of the dough is an important criterion in the salability of Canadian wheat.

Because Canadian wheat is used abroad to mix with other wheats for bread-making, Engineering Research Service has developed a new approach to this measurement of wheat flour. We can now test as little as 2 grams of flour to evaluate a wheat compared to the 30 grams previously required. The new testing technique has also reduced the time required to evaluate a sample. Sensitive electronic recording apparatus is used to make records of dough strength. This is more precise than before. Currently the apparatus is in use at the wheat quality laboratory of the Ottawa Research Station evaluating new varieties of soft wheat grown in a CDA program in eastern Canada. The CDA research laboratory in Winnipeg has similar equipment for research in the hard wheat varieties grown on the prairies. The new instruments will enable CDA researchers to test wheat earlier in breeding programs to discover the baking quality of new wheat varieties.

We are trying to find a precise way of measuring eggshell strength for nutrition studies at the Animal Research Institute. If we can do this the effect of diet, strain and environment of the hen on eggshell strength can be studied. Canadian farmers lose millions of dollars because eggshells crack and an "unbreakable shell" would prevent this. Eggshells are strong if the force applied is distributed over the shell. This is the case in the old trick of not being able to break an egg between our hands. Under these conditions it requires a large force to crack the shell. But, under most normal conditions eggs are subjected to impact forces concentrated almost at a point. For example, this occurs when the egg drops onto a flat surface or another egg. This is sufficient to crack the shell. We are therefore studying what happens to the shell under these conditions. From the engineering standpoint, the eggshell is an extremely complex structure, and only recently has man succeeded in copying the eggshell proportions as in the construction of reinforced concrete shell roofs.

Engineering Research Service is currently working on several other devices for measuring food texture. Some of these devices are simple, such as measuring the plumpness of chickens by a simple angle meter, while others are complex and rely on sophisticated electronic equipment. ●

FOOD TEXTURE

ECHO

NOTES AND COMMENTS FROM THE FIELD

OUT-OF-SEASON GROWTH AND FLOWERING OF NATIVE PLANTS—The forcing of spring wild flowers and other plants into leaf and bloom in late winter prior to their natural period of growth for use in flower shows in February and March has been a common practice for many years. However, very little effort has been made to delay this growth and flowering to mid-summer or later. Work being conducted at the CDA Plant Research Institute, Ottawa, Ont., has shown that with careful planning and the proper use of cold storage, several of our more attractive wild flowers can be flowered after their normal period of bloom. Most of the work to date has been done with trilliums, ladyslippers and other orchids, Bloodroot, lilies, Jack-in-the-Pulpit and ferns.

Plants collected from native stands or purchased from nurseries are grown in deep flats or pots with good drainage and with soil mixtures with varying quantities of leaf mold and peat moss depending on the species involved. Plants obtained in the spring are best brought into growth immediately to allow the root systems to become re-established. These plants can then be placed in cold storage after the foliage has dried down and the dormant buds have developed. For the plants mentioned above, 40°F storage is sufficiently cold if the plants are to be flowered in late winter or early spring. Such plants require a minimum of three months cold treatment if normal and rapid growth is to take place after the plants are brought into the greenhouse. However, if flowering is to be delayed longer, a colder storage, preferably 28° or 29°F should be used to keep the plants completely dormant. A temperature of 31°F (with occasional higher temperatures during defrosting) will hold ladyslippers dormant until July or August, but not trilliums, Jack-in-the-Pulpit, ferns or most other spring flowers. Even short periods above 31°F are sufficient to produce etiolated growth on trilliums where growth is delayed past their usual flowering period. This growth, however, does turn green when the plants are brought into the greenhouse.

Plants kept at 28° or 29°F do not need additional watering during storage; however, those kept at 31°F or higher temperatures and where fan cooling is used, will need watering once a week. Cold storage at temperatures above 30°F without fan cooling should be avoided as many plants will rot.

Once a plant has had its flowering period delayed gradually over a period of two or three years, it is a simple matter to program its growth cycle and cold storage periods to flower the plant at that time of the year every year. With controlled greenhouse temperatures it is possible to time these wild flowers to bloom for a specific date, once the time required to flower after removal from cold storage has been established for the species.—L. C. SHERK AND J. REISS, OTTAWA.

Five varieties of chrysanthemums were introductions from the CDA Plant Research Institute breeding program at the Centennial Chrysanthemum Show held in the conservatories of the Plant Research Institute, Central Experimental Farm, Ottawa, Ont. last fall. They were: XR Bronze Princess Anne; XR Lemon Shoesmith; XR Champlain; XR Dark Pink Delmar, and XR Rideau Champagne.

Imported from the United States last year as new introductions to the industry were: Nob Hill, a large, ivory white incurve: B.G.A. Deep Tuneful, a bright russet bronze daisy type flower, and B.G.A. Goldpiece, an intermediate golden yellow decorative variety.

New to the show, but available to the industry before last year were: Yellow Knight, a yellow spider type; Everest, a yellow incurve; Chattanooga, a white incurve; Carillon, a pink formal pom pom, and Tanfastic, a red bronze formal pom pom.

NEW POTATO—Cariboo, a new high-yielding potato variety, has been licenced by CDA. It was developed in the potato breeding program at the CDA Research Station Fredericton, N.B., and tests have shown it to be particularly suited for British Columbia.

Trials at several locations in that province have shown that Cariboo is resistant to verticillium wilt and has some resistance to late blight and scab. It is also top necrotic to virus X and B, which means that infected plants can be quickly rogued and thus avoid infection of the seed.

Cariboo is resistant to bruising and skinning, and has good storage qualities. Also, it is suitable for both home consumption and processing. Pink eyes and patches of pink skin at the eye end give the potato a distinctive appearance.

Multiplication of Cariboo seed will be done this year in the NCAR Quesnel B.C., under the supervision of a staff member from the CDA Experimental Farm at Prince George.—A. R. MAURER, AGASSIZ, B.C.

PEACHES FOR COLDER AREAS—Research scientists at the Canada Department of Agriculture Research Station, Harrow, Ont., have developed a new series of hybrid peaches which combine outstanding quality with exceptional winterhardiness. Some may find a useful place in marginal peach growing areas of Ontario and perhaps those of British Columbia and Nova Scotia.

Most of Canada's peaches are grown in the warm Niagara and Essex-Kent regions of southern Ontario. Even here, however, occasional severe winters continue to threaten the industry.

Fruit quality and market appeal, rather than tree qualities such as structure, hardiness and resistance to disease, have been the principal factors in determining which varieties to plant. Consequently the over-all level of winterhardiness in Ontario peach orchards has declined, as has orchard longevity—the latter, to an average ten years or less.

As reported in "Research for Farmers", Vol. 9, No. 1 (Winter, 1964), an intensive program was begun at Harrow in 1960 by Dr. G. M. Weaver and co-workers to combine high quality over an extended harvest season with increased levels of winterhardiness. The initial hybrids were developed from the best genetic stocks available in North America. As the program progressed, the search for greater hardiness was extended beyond this continent to include exploration in Poland, the Soviet Union, and indirectly, also into northern China.

Of more than 17,500 hybrid peach trees evaluated, only 27 have been retained because of their outstanding performance.

Plant selection has been facilitated by using several laboratory methods to assess winterhardiness. This has eliminated the need for severe test winters.

District fruit growers have organized the Western Ontario Fruit Testing Association, aimed solely at extensive regional testing of these new hybrid selections under a wider range of commercial conditions. This will enable the scientists to complete the appraisal of new hybrids and establish the confidence of the industry in the improved varieties.

Agassiz Supreme Alert with 35 of her maternal descendants presently in the herd of the Agassiz Research Station. The four daughters of milking age in the second row have completed 14 lactations with a breed-class average of 157% for milk and 167% for fat. Daughter, Agassiz Kanessa Alert Prince (extreme left, second row) has a 7-lactation average of 21,052 lb. milk and 809 lb. fat with her highest record being 26,871 lb. milk and 1,074 lb. fat. Agassiz Supreme Alert, the matriarch of the line, has a lifetime total of 176,959 lb. milk and 6,777 lb. fat, an excellent record as well as being the dam of an outstanding cow family. (*See below*).

OUTSTANDING COW FAMILY—At the CDA Experimental Farm, Agassiz, B.C., "Old 614", Agassiz Supreme Alert, born August 21, 1953, has completed 11 lactations with an unofficial 17,284 pounds of milk and 640 lb. of fat in her last lactation, and a lifetime total of 176,959 lb. of milk with a 3.83 fat test. In the first 10 lactations, her official R.O.P. breed class average (B.C.A.) values for milk and fat were 142% and 149% respectively. This is just a small part of her total contribution as one of the outstanding cows of the Agassiz Holstein herd.

She has 35 maternal descendants in the present herd of 237 females; 5 daughters, 8 granddaughters, 12 great granddaughters, plus 9 fourth generation, and one fifth generation descendants. Of Alert's 41 female descendants, only one has been culled for low production, while 3 have been culled for breeding or udder problems, one was sold to a private breeding herd, and one was stillborn.

Alert's four daughters of milking age have completed 14 lactations with a B.C.A. of 157% and 167% for milk and fat, respectively. Fifteen of Alert's 35 descendants presently in the herd have completed one lactation or more. The best lactation for eight of these cows averages 19,177 lb. of milk and 753 lb. of fat in 305 days on a mature equivalent basis.

Alert's most outstanding daughter, Agassiz Kanessa Alert Prince, in 7 lactations has averaged 21,052 lb. of milk and 809 lb. of fat in 305 days. In Kanessa's best lactation she produced 26,871 lb. of milk and 1,074 lb. of fat.

Two of Alert's sons were selected as potential herd sires for a National Dairy Cattle breeding project conducted by the Research Branch of the Canada Department of Agriculture. Another son is being used in a private dairy herd, while a grandson, Agassiz Sovereign Usher, is awaiting proof at the Artificial Insemination Centre, Milner, B.C.

Agassiz Supreme Alert has an excellent record for production and longevity as well as being the dam of an outstanding cow family.—D. E. WALDERN, AGASSIZ, B.C.

ONTARIO WINTER WHEAT VARIETIES—Four varieties of winter wheat—Genesee, Talbot, Richmond and Rideau—have been recommended by the Ontario Committee on Field Crop Recommendations for planting this year.

Talbot, a relatively new variety, was licenced for sale in Canada only five years ago but a considerable quantity of seed is now available to growers. It is white seeded, about equal to Genesee in yield and milling quality, but with somewhat stronger straw and better leaf rust resistance.

Genesee, still one of the most popular varieties in Ontario, is widely adapted in that province and produces good yields under most conditions. In variety trials at the CDA's Woodslee substation, Genesee produced about the same yield as Talbot over the past six years. Like Talbot, it has medium straw length and white grain of good milling quality.

Richmond is more winter hardy than Talbot and Genesee. It is adapted to most areas south of Ottawa in eastern Ontario. It has white grain of good milling quality and straw of medium height and strength.

Rideau is the most winter hardy of the varieties grown in Ontario. It is recommended for the more northern areas of the winter wheat growing region, such as Renfrew County, and for other areas where winter killing of Genesee occurs fairly frequently. Rideau has a white grain, but this is of only fair milling quality. It should, therefore, be grown only for feed. Its straw is of medium height but only moderate strength—G. H. CLARK, HARROW, ONT.

HALTING CEREAL LEAF BEETLE—The CDA Plant Protection Division is taking action to keep the cereal leaf bettle, a destructive pest of grain crops, out of prairie wheat fields.

A new regulation introduced by the division requires all fresh green corn bound for Manitoba and Saskatchewan from Ontario to be fumigated before shipment. This measure was taken after the discovery, last year, of a cereal leaf beetle infestation in Essex and Lambton counties of southwestern Ontario—the first infestation of the pest in Canada.

Shipments of fresh green corn from Ontario to British Columbia and Alberta have for several years been subject to fumigation to prevent the spread of another pest, the European corn borer.

The fumigation measure applies only to fresh green corn which, Plant Protection officers say, is the principal medium by which the cereal leaf beetle could reach the western grain areas.

A grower may have his corn fumigated by a local pest control officer, or he may do it himself under the supervision of an officer of the Plant Protection Division.

The infestation was discovered in last year's survey by federal and provincial agricultural departments. These have been carried out since 1965, when a single beetle was found in a field near Harrow, Ont.

SHORT TERM CANNING CROP ROTATIONS

H. B. HEENEY

Vegetable canning crops provide a major portion of the cash income for many farmers in sections of eastern Ontario. Crops are grown on light textured soils such as Percy fine sandy loam and Brighton sandy loam, or on the somewhat heavier textured and deeper Newcastle loam or clay loam. Many of these shallow soils lack organic matter needed for the canning crops. In addition, low rainfall, poorly distributed, and high temperatures during cultivation make it difficult to keep soil organic matter at an adequate level.

The average farmer in eastern Ontario who grows canning crops has small numbers of livestock and finds there is not enough manure to maintain soil organic matter and soil fertility, especially with the land under continuous cultivation. The grower, consequently, must adopt crop rotations and use the limited manure as a supplement.

Research on canning crop rotations started at Smithfield in 1946. The initial experiment ran for twelve years. A second trial was conducted on short-term crop rotations from 1959 to 1966.

The original long-term trials with canning peas, tomatoes and corn were done on Percy fine sandy loam. Different rotations were used in groups of plots. Changes in soil constituents and crop yields were investigated over an extended period.

Of the thirteen rotations studied (Table 1) the highest yields of corn, peas and tomatoes occurred in Group 1 where manure was used in two-year rotations with uninterrupted production of canning crops and adequate use of green manuring practices. We also found an increase in soil organic matter, exchangeable potassium, and easily acid soluble plus absorbed phosphorus. The increase was accomplished using commercial fertilizer plus 12 tons of manure per acre every second year and two green manure crops after harvesting peas.

The four-year Group II rotations were annual sweet clover with one year each of the three canning crops. Manure additions had little effect on pea yields, but increased tomato and corn yields. The pea yields were slightly below the mean of all rotations, probably because of the poor catch of annual sweet clover in some years and the resulting heavy weed population. We also showed that three tons of straw applied every fourth year was a possible substitute for barnyard manure. In these rotations, where annual sweet clover was used as a soil building crop, soil organic matter increased when 12 tons of manure or three tons of straw per acre were added once in the rotation. A decrease in organic matter occurred when either supplement was absent.

The Group III rotations were four and five years with grain and two years with timothy-red clover sod. They were not generally as satisfactory as the more

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intensive rotations with green manure crops, particularly when manure was not applied.

In summary, these early trials indicated that green manuring with light applications of manure in two-year rotations resulted in the highest average yields coupled with a net increase in soil fertility. While the use of annual sweet clover as a crop was not too satisfactory, the four-year rotations including this crop showed considerable promise. Of particular interest in these rotations was the apparent benefit of three tons of straw in place of manure, both on average yields and maintenance of soil fertility. The use of timothy-red clover sod after grain (even when manure was applied in a four or five-year rotation containing two or more canning crops) did not appear to be as satisfactory as the more intensive rotations involving both manure and green manuring practices.

In 1959, we set out a further study to investigate more fully the value of short term intensive canning crop rotations with particular reference to high yield and maintenance of soil fertility. In this new trial, manure was added to rotations 1, 3 and 4 at 12 tons per acre and three tons of straw fortified with 500 lbs of 10-5-10 fertilizer was added to rotations 2, 5 and 6. Applications in both cases were made once every four years. There was a total of six rotations in the trial, as follows:

Rotations 1 and 2 *peas, corn, peas, tomatoes*
Rotations 3 and 5 *peas, tomatoes, LaSalle red clover, corn*
Rotations 4 and 6 *peas, tomatoes, alfalfa, corn*

In all rotations, two green manure crops were used after peas. Immediately after harvest, sudan grass was seeded and grown to the milk stage, approximately the third week in August, and the land again prepared and sown to fall rye which was turned under in the spring.

We have found (Table 2) that after eight cropping years with this second rotation study, yields were comparable to the best obtained in the initial trial. The differences in yield between similar rotations receiving manure and those receiving straw fortified with fertilizer, apparent at the end of four years, gradually disappeared. Since 1963 differences have not been significant with the exception of Rotation 5. It would seem apparent that when using the fortified straw, red clover is not as satisfactory a soil-building crop as alfalfa.

All rotations resulted in a net loss of organic matter over the eight-year period, although these losses were not significant and are probably due to the rapid change from sod culture to cultivation at the start of this experiment in 1959. The average decrease in per cent organic matter (O.M.) during the first year was 0.5%. Since that time all rotations have shown a net increase in per cent O.M. There is some indication that this recovery of initial loss of O.M. has been as great when straw and fertilizer were used as it was when manure was used. There were only small positive changes in potassium and phosphorus levels during the eight-year period. We feel that, with the possible exception of the rotations with red clover, all are equally satisfactory.

As a result of this work we would summarize our views of canning crop rotations as follows:

- It is not necessary to use long rotations to maintain soil fertility. This does not mean, of course, that if land is available, long-term rotations should not be used. Factors affecting length of rotation are: type of farm operation, quantity of suitable land available, value of land, extensiveness of soil-borne disease organisms, etc.
- We do not question the value of barnyard manure if available. Our results would indicate that it is quite possible, however, to obtain the same effect using a substitute such as straw fortified with a commercial fertilizer.
- Green manuring practices are essential in short-term rotations. Our results suggest that there is considerable benefit from using at least one green manure crop after peas.
- No rotation will replace good practices of disease, insect and weed control, nor will it compensate for satisfactory amounts of commercial fertilizers based on adequate soil tests.

TABLE 1—AVERAGE YIELDS AND AVERAGE CHANGES IN SOIL CONSTITUENTS IN A SERIES OF CANNING CROP ROTATIONS, 1947-57

Rotation	Organic Supplement	Average Yields			Changes in Soil Constituents		
		Tomatoes T/ac	Peas T/ac	Corn T/ac	O.M. %	P Lb/ac	K meq/100gm
I	Manure	18.4	1.7	6.5	+1.1	+285	+0.2
II	Manure	15.7	1.1	6.0	+0.25	+90	−0.03
	Straw	16.0	1.2	5.5	+0.10	+125	+0.05
III	Manure	16.0	1.5	6.5	−0.1	+35	−0.01
	—	14.5	1.2	5.0	+0.2	+60	−0.05

T/ac: Tons per acre
O.M.: Organic matter
meq: milliequivalents

TABLE 2—AVERAGE YIELDS AND AVERAGE CHANGES IN SOIL CONSTITUENTS IN A SERIES OF SHORT-TERM CANNING CROP ROTATIONS, 1959-66

Rotation	Average Yields (T/ac)			Changes in Soil Constituents		
	Tomatoes	Peas	Corn	OM %	P lb/ac	K lb/ac
1	20.3	1.73	6.5	+.18	+176	+107
2	17.6	1.64	6.0	−.21	+105	+ 56
3	18.2	1.63	6.5	−.19	+ 94	+ 82
4	18.0	1.56	6.3	−.02	+104	+102
5	15.6	1.46	6.2	+.16	+ 27	+ 72
6	18.2	1.80	6.7	−.12	+115	+ 56
X	18.0	1.64	6.4	−.03	+102	+ 79
Manure	18.8	1.64	6.4	−.01	+125	+ 97
Straw	17.1	1.63	6.4	−.05	+ 79	+ 61
Red Clover	16.9	1.55	6.3	−.01	+ 61	+ 77
Alfalfa	18.1	1.68	6.5	−.07	+110	+ 79

T/ac: Tons per acre
OM: Organic Matter

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SEARCH FOR TO POTATO DISEASES

C. H. LAWRENCE, W. A. HODGSON, J. MUNRO, L. A. DIONNE

Success in breeding for resistance to potato disease lies in combining the best possible sources of disease resistance with high yield and quality characteristics to produce a potato variety acceptable to both producer and consumer.

Adequate controls have been developed against many potato diseases, but these are often expensive and are not always completely effective. By contrast, breeding potato varieties that are resistant to major potato diseases offers a less costly method of control. This is why the Canada Department of Agriculture has a comprehensive potato breeding program for disease resistance centered in Fredericton, N.B., responsible for serving the Canadian potato industry.

The ability of the potato plant to ward off disease varies from a low degree to complete immunity. This resistance against some diseases is found in certain potato varieties and seedlings, as well as in some wild potato species. Consequently, the first step in breeding for disease resistance is in locating the best possible source of resistance.

There are many problems associated with breeding for disease resistance. One of the most important is caused by the natural variation found in many of the disease-producing organisms. For example, a variety may be developed which is resistant to one race of an organism but susceptible to another. Or, a variety resistant to all known races of an organism may later become infected with an unknown new race. The varieties, Keswick and Canso, were introduced by the Fredericton Research Station in 1951 and were resistant to the races of late blight present in Canada at that time. Unfortunately, a short time after these varieties were made available to the growers, other races of blight appeared to which the varieties were susceptible. Both Keswick and Canso now require treatment with fungicides to produce a satisfactory crop where late blight is a problem.

In the past, most of the testing for disease resistance was carried out in the field, but because of variable environmental conditions this was not always satisfactory. It was often necessary to wait two or more years for the required environmental conditions favoring a specific disease. Consequently, to speed up the research, we are now employing standard methods of testing for disease resistance that have been developed under controlled conditions in the greenhouse and laboratory.

Another complicating factor is that a seedling selected for resistance to one disease may be very susceptible to another or have an unexpected physiological weakness. For example, we know that some seedlings with resistance to common scab are more susceptible to bacterial ring rot than existing varieties. Other seedlings with resistance to a number of diseases are more susceptible to blackleg. Similarly, the Katahdin variety is resistant to some of the potato virus diseases but susceptible to scab.

LATE BLIGHT

For many years the goal of the potato breeding program in Canada has been to develop a variety with late blight resistance. However, as yet, no resistant variety adapted to Canadian conditions is available to our potato growers. But the discovery that the fungus causing blight is variable and that many races exist has resulted in major changes in the methods employed by plant breeders and plant pathologists in their efforts to produce blight-resistant varieties.

We now know that there are at least two types of resistance to late blight. In one, resistance is limited to particular races of the fungus. In the other, resistance is generalized and is expressed regardless of the race or races which may be present. This latter type of resistance is found in a few commercial varieties, but

Messrs. Lawrence and Hodgson are with the CDA Research Station, Fredericton, N.B., while Messrs. Dionne and Munro recently left the Station. Mr. Dionne has joined the staff of the University of New Brunswick, Fredericton, and Dr. Munro is now with the CDA Plant Protection Division, Ottawa, Ont.

RESISTANCE

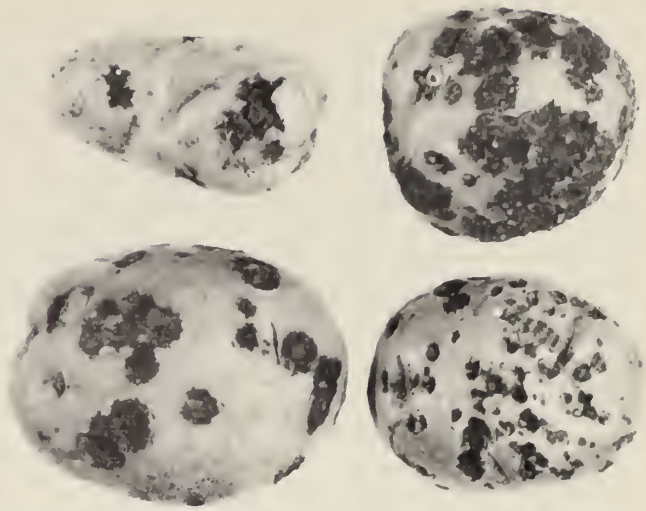

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Fig. 1—Testing for late blight resistance in the laboratory by the leaf-disc method.

Fig. 2—Testing for common scab disease resistance in the greenhouse.

Fig. 3—Common scab disease of potato.

at a low level, and in these, spraying with a fungicide is still required to assure a satisfactory crop. A few European varieties have much higher levels of generalized resistance and some recently introduced Mexican varieties are sufficiently resistant to give a good crop without fungicidal treatment, though the latter are poorly adapted to Canadian conditions. By utilizing such sources of resistance as well as that found in certain wild potato species, seedlings have been obtained with high levels of resistance to late blight. Some of these approach commercial requirements in quality, yield, and appearance.

COMMON SCAB

Breeding potatoes for resistance to common scab, another serious disease, also has been a major aim of breeding programs in the United States, Europe, and at Fredericton for many years. A few German varieties have a high degree of resistance to scab and, although not adapted to Canadian conditions, they have been used extensively as parents in our breeding program. Some American varieties also are quite resistant to scab but none have been well accepted by Canadian growers. Our own varieties, Chinook, Huron and Avon, which have some resistance, are beginning to find a place in commercial production.

A major problem in breeding for scab resistance has been the lack of a reliable diagnostic test for eliminating susceptible progeny in the seedling stage. The more desirable selections have had to be grown in a field nursery for a number of years to determine with certainty their reaction to the pathogen. We now have a greenhouse test which promises to greatly reduce the time required to evaluate scab resistance.

Recently, we have found new sources of resistance to scab in some wild potato species, and the use of these in breeding has resulted in progenies with higher levels of resistance than any known previously. Some of these selections appear to be immune to the scab disease.

VIRUSES

The development of potato varieties resistant to viruses is another important part of the Fredericton potato breeding program. Resistance or immunity to the viruses that cause potato mosaics, streak and leafroll has been found in some wild potato species and hybrid progenies.

Because of the difficulty of detecting some viruses, and the fact that many strains of certain viruses exist, new diagnostic tests have been developed to make effective use of the newly found sources of resistance. The new techniques should greatly reduce the time required to produce potato varieties with high levels of virus resistance. We are now combining resistance to the virus diseases with desirable horticultural qualities and commercial varieties having these attributes should, in the not too distant future, be available to potato growers.

OTHER DISEASES

Potato breeders at Fredericton also are cooperating with plant pathologists at Canadian research establishments in breeding for resistance to other potato diseases. These include blackleg, bacterial ring rot, Verticillium wilt, Fusaria and Phoma storage rots.

In addition to the potato diseases mentioned, an insidious fungus disease known as wart is found in Newfoundland but not in other potato growing areas of Canada. Through quarantine and other legislative measures this disease has been confined to that province. A breeding program centered at the CDA Research Station, St. John's West, Newfoundland, has been initiated in an attempt to develop potato varieties resistant to wart.

The availability of new sources of resistance, and the development of better disease assessment techniques has greatly increased the prospects of controlling the important potato diseases by means of resistant varieties. ●

OBJECTIVES OF THE CANADIAN

S. C. BARRY

The objectives of the Canadian Dairy Commission are the objectives of everyone associated with dairying. In the simplest of terms they are for a balanced, efficient, profitable industry. The problem confronting us all, and the task of the Commission to the extent that it has authority, is how to achieve that objective.

The Canadian Dairy Advisory Committee pinpointed the basic problem of the industry in its report. It said:

> "*It is recognized that the capacity to produce milk is overdeveloped in comparison with the market ability to absorb the output at prices which are satisfactory to producers. The basic imbalance lies at the root of the problem which faces the dairy industry.*"

In considering that comment of the Dairy Advisory Committee it is of interest to review government actions in the area of dairy price stabilization.

For many years these relied on supporting the price of major manufactured dairy products. This was done in part through offer to purchase and in part through subsidizing exports to equal a desired domestic price.

These procedures had their vicissitudes, notably the serious accumulation of butter in the late 1950's.

But in spite of government support measures and the very considerable funds devoted to them, the market was not yielding prices which were considered satisfactory to producers. The Stabilization Board had, for some time, paid minor indirect subsidies to compensate for changes in its support program, but starting with the 1966-67 dairy year the government instituted a policy of augmenting returns from the market with direct subsidy payments to producers.

Setting aside any argument as to whether or not present total returns, from the market and from subsidies, are adequate for producers, the present measures do not resolve the root problem pointed out by the Dairy Advisory Committee.

The arithmetic is simple. Market support prices during 1967 were designed to yield a national average price for 3.5 per cent manufacturing milk of about $3.54 per 100 pounds. The gross rate of subsidy is $1.21, making a total of $4.75. With certain notable exceptions, which I will refer to later, the market is just about absorbing the present output of manufacturing milk and cream. But it is not absorbing them

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HISTORICAL

In November, 1962, the Canadian Federation of Agriculture, on behalf of Dairy Farmers of Canada, proposed to the Federal-Provincial Agricultural Outlook Conference of that year that a Canadian Dairy Conference be held. The proposal was acted on and the Dairy Conference took place in Ottawa in February, 1963.

Representation at the Conference included Dairy Farmers of Canada, the National Dairy Council, Federal and Provincial Governments, the Federation of Agriculture, Farmers' Union and the Co-Operative Union.

The Conference recommended the establishment of a Canadian Dairy Advisory Committee to consider a wide range of matters affecting the dairy industry and report on them.

In the organization of the Committee representation was provided from five regions—the Atlantic Provinces, Quebec, Ontario, Manitoba and Saskatchewan, and Alberta and British Columbia. Dairy Farmers of Canada, the National Dairy Council and Provincial Governments each designated one member to the Committee from each of the five regions. One member was designated by the federal government.

The Committee submitted its report in August, 1965.

One of its recommendations was that a National Dairy Authority be established under federal legislation. The Committee proposed that the Commission have eight primary functions.

1. To administer federal dairy stabilization funds and funds obtained through trading and storage operations;
2. To have authority in the field of foreign trade, subject to government policy;
3. To establish producer prices on raw milk, as necessary;
4. To direct utilization of milk, if necessary, for the long-term benefit of the industry;
5. To negotiate and administer marketing quotas;
6. To assist in research;
7. To assist in publicity and advertising;
8. To recommend minimum national standards for quality and composition.

Acting on this recommendation for a National Dairy Authority the government presented a Bill to Parliament for the establishment of a Canadian Dairy Commission. The measure was approved by Parliament and assented to in July, 1966.

The Bill vested in the Commission the authority and functions which had been proposed for it by the Canadian Dairy Advisory Committee insofar as those functions came under federal jurisdiction.

The Act was proclaimed to come into force on October 31, 1966, and the Commission was appointed by Order-in-Council on December 1, 1966.

On December 2 the Minister of Agriculture designated the Consultative Committee to the Commission which the Act authorized.

While the Commission was appointed on December 1, 1966, it actually became operative with the start of the next dairy support year on April 1, 1967. The intervening time was spent in organizational affairs and in developing a program for the matters which would require its immediate attention in the new dairy year.

DAIRY COMMISSION

at the $4.75 level. For that price to be secured from the market—and referring only to butter and powder —would require an increase of 10 cents per pound in the price of each of them or some other combination of pricing to provide another $1.21. Prices of that nature could be expected to lead to some considerable shrinking of the total market for dairy products.

The Commission has no ready answer to this basic problem. Economic purists might suggest that the rule of comparative advantage indicates a much smaller dairy industry in Canada. This, however, ignores the fact that the circumstances of our climate, geography and soil, to say nothing of history, make dairying an integral part of much of our agriculture.

IMPORTANT BREAK WITH TRADITION

But while there is no ready answer to this basic problem, the Commission considered that there was one important, indeed fundamental, first step in its operations. This was to exercise what influence it could to keep production within the bounds of the available market and, of equal or greater importance, to bring to the industry at large an appreciation of the fact that production has to be related to demand.

This was an important break from previous dairy support measures which, in the main, had placed no limitations on the quantities eligible for support or subsidy assistance.

The Commission does not have the power—and indeed as a federal agency does not have the authority—to place restrictions on the production or marketing of milk within a province. But it does have authority over subsidies. So we adopted the device of placing a limit on the total amount of milk or cream on which we would pay subsidy and, within that total, giving an individual quota to each shipper.

There has, of course, been some criticism.

There has been criticism of the fact of a government agency interfering, if even indirectly, with the production decisions of individuals, with bureaucracy inserting itself into personal planning of farmers.

There is only one answer to that. This industry—and I use that term in its broadest sense of including both producers and processors—can follow one of two basic courses. It can be a supported industry or it can be completely free and competitive in the market place. Not only by government decision, but by popular wish, certainly on the producing side, it is a supported industry and as such, some controls should not be unexpected.

There has, of course, been some criticism also of individual quotas, of the way the total "pie" has been cut. We have tried to be fair in that.

But what has impressed itself most on the Commission is the degree to which producers generally have recognized and accepted the principle that

the production of manufacturing milk and cream must, in total, be kept reasonably within the limits of the quantities which the market will take at a given price. The acceptance of this point of principle is, in our view, an important step in the long-term planning of the industry.

In effect, what the Commission is saying in this subsidy quota policy is that industrial milk and cream producers can expect to receive the full benefits of the stabilization program, including market price supports and subsidies, only for the quantity taken by the domestic market.

EXPORT EQUALIZATION FUND

This raises another important point.

Canadian dairy product prices are among the highest in the world. If there are surpluses which have to be exported they cannot command prices equal to those in the home market. If they return to exporters only what the export market will bring the effect would be to depress Canadian prices and nullify the support program.

To avoid this, the procedure had been to subsidize exports to the difference between export and domestic values. But if the stabilization program is to be geared basically to the domestic market, and if the industry overproduces in relation to that market, should it not accept, for that surplus, the returns which it actually brings?

The Dairy Advisory Committee recognized this point and stated in its report:

> "*The Authority (which is now the Commission) might establish a basic quota for which a certain minimum price would be established. Production over and above such quota then will return whatever could be realized.*"

Assuming that domestic prices are stabilized, what the Committee was saying in this part of its report was that producers should receive a certain price for their milk or cream used in products sold in Canada and for the rest, which has to be exported, the price would be whatever the market might bring.

In practice, we have not been able to devise a way of doing that directly. At the time milk is marketed and paid for there is no way of knowing where the end product will be sold.

Another way to achieve the same result, of course, would be to pool all milk, with the final price reflecting the average of returns from the domestic and export markets. Here, also, we lack the physical means to take this approach.

Still another procedure would be to make a levy to finance the cost of equalizing export and domestic prices. The end result of this would be the same as if producers received a pooled price for their milk used for domestic and export sales.

The arithmetic here, also, is simple. Assume that for every hundred pounds of milk marketed 90 pounds are used domestically at a value of $3.54 and 10 pounds are exported at a value of $2.44. A pooled price would provide an average return of $3.43.

If, instead of having a pooled price, the hundred pounds was paid for at $3.54 minus a levy of 11 cents, the net return would be $3.43, the same as a pooled price.

The principle that production over and above domestic requirements should return whatever could be realized for it was introduced last year by the Stabilization Board, using the levy device, and has been continued by the Commission.

Theoretically the levy could be made at point of marketing. Lacking the facilities to do this, we make the levy against the producer subsidy payments and this creates what we call the export equalization fund. Out of it are made the payments to equalize export and domestic prices.

While there is still some misunderstanding on the part of producers with respect to this levy or holdback, there have been very few occasions, when it has been explained to them, that they do not accept it and agree with it.

In summary of what I have dealt with so far, two related and important points of principle dealt with by the Advisory Committee have been embodied in the objectives and operations of the Commission.

One is that through the subsidy quota system we have related the full benefits of the dairy stabilization program, including support prices and subsidies, to the volume of industrial milk and cream which can be marketed in Canada.

The second is that through the indirect device of a levy against the subsidy we have continued the principle established in 1966 by the Stabilization Board of pooling prices from domestic and export sales in total returns from the market to producers.

DAIRY IMPORTS AND EXPORTS

This leads to one final matter which I thought I might touch on at this time. This has to do with imports and exports of dairy products.

This, also, was considered by the Canadian Dairy Advisory Committee. It proposed, broadly, that the Commission "have authority in the field of foreign trade and to act on matters related to exports and imports, subject to government policy."

On the subject of imports the Committee was quite specific. It proposed that the Commission should have the power to import at world prices any dairy products which are in short supply domestically, resell them at domestic prices and that any profit should accrue to the Commission for use in its programs.

There was one instance where the Commission acted along these lines. This was when we imported two million pounds of butter last winter to guard against the possibility of a shortage.

Any suggestion about importing butter into Canada used to be, and to some extent still is, regarded as the ultimate in folly. There is still some criticism of this importation but I find that increasingly producers are accepting the principle that

since it is not reasonable always to expect an exact balance in butter production and consumption it is better to be a bit short than long.

If we are long and if any butter has to be exported, which would be at a sacrifice price if a market could be found, the cost would have to be borne by the export equalization fund, which is the producers' own money.

If we are a bit short and some has to be imported by the Commission, any profit accrues to the Commission and is there to be used for the benefit of the industry in the Commission's total program.

SKIM MILK POWDER PRODUCTION

I should make it clear here that I am dealing with this matter only in principle and not with any implication that butter may be imported this year.

But our major problem has to do not with imports but with exports, with a substantial and growing surplus of one product—skim milk powder.

There has been no recent substantial problem with other products. The Canadian market is using the major volume although it has to be recognized that with subsidies providing about 25 per cent of producers' returns Canadian sales are being achieved at what is, in effect, a subsidized price.

Butter sales to the latter part of 1967 were down 6 per cent and production down 3 per cent. Production and sales this year will likely match each other quite closely.

Whole milk powder and evaporated milk for export are at normal minor levels. Casein production and exports will be substantially below a year ago.

Cheese production and sales are running about on a level with a year ago.

The situation with skim milk powder is much less encouraging. In the current year we will have at least 120 million pounds more than will be used in Canada. We are reaching a position where about 40 per cent of our powder has to find a home outside this country.

To the end of August, 1967, powder production was up 32 million pounds, or 17 per cent, over 1966. About half of this increase appears to be due to a diversion of skim milk from casein to powder.

Over and above that, however, there is a significant and continuing trend which is accentuating the powder problem. This is the trend away from cream shipments to whole milk shipments, with an increasing percentage of our butter being made from whole milk. The skim milk from this goes into powder.

The extent of this change is very great. The best available figures indicate that, in 1957, 75 per cent of Canadian butter was made from farm-separated cream. By 1966 this had dropped to 44 per cent.

We have a paradox here. In dairy areas, economics on the production side and on the processing side dictate the shipment of whole milk instead of cream. As this change takes place progressively we add to our difficulties in the disposal of the resulting skim milk powder.

It is interesting, in this respect, to compare Canada's situation with that of the United States, where about 90 per cent of the butter is now produced from whole milk.

The U.S. produces about 1.2 billion pounds of butter a year, which is about 6 pounds per capita of its 200 million people. As an associated product, it produced, in 1966, 1.6 billion pounds of skim milk powder, or 8 pounds per capita.

We produce about 330 million pounds of butter for our 20 million people, or 16 pounds per capita. We produced in 1967 at least 300 million pounds of powder, or 15 pounds per capita.

If we produced powder at the same per capita rate as the U.S., we would have about 160 million pounds a year, which is just about our domestic use. However, because of our much heavier butter use we have proportionally more skim milk and produce powder at about double the U.S. rate. This has become the most serious present disposal problem within the Canadian dairy industry. Unfortunately, it has become acute at a time when several countries also have substantial powder surpluses.

In the short term, of course, from the standpoint of processors, tenderable powder can be sold to the Commission. Our 1967 purchases were almost double those of a year ago. This, though, is not the final solution. It resolves an individual business problem but not a national industry problem. At some point the stocks which the Commission buys have to be disposed of.

The device on which we have relied to dispose of surpluses on export markets has been export assistance at a fixed rate. The cost of this, as I said earlier, now comes from the export equalization fund, which is a charge against producers.

We started the 1966-67 dairy year with export assistance on powder at the rate of 5 cents per pound. To be more competitive, in view of world prices and heavy supplies, we increased this, effective September 18 until further notice, to 7 cents per pound on registrations of 1,200 tons or more to one country. The hope, obviously, was to move some substantial quantities out of the country.

The device of export assistance at a fixed rate has worked reasonably well where there are only minor quantities of a given product to dispose of in export markets. There may be some question as to whether it is the best device, and the best way of doing business, under circumstances such as we have with skim milk powder.

I have dealt with some of the major items which have become a part of our program. There are some, including the important one of milk quality, with which we have not yet dealt in the time the Commission has been operative.

These will have our attention and we hope, as we know the industry does, that the Commission can play the part which everyone envisaged for it. ●

OBJECTIFS DE LA COMMISSION CANADIENNE DU LAIT

S. C. BARRY

Les objectifs que s'est fixés la Commission sont ceux de toute personne impliquée dans la production laitière. Pour les résumer en quelques simples mots on peut dire qu'ils visent l'établissement d'une industrie équilibrée, productive et rentable. Comment atteindre cet objectif? C'est là le problème que nous avons tous à résoudre et c'est la tâche à laquelle doit s'appliquer la Commission dans la mesure de ses pouvoirs.

Le Comité consultatif canadien de l'industrie laitière a indiqué le problème fondamental de l'industrie dans son rapport. On y lisait:

> *«Il est reconnu que la capacité de production de lait dépasse la faculté du marché d'absorber ce produit à des prix qui puissent satisfaire les producteurs. Ce déséquilibre fondamental est à la source du problème auquel l'industrie laitière doit faire face.»*

Tenant compte de ce commentaire du Comité consultatif canadien de l'industrie laitière, il pourrait être intéressant de passer en revue les interventions gouvernementales dans le domaine de la stabilisation des prix du lait.

Pendant de nombreuses années, ces interventions ont consisté à soutenir les prix des principaux produits manufacturés du lait. On y est arrivé soit en offrant d'acheter ces produits, soit en les favorisant de subventions à l'exportation en vue de les maintenir au prix désiré à l'intérieur du pays.

On se rappelle que ces méthodes ont eu leurs inconvénients en particulier la sérieuse accumulation de beurre vers la fin des années 50.

Cependant, en dépit des mesures de soutien de la part du Gouvernement et des fonds considérables qu'on leur a consacrés, le marché n'a pas donné des prix jugés satisfaisants par les producteurs. L'Office de stabilisation a, pendant quelque temps, payé des subventions minimes indirectes pour compenser les changements apportés à ses programmes de soutien des prix mais, au début de la campagne laitière de 1966-1967, le Gouvernement a opté pour une politique visant à augmenter les revenus du marché par des subventions versées directement aux producteurs.

Sans qu'on se soit demandé si les recettes globales présentement tirées du marché et des subventions sont suffisantes pour les producteurs, les mesures actuellement en vigueur n'apportent pas une solution au problème fondamental signalé par le Comité consultatif canadien de l'industrie laitière.

Il s'agit simplement d'un problème d'arithmétique. Au cours de 1967, les prix de soutien du marché visaient à assurer un prix national moyen de $3.54 les 100 livres pour le lait de transformation d'une teneur de 3.5 p. 100 de matières grasses. Le taux brut de la subvention est de $1.21, ce qui forme un prix global de $4.75. A certaines exceptions notables près sur lesquelles je reviendrai plus loin, le marché absorbe à peu près la production présente de crème et de lait de transformation. Mais il ne les absorbe pas au niveau de $4.75. Pour obtenir ce prix du marché, et ici nous ne parlons que du beurre et de la poudre, il faudrait hausser de 10c. la livre chacun de ces produits ou recourir à une autre combinaison quelconque pour l'établissement des prix qui fournirait $1.21 de plus ou la subvention totale. On peut s'attendre que des prix de cette nature comprimeraient considérablement l'écoulement des produits laitiers dans leur ensemble.

La Commission ne possède aucune solution facile à ce problème fondamental. Les puristes de l'économique pourraient suggérer que la règle des avantages comparatifs exigerait une industrie laitière réduite au Canada. Cette solution, cependant, ne tient pas compte du fait que nos conditions climatiques, notre géographie et notre sol, sans parler de notre histoire, font de l'industrie laitière partie intégrante de presque toute notre agriculture.

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HISTORIQUE

En novembre 1962, la Fédération canadienne de l'agriculture, au nom des producteurs laitiers du Canada, proposait à la Conférence fédérale-provinciale sur l'agriculture la tenue d'une conférence canadienne sur le lait. La proposition fut acceptée et de fait la conférence eut lieu à Ottawa en février 1963.

Y étaient représentés les producteurs laitiers du Canada, le Conseil national de l'industrie laitière, les gouvernements d'Ottawa et des provinces, la Fédération de l'agriculture, l'Union des agriculteurs et l'Union des coopératives.

La Conférence recommanda l'institution d'un Comité consultatif canadien de l'industrie laitière, qui aurait pour fonction d'examiner le vaste assortiment d'éléments intéressant de près l'industrie laitière et ensuite d'en présenter un rapport.

La structure d'un Comité prévoyait la participation de cinq régions, les provinces atlantiques, le Québec, l'Ontario, le Manitoba et la Saskatchewan, l'Alberta et la Colombie-Britannique. En plus, les producteurs laitiers du Canada, le Conseil national de l'industrie laitière et les gouvernements provinciaux y avaient chacun un membre de chacune des cinq régions. Un membre enfin devait être choisi par le gouvernement fédéral.

Le Comité présenta son rapport en août 1965. Dans ses recommandations, il proposait l'établissement par loi fédérale d'une Commission nationale du lait et des produits dérivés. Le Comité stipulait les huit fonctions essentielles de cette Commission.

1. Administrer le fonds de stabilisation fédéral des produits laitiers et les fonds recueillis de la vente ou de l'entreposage des produits laitiers.
2. Exercer la juridiction en matière de commerce extérieur, en conformité avec les politiques du gouvernement.
3. Fixer selon les besoins les prix payés aux producteurs de lait à l'état brut.
4. Diriger, au besoin, l'utilisation du lait, ayant en vue les intérêts à long terme de l'industrie laitière.
5. Négocier et exécuter le contingentement (les quotas) des ventes.
6. Aider aux recherches en matière de production laitière.
7. Aider à la publicité et à la réclame.
8. Recommander les normes nationales de base pour la qualité et la composition des produits laitiers.

Fort de cette recommandation, le gouvernement soumettait au Parlement un projet de loi pour l'institution d'une Commission canadienne du lait et des produits dérivés. Le projet fut adopté par le Parlement et approuvé par le gouverneur général en juillet 1966. Le projet de loi investissait la Commission des pouvoirs et attributions proposés par le Comité consultatif canadien de l'industrie laitière, pour autant que ces fonctions tombent sous la juridiction fédérale.

La Loi fut proclamée le 31 octobre 1966 et, le 1er décembre 1966, un décret du conseil des ministres instituait la Commission.

Le 2 décembre, le ministre de l'Agriculture nommait les membres du Comité consultatif de la Commission, tel que l'avait prévu la Loi.

Instituée le 1er décembre 1966, la Commission n'entra réellement en fonction qu'au début de la suivante année financière, soit le 1er avril 1967. Dans l'entre-temps, eut lieu une phase d'organisation et l'on mit au point un plan concernant les affaires les plus urgentes.

RUPTURE AVEC LA TRADITION

Même s'il ne se trouve pas de solution facile à ce problème fondamental, la Commission croit qu'on a pris une première mesure importante, voire fondamentale, pour y arriver. Elle a consisté à faire agir toutes les influences possibles pour maintenir la production en dedans des limites du marché disponible et chose aussi importante sinon plus, à convaincre l'industrie en général du fait que la production doit être proportionnée à la demande.

Cette orientation nouvelle s'écartait considérablement des mesures de soutien du lait qui, auparavant, ne limitaient généralement pas les quantités admissibles au soutien ou aux subventions.

La Commission n'a pas le mandat et—comme organisme fédéral, n'est pas autorisée—à imposer des restrictions à la production ou à la vente du lait dans les limites d'une province. Cependant elle peut disposer librement de ses subventions. C'est ainsi que nous avons adopté un mécanisme qui limite la quantité globale de lait et de crème pouvant bénéficier de la subvention et, à même la production totale, nous avons attribué un quota individuel à chaque expéditeur.

Bien entendu, il y a eu des critiques.

On a d'abord critiqué le fait qu'un organisme du gouvernement s'ingérait, malgré que ce fût indirectement, dans les décisions prises par les individus à l'égard de la production et que la bureaucratie se mêlait de planification, cette dernière devant être du ressort personnel des cultivateurs.

Il n'y a qu'une réponse à cela: l'industrie, et nous utilisons ce terme dans son sens le plus vaste pour y inclure à la fois les producteurs et les conditionneurs, peut suivre l'une de deux voies fondamentales. Elle peut être une industrie soutenue, ou elle peut être entièrement libre et se livrer au jeu de la concurrence sur les marchés. Ce n'est pas uniquement par la décision du gouvernement, mais pour répondre à un désir populaire au secteur de la production du moins, qu'elle est devenue une industrie soutenue. Comme telle, elle ne saurait échapper à certaines régies.

Bien entendu, on a aussi critiqué les quotas individuels et la façon dont le gâteau avait été partagé, mais nous avons cherché à être équitables à ce sujet.

Ce qui a pourtant le plus impressionné la Commission, c'est la façon dont les producteurs ont généralement compris et accepté le principe voulant que la production de la crème et du lait de transformation doive globalement se limiter aux quantités que le marché peut absorber à un prix donné. A notre avis, l'acceptation de ce principe précis constitue une étape importante dans la planification à long terme de l'industrie.

En effet, la Commission soutient, en ce qui a trait au régime des subventions et des quotas, que les producteurs de crème et de lait de transformation ne doivent s'attendre à tirer tous les avantages possibles du programme de stabilisation, y compris le soutien des prix au marché et les subventions, que sur les quantités absorbables et absorbées par le marché domestique.

FONDS DE PÉRÉQUATION À L'EXPORTATION

Cela soulève une autre question importante.

Les prix des produits laitiers canadiens sont parmi les plus élevés au monde. S'il y a des surplus que l'on doit exporter, ils ne peuvent commander les prix qui ont cours sur le marché national. S'ils rapportent aux exportateurs uniquement ce que le marché d'exportation leur accorde, il s'ensuit un abaissement des prix au Canada et la neutralisation du programme de soutien.

Pour obvier à cette situation, la mesure adoptée à l'égard des exportations a pris la forme d'une subvention égale à la différence entre les prix d'exportation et les prix au pays. Mais si le programme de stabilisation doit être fondé principalement sur le marché canadien et si l'industrie produit en excès des besoins de ce marché, celle-ci ne devrait-elle pas accepter, à l'égard de ses surplus, ce qu'elle peut effectivement en obtenir?

Le Comité consultatif de la Commission du lait a reconnu le bien-fondé de ce point de vue et déclare dans son rapport:

«*L'Office (qui est maintenant remplacé par la Commission) pourrait déterminer un contingentement (quota global) de base à l'égard duquel serait établi un prix minimum. La production excédentaire ou déficitaire, par rapport au contingentement (quota), rapporterait ce qui pourrait en être obtenu.*»

En supposant que les prix au pays soient stabilisés, le sens de cette partie du rapport du Comité, c'est que les producteurs devraient recevoir un certain prix pour les quantités de lait et de crème utilisées pour la fabrication de produits vendus au Canada, et qu'à l'égard du reste forcément exporté, le prix serait uniquement celui du marché libre.

Dans la pratique nous n'avons pu trouver le moyen d'appliquer directement cette proposition. Lors de la mise sur le marché et du paiement du lait, il n'y a aucun moyen de prévoir où sera écoulé le produit fini.

Un autre moyen d'arriver au même résultat serait évidemment de mettre en commun tout le lait dont le prix en définitive serait égal à la moyenne des recettes provenant des ventes sur les marchés intérieurs et extérieurs. A cet égard aussi, les moyens physiques font défaut. Une autre méthode serait d'effectuer un prélèvement pour financer le coût de la péréquation des prix nationaux et étrangers. En définitive, cette dernière méthode donnerait aux producteurs le même résultat que la mise en commun du lait servant à la fabrication des produits écoulés au pays et à l'exportation.

Le calcul dans ce cas est fort simple. Mettons que 90 livres par 100 livres de lait servent à la consommation nationale au prix de $3.54 et que la différence de 10 livres aille à l'exportation au prix de $2.44. La mise en commun rapporterait $3.43.

Maintenant si, au lieu de pratiquer la mise en commun, les 100 livres de lait sont payées $3.54, moins le prélèvement de 11c., le prix net s'établit à $3.43, soit le même que le prix obtenu par la mise en commun.

Le principe voulant que la production excédant les besoins nationaux rapporte ce qui peut en être obtenu a été introduit l'an dernier par l'Office de stabilisation des prix agricoles au moyen d'un prélèvement, et la Commission a maintenu ce système.

Théoriquement, le prélèvement pourrait se faire à l'endroit même de la vente mais, parce que nous n'avons pas présentement le moyen de procéder de cette manière, nous avons choisi de faire le prélèvement à même les paiements de subvention: c'est ce que nous désignons sous le nom de fonds de péréquation à l'exportation. Il sert à uniformiser les prix à l'exportation et les prix au pays.

Bien qu'il y ait encore de l'incompréhension chez certains producteurs au sujet de ce prélevé ou de cette retenue, rares sont les cas où, après explication, on n'ait pas accepté et agréé cette mesure.

Pour résumer ce que j'ai dit jusqu'ici, deux importants principes connexes ont été admis par le Comité consultatif et ont été incorporés dans les objectifs et les opérations de la Commission.

D'abord, au moyen du régime des subventions appliquées aux quotas de production, nous avons rattaché les avantages du programme de stabilisation des prix du lait, y compris les prix de soutien et les subventions, aux quantités de lait et de crème industriels qui peuvent être écoulées sur le marché du Canada.

En deuxième lieu, par le moyen indirect d'un prélevé à même la subvention, nous avons maintenu le principe, admis en 1966 par l'Office de stabilisation des prix agricoles, de la mise en commun des prix réalisés sur les marchés intérieurs et extérieurs, déterminant ainsi les recettes totales obtenues par les producteurs sur ces marchés.

IMPORTATIONS ET EXPORTATIONS

Cela m'amène au dernier point que je désire toucher en ce moment. Je veux parler des importations et des exportations de nos produits laitiers.

Le Comité consultatif de la Commission canadienne du lait a également étudié ce point. Il a proposé en somme que la Commission «exerce ses pouvoirs dans le domaine du commerce extérieur et agisse en matière d'exportation et d'importation, conformément à la politique du gouvernement».

A l'égard des importations, le Comité a été bien explicite. Il a proposé que la Commission soit autorisée à importer, aux prix mondiaux, tous les produits laitiers déficitaires sur le marché canadien, à les revendre aux prix canadiens et à encaisser les bénéfices ainsi réalisés pour servir au financement de ses programmes.

C'est ce que la Commission a fait en une occasion. Je me réfère à l'importation de deux millions de livres de beurre l'hiver dernier pour parer à une pénurie éventuelle.

L'idée même d'importer du beurre au Canada était regardée, et l'est encore, comme le comble de la folie. Ces importations subissent toujours le feu de la critique dans certains milieux; je constate néanmoins qu'un nombre croissant de producteurs admettent qu'il n'est pas toujours raisonnablement possible d'équilibrer exactement la production et la consommation beurrières et qu'alors, il vaut mieux rester en deçà plutôt que d'aller au delà de la production idéale.

Si nous dépassons les besoins et qu'il devient nécessaire d'exporter le beurre à un prix de sacrifice, si tant est que l'on puisse trouver un débouché, la différence de prix devra être comblée en puisant dans le fonds destiné à l'exportation, fonds qu'alimentent les producteurs.

S'il y a une légère pénurie et que la Commission doive en importer, tout le profit revient à la Commission qui peut s'en servir pour le bien de l'industrie, conformément au programme de la Commission.

LA POUDRE DE LAIT ÉCRÉMÉ

Je dois souligner ici que je traite de cette question seulement en principe et je ne veux pas donner à entendre qu'on importera du beurre cette année.

Notre principal problème porte non pas sur les importations mais sur les exportations d'un excédent considérable et croissant d'un seul produit: la poudre de lait écrémé.

Il n'y a presque pas eu de problème récemment en ce qui concerne les autres produits. Le marché canadien en absorbe la plus grande partie; il faut bien reconnaître cependant que, les subventions comptant pour environ 25 p. 100 des recettes des producteurs, les ventes au Canada se font à ce qui est effectivement un prix subventionné.

Les ventes de beurre, vers la fin de 1967 ont été inférieures de 6 p. 100 et la production a baissé de 3 p. 100. La production et les ventes cette année s'annoncent à peu près égales.

La poudre de lait entier et le lait évaporé aux fins d'exportation sont à un faible niveau, ce qui est normal. La production et les exportations de caséine seront très inférieures à celles de l'an dernier.

La production et la vente de fromage correspondent ou à peu près, à celles de l'an dernier.

La situation est beaucoup moins encourageante en ce qui concerne la poudre de lait écrémé. Au cours de la présente année, notre production dépassera d'au moins 120 millions de livres le volume utilisé au Canada. La situation est telle que 40 p. 100 environ de notre poudre devra être exportée.

Jusqu'à la fin d'août 1967, la production de poudre avait augmenté de 32 millions de livres, soit 17 p. 100 de plus qu'en 1966. Environ la moitié de cette augmentation semble attribuable à l'acheminement du lait écrémé vers la production de poudre plutôt que de caséine.

En plus de cela, cependant, il y a une tendance importante et soutenue qui aggrave le problème de la poudre. Il s'agit des expéditions de lait entier qui remplacent celles de crème, de sorte qu'une proportion croissante de notre beurre est fabriqué à partir de lait entier. Le lait écrémé qui en résulte est transformé en poudre.

La portée de ce changement est très grande. Les meilleures données disponibles indiquent qu'en 1957, environ 75 p. 100 du beurre canadien était fait de crème séparée à la ferme. En 1966, ce chiffre avait baissé à 44 p. 100.

Il y a ici un paradoxe. Dans les régions laitières, l'aspect économique de la production et de la transformation impose l'expédition du lait entier au lieu de la crème. Étant donné que ce changement se produit progressivement, nos difficultés s'accentuent lorsqu'il s'agit d'écouler la poudre de lait écrémé qui en résulte.

A ce sujet, il est intéressant de comparer la situation du Canada à celle des États-Unis, où environ 90 p. 100 du beurre est fabriqué à partir de lait entier.

Les États-Unis produisent environ 1.2 milliard de livres de beurre par année, soit environ 6 livres pour chacun de leurs 200 millions d'habitants. Comme produit associé, ce pays a fabriqué en 1966 1.6 milliard de livres de poudre de lait écrémé, soit 8 livres par habitant.

Nous fabriquons environ 330 millions de livres de beurre pour nos 20 millions de population, soit 16 livres par tête. Nous avons produit en 1967 au moins 300 millions de livres de poudre, (15 livres par tête.)

Si nous produisions de la poudre au même rythme par habitant que les États-Unis, nous aurions environ 160 millions de livres par année, ce qui est à peu près notre consommation intérieure. Cependant, à cause de notre consommation beaucoup plus élevée de beurre, nous avons proportionnellement plus de lait écrémé et produisons de la poudre en quantité double de celle des États-Unis. Il en résulte un problème d'écoulement des plus épineux à l'heure actuelle au sein de l'industrie laitière du Canada. Malheureusement, il devient aigu à un moment où plusieurs autres pays ont également des excédents élevés de poudre.

A court terme, évidemment, du point de vue des fabricants, la poudre acceptable peut être vendue à la Commission. En 1967, les achats de la Commission ont été presque le double de ceux de 1966. Ce n'est pas cependant la solution définitive. Elle résout un problème commercial chez l'individu, mais non un problème de l'industrie à l'échelle nationale.

Notre façon de disposer des excédents sur le marché d'exportation a été une aide à l'exportation à un taux déterminé. Le coût de cette opération, provient du fonds de peréquation à l'exportation, lequel est à la charge des producteurs.

Nous avons commencé l'année 1966-1967 par une aide à l'exportation de la poudre au taux de 5 cents la livre. Pour faire face à la concurrence, vu le prix mondial et les approvisionnements considérables, nous avons augmenté cette subvention à compter du 18 septembre et jusqu'à nouvel ordre à 7 cents la livre dans le cas d'expéditions inscrites de 1,200 tonnes ou plus à destination d'un pays. Nous espérons, évidemment, en expédier d'importantes quantités hors du pays.

L'aide à l'exportation à un taux déterminé a donné des résultats plutôt satisfaisants dans le cas de petites quantitiés seulement d'un produit donné à écouler sur les marchés d'exportation. Il y a lieu de se demander si cette façon est la meilleure formule de transaction dans des conditions comme celles que présente la poudre de lait écrémé.

J'ai parlé de certains des principaux sujets qui sont devenus un partie de notre programme. Il en est certains autres, y compris l'aspect très important de la qualité du lait, dont nous n'avons pas encore eu le temps de nous occuper depuis que la Commission est à l'œuvre.

Nous y reviendrons et nous espérons, tout comme l'industrie, que la Commission pourra jouer utilement le rôle que tous souhaitent qu'elle joue. ●

agriculture in the fort nelson area of british columbia

A. M. F. HENNIG AND A. A. GUITARD

The Fort Nelson area is one of the remaining frontiers with considerable potential, both industrial and agricultural. The area is currently awakening to oil and gas development. Vast reserves of timber, pulp and minerals are relatively untapped, but there is no commerical agricultural development.

Extensive swampy areas, poor topography or heavy tree cover limit the arable acreage of this area. Leahey,[1] in a preliminary study, estimated the arable land in the Fort Nelson area at 500,000 acres which he classed as: 1) river flats and flood plains, and 2) the Nelson plateau. In a study directed from the CDA Research Station, Beaverlodge, Alta., we have made a reassessment of the area and found that along numerous creeks there are extensive grass and willow covered meadows which could be used for agriculture. Many of the bogs are fairly shallow and could, with clearing and improved drainage, also be arable. Thus, in reassessing the potential, the arable acreage in this region is now estimated at from 1,000,000 to 1,500,000 acres.

The location chosen for this study is at Mile 319 on the Alaska Highway, which is about 20 miles west of Fort Nelson in an area of soil typical of the entire Nelson Plateau.

The soils in the flats vary from gravels and sands, of questionable value, to silts and clays of high fertility. The size of the native spruce and poplar and excellent growth of garden vegetables provide good evidence of fertile soil.

The Nelson plateau is an undulating to gently rolling upland area with solid stands of large aspen-poplar and spruce-popular mixtures. The soil is generally a fine textured, fairly stone-free till and is usually low in calcium.

At Fort Nelson, for many years now, up to 50 kitchen gardens have been in operation by the Air

[1]Preliminary Report on an Exploratory Soil Survey Along the Alaska Military Highway and the Yukon River System by A. Leahey, Experimental Farms Service, Ottawa, Ontario, Oct. 1943.

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Fig. 1—Tree cover at Mile 308 on the Alaska Highway. This is Type 4 of cover, poplar with from 500 to 1500 trees per acre. Trees have an average diameter of 6 to 14 inches at a height of 4 feet. These trees in the foreground have been walked down with a bulldozer.

TABLE 1. COMPARISON OF SOME ASPECTS OF THE FORT NELSON AND BEAVERLODGE CLIMATES FOR THE PERIOD 1964-1966.

	Fort Nelson, B.C. 58° 50′ N Lat. 122° 40′ W Long.	Beaverlodge, Alta. 55° 12′ N Lat. 119° 19′ W Long.
Annual mean temperature in °F	28.2	33.4
Summer temperature (May-Aug.) in °F	57.3	54.6
Degree days above 42°F (May-Aug.)	2066	1648
Killing frost free period (28°F) in days	128	134
Frost free period (32°F) in days	108	105
Annual precipitation in inches	16.4	24.8
Growing season precip. (May-Sept.) in inches	10.5	16.1

Force personnel. These gardens flourish along the river flats on rich alluvial soil.

The climate of the Fort Nelson area (as determined at the Airport by the Department of Transport) compares favorably with that at Beaverlodge, some 300 miles south. The 3-year comparison in Table 1 gives a good estimate of the climate of the two locations. One exception is that the annual and growing-season precipitation at Beaverlodge is only 17.9 and 10.0 inches based on a 51-year average.

CROP TRIALS

Our initial test, in 1964, was on fall (1963) moldboard breaking. In 1965, one test was on barley stubble and the other on summerfallowed breaking. In 1966, only Gateway and Husky barley were grown with fertilizer combinations of nitrogen, phosphorus and potassium and with different rates of nitrogen. This was on land that had produced potatoes in 1964 but was not cropped during 1965. In our investigations, Saunders and Thatcher wheat, Glen and Victory oats, Gateway and Husky barley, Arlo and Golden rapeseed and Cree, Redwing and Redwood flax were seeded without fertilizer and with nitrogen, phosphorus, potassium, sulphur and lime in additive combinations.

In 1964, on new breaking, both nitrogen and phosphorus were required for maximum yield of all cereals. We found that there was no need for potassium, sulphur or lime. In 1965, on summerfallowed breaking, cereals again responded to nitrogen and phosphorus fertilizer but there was generally less increase from nitrogen alone. Nitrogen was the major requirement of all cereals grown on stubble in 1965. These observations are shown in Table 2.

TABLE 2. YIELD OF CEREALS IN BUSHELS PER ACRE (AVERAGE FOR WHEAT, OATS AND BARLEY) UNDER DIFFERENT CROPPING CONDITIONS, FORT NELSON, B.C. 1964 AND 1965.

Treatments		Year and cropping condition		
		1964	1965	
N	P	Late breaking	Barley stubble	Summer-fallowed breaking
lb/ac				
0	0	28.8	19.3	24.6
60	0	36.3	27.9	30.0
60	40	44.7	30.4	37.8

In 1966, we found that both Husky and Gateway barley responded to nitrogen and to increased rates of nitrogen. There was also some response from phosphorus. Twenty pounds each of nitrogen and phosphorus with 30 pounds potassium per acre increased average yields from 38 bushels per acre to 65 bushels. Increasing nitrogen to 40 and 80 pounds per acre further increased yields to 73 and 86 bushels per acre respectively. Although potassium did not increase yield, it greatly improved straw strength.

Due to unfortunate timing of harvesting operations and an unexplained "boll drop" in flax, we were unable to determine accurate yields for flax or rapeseed. Estimates place flax yields at 9 to 13 bushels per acre, Arlo rapeseed at 7 and Golden at about 13 bushels per acre.

FORAGE CROPS

A test of three species each of grasses and legumes

TABLE 3. HAY AND SEED YIELDS OF GRASSES AND LEGUMES, FORT NELSON, B.C. 1965 AND 1966.

Crop	Hay (tons/ac)			Seed (lb/ac)		
		1966–2 cuts			1966	
	1965[1] 1 cut	Fertilizer Yes	Fertilizer No	1965[1]	Fertilizer Yes	Fertilizer No
Carlton brome-grass	.8	.9	2.1	36	75	135
Climax timothy	.8	1.0	3.0	173	180	445
Olds creeping red fescue	.2	.6	2.0	143	178	391
Rambler alfalfa	.6	3.0	5.0	190	247	272
Aurora alsike	1.0	1.4	1.4	216	469	578
Leo birdsfoot trefoil	.8	1.4	1.8	—	240	276

[1]First production year.

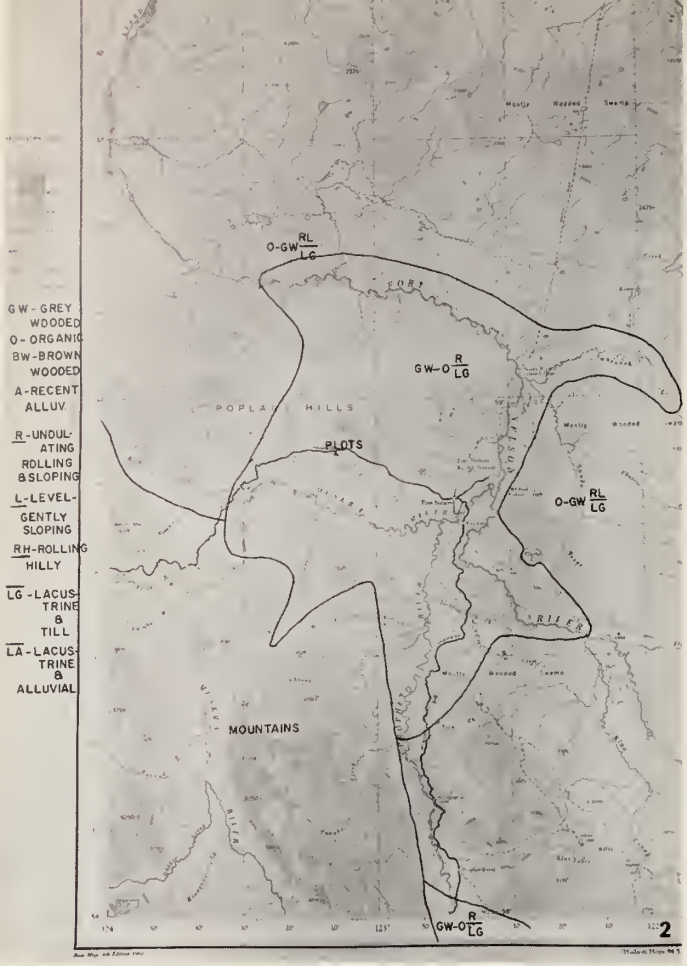

Fig. 2.—Physiographic features of the Fort Nelson area: major area of potentially arable soils and location of test plots. Field trials were started in 1964 as part of the program to determine the agricultural potential of north western Canada. They were conducted for three years to determine the productivity of different cereal, oilseed and forage crops and the major nutrient requirements for their growth.

Fig. 3—Soil profile at the test site at Mile 319 Alaska Highway, on a former burn, cleared of regrowth, and broken in 1963. The soil at this location is grey wooded or brown wooded clay till on moderately sloping upland. The top soil is slightly to moderately acid. The next 12 to 18 inches is strongly acid and then changes to moderately calcareous in the subsoil.

was seeded in 1964 on new breaking. Hay and seed yields were determined in 1965 on unfertilized plots. In 1966, half of each grass plot was fertilized with 225 pounds per acre of 27-14-0, while half of each legume plot received 125 pounds per acre of 11-48-0 fertilizer.

Without fertilizer, hay yields were uniformly low in 1965 (the first production year—Table 3). Seed yields were somewhat better. In 1966, the hay yield of the grasses was greatly increased by the addition of fertilizer. The legumes responded variably. Alfalfa gave the greatest increase in hay production. Seed yields of all species were increased by fertilizer applications. Because of shattering, seed yields of trefoil were only approximations.

CONCLUSIONS

1. The area has the potential for the production of a wide range of cereal, oilseed and forage crops but the development of this potential must await industrial and community development, and improved transportation. Local market is limited (present population 1800) and the nearest major market and source of equipment, seed and fertilizer is Fort St. John which is 250 miles away. Heavy tree cover contributes to high development costs and bogs and muskegs throughout the area present problems in the construction of private access roads.
2. With high summer temperatures, long daylength, an adequate frost-free period and moderate precipitation, the Fort Nelson area is climatically suitable for production of a wide variety of cereal, oilseed and forage crops. Varieties which we normally recommend for the presently settled Peace River region, even those that are late maturing, should also be suitable for the Fort Nelson area.
3. As in the Peace River region, nitrogen and phosphorus are the major limiting nutrients and fertilizer response in cereals is affected by the cropping conditions. Potassium may be required to reduce lodging when high rates of nitrogen are used with cereals. Grasses require nitrogen and legumes respond to phosphorus. Mixtures would be expected to require both, and probably also potassium. In general, Peace River region cropping recommendations should apply.
4. At the present time, market garden production to satisfy local demand appears feasible on the medium-textured, river-flat soils where irrigation is possible. In view of the high population of native pollinators, legume seed, particularly alfalfa, might also be produced. Hay production, to feed the local pack horse population should be economical but large-scale agricultural development is not practical. ●

PUBLICATIONS

Copies of these, and a list of other publications may be obtained free of charge (unless otherwise stated) from: Information Division, Canada Department of Agriculture, Ottawa.

On peut obtenir gratuitement (à moins d'avis contraire) des exemplaires de ces publications ainsi qu'une liste d'autres publications à: la Division de l'information, ministère de l'Agriculture du Canada, Ottawa.

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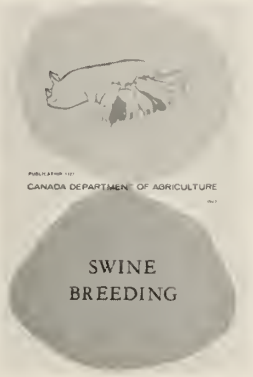

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