

degree of contamination in the tank is below a certain level.

There is no reason not to assume that the absorption of bacteria by a filter is not logarithmic; that is, a layer of glass wool of a certain thickness will absorb a certain fraction of the microorganisms passing into it, and the next layer will absorb the same fraction of the number it receives. The denser the packing the the less thick need be the filter. Wool 3 inches thick with 88 to 90% void space performs as well as a three foot thickness of material having 99% void space. The properties of glass wool to be used in a fermentation plant should be thoroughly studied before purchase.

Apparently one fiber does not inter-

fere with the others in the filter. Dr. Gaden found that values derived from mathematical calculations based on measurements involving a single fiber compared closely with actual experimental data from a filter packed with glass wool. This is possible because of large void spaces and small fiber diameter. There is no turbulent flow around the fibers.

The mechanical condition of the filter bed is of the utmost importance. Uneven distribution of the fibers, giving rise to channeling, reduces filtering action tremendously and renders any computation invalid. The ideal filter medium would be one in which each fiber is rigid and retains its position relative to that of the other fibers. The closest

approach to this is a factory preformed filter. Dr. Finn visualized extensive use of thin filters of this type in the future.

The logarithmic rate at which organisms are killed during the sterilization process holds true only for large numbers of organisms. The relationship breaks down when all but the last few viable cells have been destroyed. Chance alone determines the survival or death of the last few organisms. Some of the terms employed in the canning industry, such as "thermal death time," may not be valid said Dr. Finn. He suggested the adoption of the figure obtained by extrapolating the logarithmic death curve to the point where 99.99% of the organisms are killed.

British Find Oiling Good Pretreatment for Storage Eggs

Liquid egg pasteurization on commercial scale by Ulster processor lowers bacterial count, causes only minor changes in functional properties

BELFAST, NORTHERN IRELAND. —Oiling shell eggs before storage reduces the rate of evaporation and exerts a significant protective effect after the eggs are brought from cold storage. This was emphasized in studies by the British Ministry of Food and independent investigators reported before a Symposium on Eggs held here May 19 to 21. The symposium was sponsored by the Northern Ireland section of the Society of Chemical Industry and held on the campus of Queen's University.

In recent years the Ministry of Food has adopted the policy of oiling and cold storing of quantities of home-produced eggs during the peak of production in the spring and of releasing these eggs for sale during the low production periods of the autumn. During the 1952 season almost 400,000 cases of eggs were stored in such a manner. According to N. E. Holmes, Scientific Adviser's Division of the Food Ministry, oiling reduces by about two thirds the amount of water lost by evaporation during 3 to 6 months of cold storage.

Although the quality of oiled and un-oiled eggs is not greatly different at the end of the cold storage period, Mr. Holmes pointed out that oiled eggs suffer less deterioration of the internal membrane. After 6 months' cold storage, a 1.23% loss in oiled eggs was reported in contrast to a 3.35% loss in un-oiled eggs.

Turning to the influence of washing on storage characteristics, Mr. Holmes declared that certain types of washing seem to accelerate egg deterioration on storing. He reported that an American-

designed all-metal egg washing machine, utilizing the principle of air jet agitation, was found unsatisfactory. Washing in warm water (85° to 115° F.) in a machine equipped with rotating bristle brushes and rubber rollers gave only 2.5% rotting during the initial period of use, but in the second month losses jumped to almost 40%. Difficulties were attributed to the inability to clean this type of machine adequately. Holmes said that the Ministry is now developing a new egg-washing machine incorporating the principle of pasteurization. It is hoped that the machine will be produced before the end of this year.

Oiling apparently has only a minor effect on the rate of deterioration of the internal quality during cold storage, according to J. Brooks, of the Department of Scientific and Industrial Research at Cambridge. However, oiling does exert a significant protective effect after the eggs are brought out of cold storage, said Brooks. His studies reveal a similar effect when shell eggs are oiled and kept at normal temperatures.

Mentioning gas storage techniques briefly, Brooks pointed out that carbon dioxide gas can be used as a cover atmosphere. When 2.5% carbon dioxide is used, storage results similar to those obtained from oiling shell eggs result, he said.

Liquid Egg Pasteurization. During the past year a pasteurization unit has been incorporated in the frozen liquid egg processing plant of Gracey Bros.,

A corner session at the egg symposium in Belfast found N. E. Holmes and C. L. Heller of the British Ministry of Food talking things over with R. G. Baskett and K. L. Robinson of Queen's University (left to right)



located near Belfast. A throughput rate of 250 to 320 gallons per hour has been achieved. Processing temperatures of 146° to 150° F., with a holding time in the region of two minutes, will accomplish a 99.99% kill of the original flora without significantly impairing the functional properties of the liquid, said N. R. Knowles, of Queen's University.

Spoilage organisms associated with the genera *Pseudomonas* and *Proteus* and the coli-aerogenes group are eliminated by the heat treatment process and the residual viable flora consist of small numbers of relatively inert cocci, said Knowles.

"Apart from considerations of improved keeping quality in heat-treated liquid egg, a fundamental effect is the destruction of pathogenic organisms belonging to the food poisoning group," said Knowles. He admitted that from the viewpoint of sponge manufacture there is a slight regression in raising quality in the pasteurized egg product.

The bacterial counts in the mixed egg pulp prior to freezing are frequently high and although there is an appreciable

decrease in the count on freezing, in the frozen product it is still in the order of many millions per gram, according to C. L. Heller of the British Ministry of Food.

An antibacterial substance, effective against *Streptococcus faecalis*, *Staphylococcus aureus*, *Salmonella dusseldorf*, and *Salmonella typhimurium*, is produced when *Pseudomonas fluorescens* is grown in the presence of egg yolk, said Heller. He pointed out that his experiments indicate that egg white, either as such or mixed with yolk, is capable of destroying the large number of *Micrococcus* organisms that are likely to contaminate the pulp.

Eggshell Fundamentals. A diet deficient in calcium will cause a bird to draw calcium from the bone and will cause the bird to stop laying after about 10 days, reported Cyril Tyler, Reading University. An excess of calcium in the diet will lead to soft shell and other abnormal types of eggs, he pointed out. Sulfanilamide inactivates the carbonic anhydrase enzyme system and interrupts egg production.

stricker of the University of Georgia, and W. J. Darby of Vanderbilt University.

On the same day in Los Angeles, scientists gathered for lunch and the unveiling of the plaque in the board room of the Sunkist Building. Honor guest for the celebration was Robert A. Millikan, president emeritus of the California Institute of Technology. Capt. (ret.) Louis H. Roddis of the Navy Medical Corps, Lind's biographer, delivered a short informal talk.

Industry

Wyandotte Opens New Research Labs

Wyandotte Chemicals Corp. put its new research center at Wyandotte, Mich., into full operation on June 7, almost two and a half years after preparation of the 5-acre site began.

The new building is 172 feet long and 322 feet wide, two stories high, and with a full basement. The building houses laboratories for analytical, food technology, industrial, inorganic, laundry and textile, organic, and nucleonics research. In addition, there is space for administration offices, a meeting room that seats 150 people, market research, patent attorney's offices, and a library and reading room.

Flexibility is perhaps the outstanding feature of the building's design. This was achieved in the laboratory sections by designing the building to a 10-foot module (each module has two exterior

A member of Wyandotte's food technology department tests the sugar content of cane juice as part of study which is developing new methods for reducing loss of sugar through action of microorganisms during milling



International Commemoration Of Scurvy Cure Discovery

Scientists gather in Los Angeles and Edinburgh, Scotland, to unveil plaques honoring James Lind, discoverer of scurvy cure

IDENTICAL bronze plaques honoring the memory of James Lind, whose studies with citrus fruits led to the conquest of scurvy, were unveiled on the same day late last month at the University of Edinburgh in Scotland and in the Sunkist Building in Los Angeles.

The ceremonies commemorated the 200th anniversary of the publication, in May 1753, of Lind's book, "A Treatise of the Scurvy." Lind, a naval surgeon, graduated from the University of Edinburgh and practiced in Edinburgh during the time between his two periods of service in the British Navy. His work in hygiene and preventative medicine are said to have contributed as much to the downfall of Napoleon as did Lord Nelson's victory.

Charles Glenn King of Columbia University, who first isolated vitamin C, presented the plaque to the University of Edinburgh on behalf of Sunkist Growers. The celebration in Scotland consisted of a two-day conference of the Nutrition Society and the presentation of the honorary degree of doctor of laws to Surgeon Vice Admiral (ret.) Sir Sheldon Dudley, medical director of the Royal Navy during the war.

The two-day conference was devoted to a symposium on ascorbic acid and scurvy, with papers on the past, present, and indications of the future work in these fields.

Other American participants in the program at Edinburgh were: S. Burt Wolbach of Harvard, V. P. Syden-

