# Penicillin From Canadian Plants Plays Vital Role Healing War Wounds

## MINISTER REVEALS OUR PRODUCTION NOW ON COMMERCIAL SCALE

**Following more than six months of production in small pilot plants and experimental laboratories to meet urgent military requirements, penicillin is now being produced on a commercial scale in three modern Canadian plants, it is announced by the Department of Munitions and Supply. While total Canadian production at present is taken by the Department and earmarked for use by the armed forces, some quantities of the drug, imported by the Government from the United States, are now available for limited civilian use.**

The imported penicillin will be divided among the larger hospitals on the basis of the number of beds, and each hospital is now being advised as to its July quota. Hospitals with 25 beds or less will obtain needed supplies through the Chemicals Control of the Department of Munitions and Supply. All general hospitals will receive a circular prepared by a Medical Advisory Committee, which is advising the Government on all matters regarding the distribution of the drug. This circular will detail the uses permitted, the method of administration and the dosage.

**Two Government Plants**

Canada is now obtaining penicillin from three Canadian sources and by importation from the United States. Two of the sources are Government plants operated for the Department of Munitions and Supply, one a new modern unit on the outskirts of Montreal, operated by the Montreal pharmaceutical firm of Ayerst, McKenna and Harrison, and the other a plant in Toronto, operated by Connaught Laboratories. The third plant, privately owned, has been brought into production by Merck and Company, Montreal.

The story of penicillin in Canada has behind it a record of painstaking research, organization, and experiment. Early in 1942 research in the production of the drug, a healing agent derived from mould and accidentally discovered in London by Sir Alexander Fleming, was undertaken at the Banting Institute under the direction of Dr. Philip Greey with the assistance of Dr. Alice Gray. The penicillin thus produced was devoted to clinical research carried out in co-operation with the armed services.

The promising results warranted a marked increase in the scale of operations and the Department arranged for the setting up of pilot plants at Montreal and Toronto. Production in these temporary units added further to the knowledge of production methods. Last summer the property occupied some years ago by Knox College in Toronto was rehabilitated and through the Government, the necessary equipment was purchased and installed and Connaught Laboratories was asked to forward production as quickly as possible.

Meanwhile a similar project was under way in Montreal, where, through the agency of Ayerst, McKenna and Harrison a temporary plant was established in Bonsecours Hall on the Montreal waterfront. From this plant came the first Canadian penicillin for use by the armed forces. This plant is still in operation but its output of the "miracle drug" is being supplemented by production from the new plant on the outskirts of the city. This new plant will be officially opened this summer.

Although figures on the production on this continent have been referred to in astronomical numbers, such figures are likely to cause confusion among laymen. Dosage for the average case may run anywhere from 60,000 to 1,000,000 Oxford units. Reduced to bulk measurement however, these figures become more credible. Because of extreme potency, unit figures do not reveal the actual bulk of the drug. One billion units is equal to about one pound of the pure drug.

**Drug Derives From Mould**

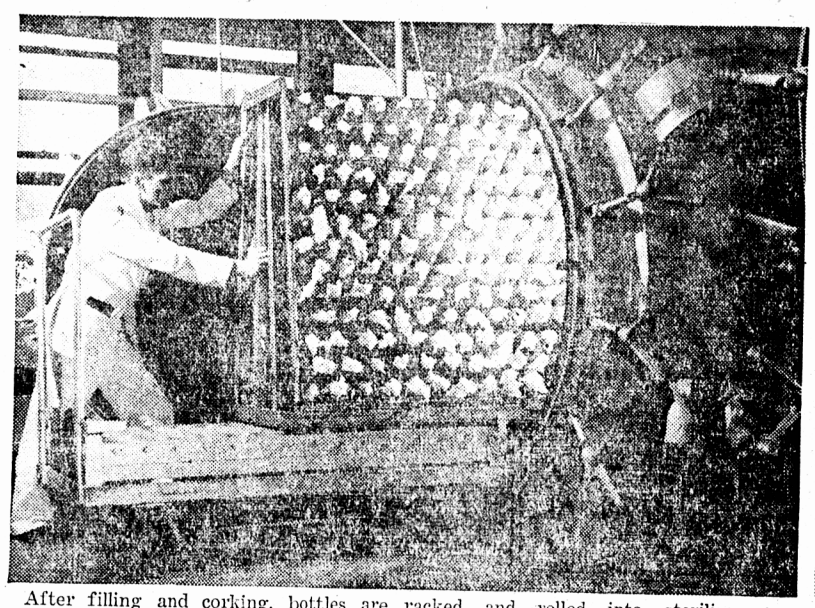
Penicillin in Canadian Government plants is produced by surface culture, large open-neck bottles, similar to the familiar milk bottle, are partially filled with culture medium, plugged with cotton and stacked on racks which are rolled into large retorts for sterilization. In the next step the bottles are inoculated with spores of the mould strain. In this regard, it is of interest that the most productive mould strain yet used to yield penicillin was discovered on an over-ripe cantaloupe.

Following inoculation, the bottles are stored in temperature-controlled incubators where they remain while the mould grows in a mat on the surface of the culture. At the end of the incubation period the penicillin is harvested; the fluid is drained off from the bottles and rapidly chilled before being subjected to a chemical process for the extraction and purification of the penicillin it contains.

Through a series of processes the penicillin is reduced to a yellowish powder which is placed in individual ampoules. These ampoules, after tests for sterility and potency have been made, are ready for use by the physician.

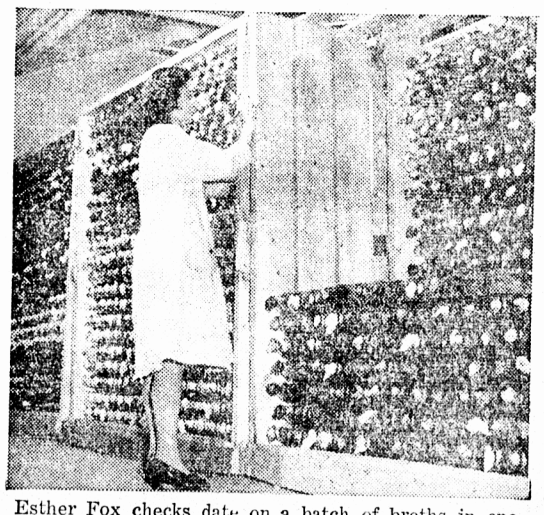
Already in Canada small amounts of the drug have been taken on "Mercy flights" to aid civilian cases where the infection would respond to no other treatment. In the main, however, the drug has been used and will continue to be used primarily for the benefit of Canada's fighting men.

Penicillin is derived from mould which grows in corn-base broth. Milk-bottling machine is used to partly fill bottles. In Toronto, Crown plant, Mrs. Hilda Martin inserts cotton plug into bottles. Plugs prevent contamination of broth.

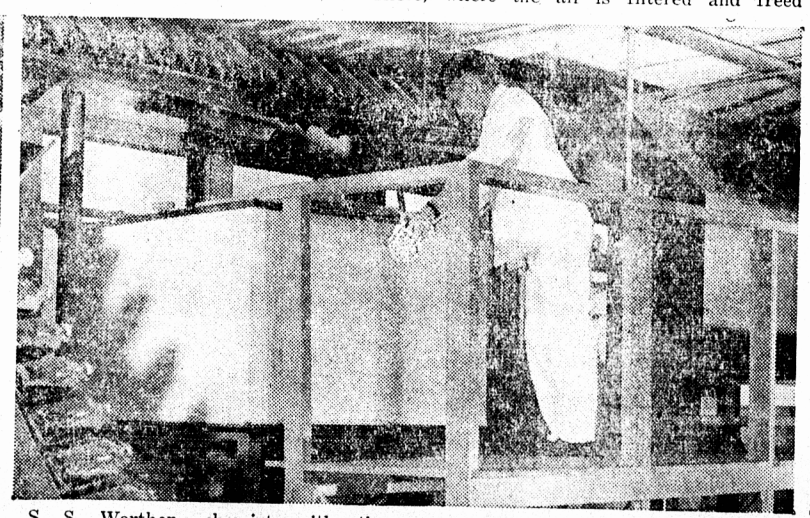


After filling and corking, bottles are racked and rolled into sterilizer or autoclave, which operates on same principle as steam pressure cooker used in home canning. Chemist Paul Morozovick pushes rack into position in sterilizer.

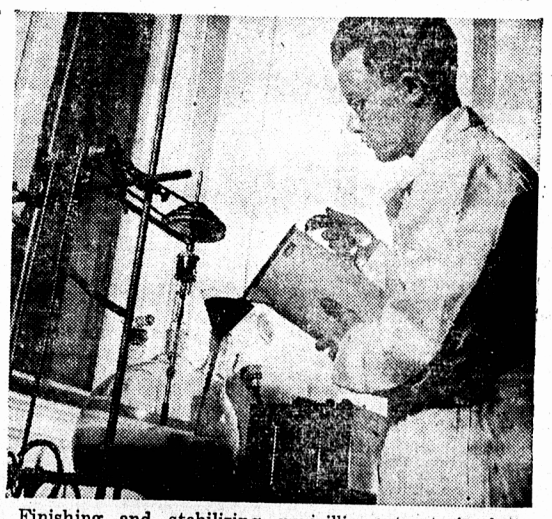
Following sterilization, bottles of corn-base broth are rolled on special wheeled racks into the "sterile area." There, where the air is filtered and freed of germs by ultra-violet lamps, penicillin culture is added to broth by workers wearing hospital gowns, masks and rubber gloves, as Cecile Rouleau here.



Esther Fox checks date on a batch of broths in one of culture rooms where culture incubates, frees the drug from mould into broth. Process lasts ten days.



S. S. Worthen, chemist with the government-owned plant in Montreal, supervises harvesting of penicillin mould, an operation which is entirely automatic. The mould and broth are separated and penicillin in broth enters chemical stages.



Finishing and stabilizing penicillin extract is last chemical stage before penicillin is filtered for bottling. Bruce Wallace adds amberlite solution.

In final operation Marjorie Joyner filters penicillin to remove impurities, clarify and sterilize the drug in its sodium salt solution ready now for bottling.

Filling of penicillin into vials for final drying stage takes place under rigidly sterile conditions. Vial is 20 cc in size but amount depends on potency


A tiny vial of penicillin that may save the life of a Canadian soldier. The drug has proven its worth in treatment of both wound and burn infections but scientists are chary about making too-sweeping claim for miracle properties.

*National Film Board Photos by Harry Rowed.*