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MOST people look upon food as something more than a mere fuel, the intake of which keeps their mechanism going, but it is basically just that. It is the primary and most essential need of the human body, and the supplying of food is the greatest business on earth, with more than two billion people eating about six billion meals every day. In fact man's first, most vital and largest activity is the growing, preservation and distribution of provisions for mankind. It is the function of the food industry to provide place, form and time utility. It must take the raw product, process it, preserve it, and deliver it to the market where and when it is needed, with all possible of its native flavour, nourishment value, and good appearance.

We have come a long way since the walking ape-man played scavenger to the sabre-toothed tiger, and from the time, about 12,000 years ago, when Neolithic man learned to cook, to bring into domestication oxen, sheep, and swine; to milk cattle, to cultivate wheat and barley, and to make bread. We are quick to forget how recently many foods now classed as necessities have become available to us. Even 50 years ago the living standards that are commonplace in Canada today were utterly unknown. The food industry, by intelligent application of our natural resources, invested capital, mechanical power, and inventive genius, has made it possible for every Canadian to have more of the products that contribute so much to our comfort and well-being.

A few glimpses from history might make the contrast more striking. In the reign of Charles II there was no means of preserving meat except in salt, and during several months every winter even the gentry tasted scarcely any fresh animal food. In the reign of Henry VII fresh meat was never eaten except during the short interval between midsummer and the end of September. Wheat bread was seldom seen in Charles' reign on the tables of even the middle classes, the great majority of the nation living almost entirely on rye, barley and oats. Macaulay records in his history that in the 17th century the holidaying gentry of Derbyshire repaired to Buxton, where they were crowded into low wooden sheds and were happy to live on oatcake and mutton.

The eight generations that have lived since the days of Charles II have seen great changes take place in diet and standards. Not only scientists, but the common people, know a great deal about nutrition, and business has kept pace by placing the needed foods at the people's disposal. We are able, today, to express in quantitative terms the nutritive requirements of individuals. We know the function and source of the vital vitamins. We know the consumption of calories in various types of work. There remain only education and distribution, to see that every citizen receives the energy-giving and health-protecting foods he requires.

This is not the place to discuss in detail the relative amounts of carbohydrate, fat, protein, and mineral necessary for an adequate diet. In fact, so long as a diet gives enough calories there is no need to measure its individual constituents so far as sustenance is concerned.

There was a steady improvement in the supply and quality of Canadian diet up to 1944. From a pre-war level below that of the United States in almost all foodstuffs, the general increase in Canadian consumption had brought supplies of nutrients to approximate equality with the United States, with the outstanding exception of ascorbic acid. The total food supplies entering into civilian consumption, distributed broadly in accordance with physiological needs, would be sufficient to meet nutritional intake requirements for health, morale and working efficiency.

A pre-war United Kingdom survey disclosed upwards of 30 million persons subsisting on inadequate diets, and this total included 12 to 20 millions who had the money but were not getting the necessary nutritive value from the foodstuffs they bought. The question of nutrition, then, includes two major problems: how to put everyone in the position to secure the minimum of foodstuffs necessary for sustenance, and how to make sure that people who can afford enough food are not malnourished through ignorance or carelessness.

A survey of nutritive intake in five regions of Canada disclosed that the difference in regard to calories, protein, and iron were not great, but in

respect of calcium the Quebec families had the smallest percentage of the estimated requirements, and those in the Maritimes showed a marked deficiency, while in the other provinces the consumption in urban wage earners' families appeared to supply nearly the full requirement as specified in the Canadian dietary standard. The report showed that within the family the worst fed member is the mother, the best fed the father or chief wage earner, and the younger generally fared better than the older children. Differences between British and French families are small. The French group consumes slightly more bread and slightly less milk and fewer eggs, more potatoes but less fresh vegetables and fruits, and slightly more pork and less sugar.

Inadequate and unbalanced diets are the sole cause of certain diseases, and important factors in lowering resistance to illness generally. A lot of nonsense has been written about vitamins, but nothing can detract from their importance in the human diet. Deprived of vitamins, the body functions badly or not at all in utilizing the other food elements. It has been found that the number of calories can be reduced drastically without permanent harmful effects, if the supply of vitamins and minerals is maintained at an adequate level. On the other hand, if calories were maintained and vitamins drastically reduced, the victim might die with a full stomach.

Persons interested in a detailed discussion of the part vitamins play in human well-being can find it interestingly set forth in "Vitamins and Health," by Borsook and Huse, while the Canadian situation is well covered in the report of the Combined Food Board committee published in Canada by the King's Printer under the title: "Food Consumption Levels in Canada, the United Kingdom, and the United States." There is space here for only a brief mention of the most important vitamins. An adult needs 5,000 International Units of vitamin A daily, and this may be had in whole milk (220 to 300 units to the glass); cheese (900 units to the ounce); butter (600 units to the tablespoonful) and eggs (500 units each). Vitamin B has been called the modern scientific substitute for the sulphur and molasses, bitters and tonics of the last generation, with the difference that vitamin B is effective, when used intelligently. B is not one vitamin, but many, hence the term "Vitamin B Complex." Of B₁ a moderately active man requires 600 units daily, and a woman 500; of B₂ the requirements are 3 milligrams and 2 milligrams daily. Vitamin C, the anti-scurvy vitamin, is needed in the amount of 800 to 2000 International Units. Canadian supplies of vitamin C in food just exceed the average restricted intake requirements, and are appreciably below the average recommended full intake requirements, while both the United States and the United Kingdom supplies show a substantial excess. Principal among common sources of vitamin C are oranges, lemons and grapefruit, while tomato juice has about one-third to one-half the vitamin C content of the citrus juices. Potatoes have been, for a century and a half, the leading source of vitamin C for many people, especially when cooked in their skins, and were recognized as an

anti-scurvy protection long before the real cause of the disease had been discovered by science. Vitamin D, of which a deficiency causes rickets, is peculiar among the vitamins because it is created as a result of the sunshine falling on the skin.

So far as the general supply of foods entering into civilian consumption in Canada throughout the war period is concerned, the significant fact is that there has been a substantial increase over the pre-war five years. In 1944 the following were representative percentage increases over pre-war: milk and milk products 20; meats 32; poultry, game and fish 6; eggs 21; oils and fats 4; tomatoes and citrus fruits 53. On the other hand, there had been a decrease in consumption of some foods, by the following percentages: sugars and syrups 11; tea, coffee and cocoa 2. It is interesting to note that the United Kingdom increased its use of milk and milk products 26 per cent, potatoes 61 per cent, vegetables 47 per cent, grain products 17 per cent, and eggs 2 per cent, while it decreased in every other food classification by amounts ranging from 30 per cent for tomatoes and citrus fruits to 16 per cent for fats. The United States increased consumption in all but 3 classifications.

Spensible income of Canadians last year was about \$3 billion higher than in 1939, and as other commodities became scarcer, Canadians spent more than ever on food. Up to November, wholesalers had sold 12 per cent more groceries by dollar value and 10 per cent more fruits and vegetables than in the same period in 1943. The food cost of living index has fluctuated as follows: 1929—134.7; 1939—100.6; 1944—131.3.

Giving credit where it is due, the farmers of Canada deserve praise for the splendid way in which they have produced food in such great quantity in spite of shortage of help and dearth of machinery. This fine effort has made it possible to meet the increased demands of civilians for meat, vegetables and dairy products, while keeping up a high level of exports to the United Kingdom and other United Nations.

Meat production, on the increase since war broke out, reached new heights in 1944, when slaughterings of hogs and beef cattle were the largest in history. Meats and poultry, excellent sources of high grade proteins and certain vitamins of the B group, are most important in the nation's diet, and it was a relief to health authorities as well as to consumers when the rationing was suspended a year ago. The great volume of livestock placed considerable stress on handling facilities, and packing plants were strained to the utmost while transportation, cold storage, stock yards and other agencies were utilized to capacity. Beef is expected to remain in abundant supply this year, but reduction of the number of hogs on farms may mean a somewhat less plentiful quantity of pork products. Domestic supplies of mutton and lamb may be lower, as a result of the opening up of export of sheep and lambs to the United States.

Milk in any form is an economical source of proteins of high quality, calcium and riboflavin, as well as of other vitamin and mineral elements. It is the most complete single food. It seems as if 1945 will see demand again in excess of supplies, but much depends upon the pasturage conditions of summer. Most recent figures show the percentage utilization of Canada's milk supply as follows: fluid 35; butter 48; cheese 11; evaporated 2; ice cream 2; other 1. The civilian demand for fluid milk has increased steadily until it is now 17 per cent above the pre-war level. Cream sales were, of course, frozen at the June 1944 level. Butter production decreased 5 per cent last year, and stocks continue to give concern to the authorities. The bulk of sales go to consumers who get 80 per cent of the quantity available for distribution. Dried whole milk is an important product, the principal civilian use of which is in the food industries, though about half the total production is reserved for priority uses such as Red Cross prisoner of war parcels. Each parcel contains one pound of dried whole milk powder, and parcels are being shipped at the rate of 140,000 weekly. Another priority use is for the armed forces in remote areas where fresh milk is not obtainable. Civilian consumption of evaporated milk has increased greatly, so that prior to imposition of restrictions of sale in places where fluid milk could be obtained, the supply was inadequate in needy areas. Cheese production was maintained in 1944 at a level sufficiently high to take care of the 125 million pound British contract, and to provide a slightly greater amount for civilian use. It is expected that the quantity available for use in Canada this year will be about the same.

The supply of leafy, green and yellow vegetables, so important for their vitamin C and pro-vitamin A content, is a problem in a country like Canada, because of the short growing season and the high cost of imports. Supplies of leafy vegetables per capita in the United Kingdom in 1944 exceeded the United States supplies by 44 per cent and the Canadian estimate by 124 per cent, private production in the United Kingdom having risen by 15 pounds per capita, largely as a result of the "dig for victory" garden campaign. These figures are supplied by a special joint committee of the Combined Food Board.

Grain products are important in the food picture as inexpensive sources of energy and protein, and they also supply iron and certain vitamins of the B group. Canadian flour millers are operating at the maximum level allowed by the available worker supply, at just below theoretical full capacity. This is one of Canada's oldest industries, dating from 1607, when the first mill was built in Port Royal, now Annapolis, Nova Scotia. From that beginning, the industry has grown until, in the 1943-44 crop year, Canadian flour mills processed 110 million bushels of wheat. The present war has witnessed a revival of flour export, attaining a record in the 1943-44 crop year of 13.5 million barrels. Exports absorb from a third to a half of total production, and are highly important, therefore, to the welfare of the industry.

Bakeries, too, have been operating at or near capacity, the only limiting factor being the shortage of labour. There is an increased per capita consumption of bakery products due to the sugar rationing, the number of women working, and the greater availability of ready cash.

Sugar and other sweet products such as syrups, molasses, honey and preserves are of importance in supplying food energy and in adding flavour. When first known to the world, sugar was used as a medicine, then it became a luxury, and now it is a necessity of everyday life. In the war with Napoleon, when the British blockaded the French ports, they cut off the supply of cane sugar. This drove the French to develop the beet industry, and at the close of the nineteenth century the world's output of beet sugar exceeded that of cane sugar; today about one-third of the total output is from beets. In Canada in 1943 beets provided 15 per cent of sugar production. Development in sugar beet production has had an impetus since the war started, and this industry is expanding in northern countries, close to densely-populated markets. Russia has developed a method of concentrating beet juice into solid blocks at the scene of the harvest to reduce transportation costs. The demand for sugar in Canada is in excess of the supply, refiners having been forced to operate on a curtailed basis due to difficulty in getting raw materials.

Fats and oils provide the most concentrated sources of food energy, besides having great importance in cooking, as spreads for bread, and for adding flavour. They are particularly important to heavy workers, because they reduce bulk and thus enable the workers to absorb their high calorie need. Supplies available to Canadian civilians are not likely to be higher in 1945 than in 1944, and continued economy in their use is needed.

Fish has never been a big item in Canadian diet, and supplies for the domestic market are expected to be equal to the demand, though variety may be limited. Most of the salmon pack will again go to Britain, but Consumer Facts, published by the War-time Information Board, expresses the opinion that a small amount will be available for civilians. The contribution of the fish industry to the United Nations food supply is important, with current agreements calling for delivery of 140 million pounds, mostly canned. In addition, Red Cross prisoner of war parcels take 2½ million pounds of canned salmon, and 1¼ million pounds of sardines.

The domestic supply picture in regard to eggs is very good, while exports to Britain of shell eggs should increase. It is expected that in this year some 1½ million cases will be sent, equal to one extra fresh egg a month per capita.

Supplies of poultry are abundant in Canada, in addition to exports to the United States and over 2 million pounds dressed poultry shipped to Britain last year.

A good word must be said about the food manufacturers and distributors, who have overcome wartime difficulties, kept up the standards of their goods, and made them available where needed. It has been a tremendous task. Food manufacturing is a big industry, with 8,500 establishments employing 115,000 persons, to whom it paid, in the latest year recorded, \$128 million in salaries and wages. The capital invested is \$550 million, and the gross value of products in the year was over \$1.1 billion. Figures given at a McGill University lecture indicated that food processing represents 34 per cent of manufacturing establishments in Canada, 12½ cents of every dollar invested in manufactories, better than 15 per cent of employees, and 22.6 cents of every dollar of manufacture.

The demand for canned goods of all kinds remains high, and easing of the tin situation will help the industry to meet the rising requirements of housewives for quickly prepared foods. Seasons are not so important now as formerly in relation to food. Fruit and vegetables are available at all times of the year, retaining much of their flavour and attractive appearance, as well as their dietary usefulness. Canada's canning factories, which produce at the rate of about \$30 million a year, compared with \$14 million at the close of the last war, are in excellent condition. They are kept spotlessly clean, and high hygienic standards are demanded of employees. Everything entering into manufacture must be sound, wholesome, and fit for human food.

Canada was the first country in the world to have special legislation for canned foods, and at the same time it was required that all packages must be marked with a true and correct description of the contents. This is a safeguard to the consumer and to the conscientious merchandizer. Grading saves time for the consumer by enabling him to buy exactly what he wants, and no more. It saves money, because there is less waste. It provides a standard by which goods may be bought at long distance, without personal inspection.

Standards are particularly important in export trade, where purchasers must be assured of the exact type of commodity they are to receive. Surplus food-producing countries are preparing for an expansion of their export activities, and, as has been pointed out in previous articles in this series Canada must be to the forefront in seeking to dispose of her food produce. This is not something to be taken casually; it is a problem that cannot be brushed off, or laid aside for future consideration. It is a problem that will face Canada squarely the day the German war ends. According to the Economic Annalist of the Dominion Department of Agriculture, Great Britain plans to maintain a high level of production; Russia looks forward to new crop acreages aggregating several million acres yearly; China envisages a 14 per cent increase in plant products and much more in livestock; India is figuring on raising agricultural production by

100 per cent in 15 years. All of this means that in regard to disposal of its food production Canada needs aggressive thinking and dynamic action.

In spite of the amount of food Canada produces (and she exports around \$440 million worth annually) it is necessary for her to import edibles worth about \$100 million. This amount includes fruits, nuts, vegetables, grains, vegetable oils, cocoa, coffee, spices, tea, fishery products and meats, commodities which cannot be grown in Canada, because of climatic conditions or because of economic factors. Take tea as an example. It cannot be produced in Canada, yet Canada is predominantly a tea-drinking country, with an annual consumption normally averaging about 3½ pounds, or 700 cups per capita, an amount exceeded only by Great Britain, Australia and New Zealand. The Empire Tea Bureau reports that 95 per cent of Canada's peace-time consumption is of black tea, mostly from India and Ceylon. Today, of course, with green tea from Japan cut off, imports are 100 per cent empire black tea. The average purchase of Canadian families is more than 15 pounds per year, and 93 per cent of Canadian families are regular tea buyers. A poll taken during the darkest days of rationing revealed that more people missed tea than any other food item except sugar. A peculiar feature is seen in the breakdown of the income classes: while 83 per cent of families in the highest income brackets buy tea, the percentage increases steadily to 94 per cent for the lowest income class. Tea is imported into Canada to the extent of about \$20 million a year, equal to 8 billion cups, because Canadians find it economical and satisfying, and it is a "must" on our import list.

The Combined Food Board, in which Canada, the United Kingdom and the United States have sunk their individualities in an effort to see that allied countries receive their fair share of the food resources of all, provides a working basis and experience upon which plans may be made for equitable international distribution of the world's food in peace years. At war's end there will be the problem of relieving hunger by the supply of energy foods; then there will be a transition stage, with enough food to satisfy hunger. After these periods there must be tackled the task of ensuring enough of the right kind of food for everyone on a continuous basis. When we reach that stage, the world will be setting its hand to a great task never before attempted. It will tax all energies of mind and will, involving an improvement in the dietary habits of millions of people and an elevation of international trade to heights never before attained.

Internally, Canada will face the demand of accumulated savings and the desire of millions of individuals to maintain the higher living standards established during the war. Canadians have lived exceedingly well during the past few years, and they will not wish to abandon these gains. Indeed, one of the great endeavours of health authorities on all levels of government should be to maintain and extend the gains that have been made.