

## Where and How Insulin is Made

Tucked away in an obscure corner of the University of Toronto grounds, overshadowed by the new electrical engineering building and flanked by a row of venerable elms, stands a two-storey, red-brick building formerly occupied by the University Y.M.C.A. A year or two ago it was planned to remove the building, as it was not suitable for any university purpose. To-day, housing, as it does, the only "Insulin laboratory" in Canada, the building, together with its recently installed equipment, is worth upwards of \$35,000.

The Insulin laboratory is one of the latest chapters in the romance of Insulin. It stands as a confirmation of the success of the research of Dr. F. G. Banting and his fellow-investigator, Charles H. Best, M.A. Its management and operation are in the capable hands of Mr. Best, who has, from the beginning, been in charge of the large-scale production of Insulin. The laboratory is operated as a division of the famous Connaught Anti-Toxin laboratories, of which Dr. J. G. Fitzgerald is director and Dr. R. D. Defries, associate director. The business administration is in charge of Dr. Fitzgerald and Dr. Defries. Mr. Best is assisted in the new laboratories by D. A. Scott, M.A., as assistant director, and a staff of twenty-six people working night and day shifts. With the exception of three trained chemical technicians, under direction of Mr. Arthur Wall, who was the first technician to assist Mr. Best when the manufacture of insulin was begun, and four chemists, the staff is largely technically untrained. During the summer months five medical students were employed in the laboratories and during the winter two students are engaged in part-time work.

The erection of such a completely equipped plant was made possible through the Ontario Government's grant of \$25,000, the remaining \$10,000 to \$15,000 being secured from funds of the laboratory and from private donations. The plant is now producing in the neighborhood of 250,000 units a week for distribution throughout Canada, Ireland, South Africa, Central and South America, New Zealand, Australia, and other countries where plants have not been established. The average dosage for the diabetic patients for whom such a large quantity of insulin is being prepared varies from 15 to 20 units a day.

The price for which insulin is distributed is, as with other products of the Connaught Laboratories, governed entirely by costs of material and of production. The Connaught Laboratories are not engaged in commercial business but constitute a department of the University of Toronto. Mr. Best has called attention to the gradual fall in the price of insulin. In May, 1923, the material was sold at 5 cents per unit, in June at 3 cents per unit and now at 2 cents per unit.

The distribution of insulin is effected through two channels. The first is hospitals which have organized departments for the administration of insulin. The second is through physicians trained in the use of insulin. For these latter a special short course of instruction was provided at the University of Toronto last July under the direction of Professor Duncan Graham.

The preliminary stages in the preparation of the health-giving extract are conducted in a large laboratory in the north-east corner of the insulin building where beef and pork pancreas (sweetbreads), fresh from the abattoirs, are first minced in a large meat-grinder, dissolved in vats of alcohol, and then placed in a large basket centrifuge. The liquid is drawn off from the centrifuge and further clarified by filtration through paper in glass funnels. This liquid, containing the soluble constituents of the pancreas, is reduced to a small volume by evaporation of the alcohol and water content in a large vacuum still. The residue contains the insulin. The solution is purified in two chemical laboratories, one on the main floor and one on the second floor, by chemical procedures known as "fractional precipitations." The purified product is then sterilized, standardized, and filled into vials for distribution by the Connaught Laboratories.

But the equipment of the Insulin Laboratory embraces more than the mere processes necessary to produce the serum. A distilling room on the main floor contains a large rectifying still, vacuum pumps, and condensers by which the used alcohol is reclaimed. An oil-burning furnace in the basement supplies steam for the vacuum still and a refrigeration machine cools the alcohol condenser and manufactures cakes of ice for small refrigerators. A large electric fan is kept running continuously to ventilate the laboratories and clear the air of alcohol fumes.

On the second floor, in addition to the purification laboratory, there is a laboratory in which two chemists are employed on research work in connection with insulin. Clean, well-ventilated rooms are provided for the

animals used and a small operating room is near at hand.

The preparation of insulin is controlled by patents applied for in various countries of the world by the original investigators. These patents have been assigned to the University of Toronto and a committee, appointed by the Board of Governors, is responsible for the administration of patent and other rights and for the promotion of efficient production and distribution of insulin in all countries of the world. The original investigators, Dr. Banting and Mr. Best, receive no financial benefit from the patent but desired to prevent the filing of other patents which might restrict the preparation of insulin. In Great Britain complete patent rights have been assigned to the British Medical Research Council and in the United States the Ely, Lilly Company of Indianapolis has been licensed by the University of Toronto to manufacture insulin. The licensing of other firms in the United States is at present under consideration. Rights in all countries except Great Britain have been retained by the University of Toronto. The patents for insulin have been obtained largely through the efforts of C. H. Riches, a patent lawyer of Toronto, who has given his services to the University without charge.

In addition to carrying out his duties as director of the Insulin Laboratory, Mr. Best is continuing the fifth year of his course in Medicine, which he interrupted in 1921 to collaborate with Dr. F. G. Banting in the researches which led to the discovery of the insulin treatment of diabetes.



Earl of Cavan  
Chief of the Imperial General Staff, who is leaving for a visit to Singapore and on his return will be a visitor at several Canadian cities.

### S. J. Farmer Re-elected Mayor of Winnipeg

A despatch from Winnipeg says:—S. J. Farmer, Labor, was re-elected Mayor of Winnipeg on Friday by a majority of 4,899. The unsuccessful candidate was Robert Jacob.

The contest was fought on variety of issues, including the record of Mr. Farmer as Mayor during the past year, the platform of the Independent Labor party, which endorsed his candidature, the policy and personnel of the Winnipeg Civic Association which brought Mr. Jacob into the field, the alleged intentions of the Winnipeg Electric Railway in the matter of their city franchise, and the general question of public utilities and the city Hydro system in particular.

Influence is more than power. Influence holds, but power breaks.—Lord Burnham.



### WHEN DEATH WIPES OUT POLITICAL BARRIERS

A significant picture at Bonar Law's funeral, in which the leaders of the three great political parties in Great Britain are grouped around the bier to the throne. The Prince of Wales is conversing with Ramsay MacDonald, the leader of the British Labor-Socialists, H. H. Asquith, leader of the Liberal party, is at the left, and Premier Baldwin, leader of the Conservatives, on the right. This is a picture which could scarcely be duplicated in any country in the world, for British statesmen of rival parties are often good friends in private life.



Col. Hamilton Gault  
Famous Canadian soldier and commander of the Princess Pats in the great war, who is entering British politics as a supporter of the protection policy.

### OLD WORLD ARCHIVES RICHES FOR CANADA

#### Dominion Archivist Succeeds in Securing for Nothing Priceless Historical Records.

A despatch from London says:—Dr. A. G. Doughty, Dominion Archivist, sailed on Saturday for Canada after a most successful raid on the private treasures in England and France, for documents of historical importance for the Dominion. Canada's chief archivist, who, as a tireless collector for his department, has won international fame for his ability to get something for nothing, is said to have surpassed himself on this occasion. Besides Sir Leicester Harmsworth's gift of the Wolfe Papers, the decision of the Hudson Bay Company to make its record available, and an arrangement for the publication of a series of biographies of makers of Canada, Mr. Doughty has been promised a mass of other material of priceless historical value.

It is hoped to obtain from English banks and trading houses records which will throw a new light on early commerce with the new world. From France it is hoped to obtain documents relating to the famous company of One Hundred Associates, as well as papers preserved by descendants of Bigot Talon and other great figures in the early history of New France.

More interesting than all, perhaps, is the likelihood of securing a document signed in Canada in 1535 by Jacques Cartier. It will be the oldest record in all America, antedating that now possessed by the Canadian Archives, which is dated 1542. The money values of these collections aggregates thousands of pounds. Canada is securing them for nothing.

The greatest sin is laziness; the second greatest sin is too great self-satisfaction.—Mr. Gordon Selridge.

The Spillers Milling and Associated Industries, Limited, London, England, may establish a large flour mill and wheat exporting business in Western Canada, according to a statement made by L. Lloyd Tanner, secretary of the company, who was recently in Winnipeg investigating conditions in the grain trade. The company are one of the largest concerns of their kind in England and are heavily interested in the Western Canada wheat industry.

## Weekly Market Report

### TORONTO.

Manitoba wheat—No. 1 Northern, \$1.04 1/4.  
Manitoba oats—No. 3 CW, 42 1/2c;  
No. 1 extra feed, 41c.  
Manitoba barley—Nominal.  
All the above, track, bay ports.  
American corn—Track, Toronto, No. 2 yellow, \$1.17.  
Ontario barley—58 to 60c.  
Buckwheat—No. 2, 72 to 75c.  
Ontario rye—No. 2, 73 to 75c.  
Peas—Sample, \$1.50 to \$1.55.  
Millfeed—Del., Montreal freights, bags included: Bran., per ton, \$27; shorts, per ton, \$30; middlings, \$36; good feed flour, \$2.05.  
Ontario wheat—No. 2 white, 34 to 36c, outside.  
Ont. No. 2 white oats—38 to 40c.  
Ontario corn—Nominal.  
Ontario flour—Ninety per cent. pat. in jute bags, Montreal, prompt shipment, \$4.75; Toronto basis, \$4.75; bulk, seaboard, \$4.25.  
Manitoba flour—1st pat., in jute sacks, \$6.30 per bbl.; 2nd pat., \$5.80.  
Hay—Extra No. 2 timothy, per ton, track, Toronto, \$14.50 to \$15; No. 2, \$14.50; No. 3, \$12.50; mixed, \$12.  
Straw—Car lots, per ton, \$9.  
Cheese—New, large, 23 to 24c; twins, 24 to 25c; triplets, 25 to 26c; Stiltons, 25 to 26c. Old, large, 30 to 31c; twins, 31 to 32c.  
Butter—Finest creamery prints, 41 to 43c; No. 1 creamery, 38 to 40c; No. 2, 36 to 38c.  
Eggs—Extras, fresh, in cartons, 70 to 74c; extras, storage, in cartons, 45 to 47c; extras, 42 to 43c; firsts, 38 to 39c; seconds, 30 to 32c.  
Live poultry—Spring chickens, 4 lbs. and over, 25c; chickens, 3 to 4 lbs., 22c; hens, over 5 lbs., 22c; do, 4 to 5 lbs., 15c; do, 3 to 4 lbs., 15c; roosters, 15c; ducklings, over 5 lbs., 20c; do, 4 to 5 lbs., 18c; turkeys, young, 10 lbs. and up, 28c.  
Dressed poultry—Spring chickens, 4 lbs. and over, 33c; chickens, 3 to 4 lbs., 30c; hens, over 5 lbs., 28c; do, 4 to 5 lbs., 24c; do, 3 to 4 lbs., 18c; roosters, 18c; ducklings, over 5 lbs., 28c; do, 4 to 5 lbs., 25c; turkeys, young, 10 lbs. and up, 33c.  
Beans—Canadian hand-picked, lb., 7c; primes, 6 1/2c.  
Maple products—Syrup, per lb., gal., \$2.50; per 5-gal. tin, \$2.40 per gal.; maple sugar, lb., 25c.  
Honey—60-lb. tins, 12 to 18c per lb.; 10-lb. tins, 12 to 13c; 5-lb. tins,

7 to 14c; 2 1/2-lb. tins, 14 to 15c; comb honey, per doz., No. 1, \$3.75 to \$4; No. 2, \$3.25 to \$3.50.  
Smoked meats—Hams, med., 26 to 27c; cooked hams, 39 to 41c; smoked rolls, 21 to 28c; cottage rolls, 22 to 24c; breakfast bacon, 25 to 27c; special brand breakfast bacon, 30 to 38c; backs, boneless, 30 to 35c.  
Cured meats—Long clear bacon, 50 to 70 lbs., \$18; 70 to 90 lbs., \$17.50; 90 lbs. and up, \$16.50; lightweight rolls, in barrels, \$36; heavyweight rolls, \$33.  
Lard, pure tallow, 18 to 18 1/2c; tubs, 18 1/2 to 19c; pails, 19 to 19 1/2c; prints, 20 1/2 to 21 1/2c; shortening tierces, 15 1/2 to 16 1/2c; tubs, 15 1/2 to 16c; pails, 16 to 16 1/2c; prints, 18 1/2 to 19 1/2c.  
Heavy steers, choice, \$6.75 to \$7.25; butcher steers, choice, \$5.75 to \$6; do, com., \$3 to \$4; butcher heifers, choice, \$5.75 to \$6.25; do, med., \$4 to \$5; do, com., \$3 to \$3.50; butcher cows, choice, \$4 to \$4.50; do, med., \$3 to \$4; canners and cutters, \$1.50 to \$2.50; butcher bulls, good, \$3.50 to \$4.50; do, com., \$2.50 to \$3.50; feeding steers, good, \$5 to \$5.50; do, fair, \$4.50 to \$5; stockers, good, \$4 to \$5; do, fair, \$3.50 to \$4; milkers and springers, \$3 to \$4; calves, choice, \$10 to \$11; do, med., \$8 to \$9; do, com., \$4 to \$5; do, grassers, \$3.50 to \$4.50; lambs, choice, \$10.25 to \$10.75; do, bucks, \$9 to \$9.25; do, com., \$8 to \$8.50; sheep, light ewes, good, \$6 to \$6.50; do, fat, heavy, \$4 to \$5; do, culls, \$2 to \$2.50; hogs, thick, smooth, F.W., \$8.25; do, f.o.b., \$7.75; do, country points, \$7.50; do, selects, \$9.05.

### MONTREAL.

Oats, Can. West., No. 2, 55c; No. 3, 54c; extra No. 1 feed, 52 1/2c; No. 2 local white, 51 1/2c. Flour, Man. spring wheat pats., 1sts, \$6.30; 2nds, \$5.80; strong bakers, \$5.60; winter pats., choice, \$5.75 to \$5.85. Rolled oats, bags, 10 lbs., \$3.05; Bran, \$27.25. Shorts, \$30.25. Middlings, \$36.25. Hay, No. 2, per ton, car lots, \$15 to \$16.  
Cheese, finest westerns, 19 1/2 to 19 3/4c; finest easterns, 18 1/2 to 19 1/4c. Butter, No. 1 creamery, 38 to 38 1/2c. Eggs, extras, 40 to 41c; No. 1 stock, 36 to 37c; No. 2 stock, 30 to 32c.  
Canners, \$1.40; cutters, \$2 to \$2.25; bulls, \$2.25 to \$2.75; good veal calves, \$10; grassers, \$3; hogs, thick smooths and butcher, \$8.50; sows, \$6.50 to \$7.

bushels were loaded into boats from stocks in store by elevators in filling orders distributed during the day by the Lake Shippers' Clearance Association. The previous record of the port was about 6,000,000 bushels and that was the record for the world.

There is no other port which can compete with the one at the Canadian head of the lakes in the rapid handling of grain. About the best that Chicago could do would be about 2,000,000 bushels in the same length of time. Duluth has one very fast elevator, the Great Northern, but here there are many just as fast for a short time, and nearly as fast under an opportunity for continuous operation.

### POINCARÉ REVERSES HIS FOREIGN POLICY

#### Aims to Conciliate Great Britain and Puts Reparations Issue in Second Place.

Paris, Nov. 24.—Premier Poincaré finally has reversed his foreign policy. No longer will he put reparations for France uncompromisingly first and friendly relations with Great Britain and the United States second.

Hereafter he may be expected to follow in the footsteps of the Premiers who have preceded him, and whose policies he condemned so bitterly in the recent battle of Yellow Book notes with Lord Curzon.

He aims now to conciliate Great Britain at almost any cost, and to interest her and the United States once more in France's security, if it is not too late. To-night the semi-official Temps and the Journal des Debats begin to prepare the way.

The Temps takes the theme, "The French government must neglect nothing in order to act in concert with the other Allies." And the Journal des Debats says: "No form of guarantee will provide us an efficacious security. Signatory Governments would nevertheless decide their action according to circumstances and the condition of their public sentiment. We must, therefore, entertain with the United States and Great Britain amicable and cordial relations."

More than double the number of immigrants came to Canada during the past six months, as compared with the similar period a year ago. The figures, according to the Department of Immigration, show 94,333 people of all nationalities to have entered Canada during the six months, April-September, 1923, while the number was 46,331 for the same period in 1922. British immigration during the past six months amounted to 51,961, United States 13,055.

The production of lumber in British Columbia for the first eight months of 1923 was twenty per cent. higher than the best previous record. This will easily be the best year in the history of the lumber industry in the province.



At the Court of St. James's  
Frank B. Kellogg, the new United States Ambassador to Great Britain, who replaces Ambassador Harvey.

### WORLD CHALLENGED BY CANADIAN PORTS

#### Elevators of Fort William-Port Arthur Harbor Establish Quick Loading Record.

A despatch from Fort William says:—A world record for all time to date is being established by the elevators of the Fort William-Port Arthur harbor in the loading of grain into ships.

Between midnight on Wednesday and midnight on Thursday 6,700,000