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## Special courses in dairy manufacturing, 1938-39.

University of Wisconsin

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# BULLETIN of THE UNIVERSITY of WISCONSIN

Serial No. 2296

FEBRUARY 1939

General Series No. 2982

*Special Courses in*

## DAIRY MANUFACTURING



1938-39

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## THE TWELVE WEEKS WINTER COURSE

|                         |                          |
|-------------------------|--------------------------|
| November 7, 1938 .....  | Registration of students |
| November 8, 1938 .....  | Class work begins        |
| December 17, 1938 ..... | Christmas recess begins  |
| January 2, 1939 .....   | Class work begins        |
| February 8, 1939 .....  | Class work ends          |

No regular classes on Thanksgiving Day.

This twelve weeks course counts as six months of the requirements for obtaining a license to operate a creamery or a cheese factory in this state.

For complete details of courses see pages 1 to 12.

### *The Summer Dairy Course*

The Summer Dairy Course, a practice course, may be taken any five week period between March 1st and November 1st, page 12.

### *Four Day Courses for Cheesemakers*

A series of courses is given in the various American cheesemaking districts. Page 15.

### *Dairy Manufacturers' Conference*

At Madison, March 14, 15 and 16, 1939. Page 15. Open to all interested in Dairy Manufacturing.

### *Swiss Cheese Course*

Page 13

For further information about the dairy courses, address H. C. Jackson, Department of Dairy Industry, University of Wisconsin, Madison, Wisconsin.

For general information about the College of Agriculture, address I. L. Baldwin, Assistant Dean, Madison, Wisconsin.

## Special Courses

... in ...

# Dairy Manufacturing

**T**HE DAIRY INDUSTRY needs trained men who understand modern manufacturing methods. The twelve-weeks winter course in dairy manufacturing is offered to meet the individual's need for such training. In this course the student is taught not only how to do things but also why to do them.

### THE 12 WEEKS WINTER DAIRY COURSE

The student learns about the chemical and bacteriological properties of milk and its products, the relation of these properties to dairy manufacturing, the various methods of testing milk and its products for quality and composition, diseases of dairy cattle, record keeping, accounting, construction and operation of dairy machinery, the use of power, manufacture of dairy products.

### HOW THE WORK IS PLANNED

The course of twelve weeks is divided into two parts. During the first six weeks instruction is almost entirely devoted to lectures, recitations and laboratory work in order that the student may know the "why" of manufacturing processes. During the second six weeks the instruction and recitations are conducted along with actual laboratory operation using the extensive facilities of the Dairy School. In this manner the student may employ the latest scientific knowledge in the manufacture of dairy products.

### FIRST SIX WEEKS PERIOD

|  |                        |
|--|------------------------|
| Milk Composition and Tests .....       | Lecture and Laboratory |
| Dairy Engineering .....                | Lecture and Shop Work  |
| Dairy Arithmetic and Bookkeeping ..... | Lecture and Recitation |
| Dairy Bacteriology .....               | Lecture and Laboratory |
| Marketing .....                        | Lecture and Recitation |
| Veterinary Science .....               | Lecture and Recitation |

## SECOND SIX WEEKS PERIOD

During first half of  
period *one* of these  
may be chosen.

Butter Laboratory, Lectures and Recitation.  
Ice Cream Laboratory, Lectures and Recitation.

During second half of  
period *one* of these  
may be chosen.

Cheese Laboratory, Lectures and Recitation.  
Market Milk, Lectures and Recitation.

## REQUIREMENTS FOR ADMISSION

Students should be at least 16 years old and have an eighth grade education. No entrance examination is required. Everyone who attends the Winter Dairy Course must have had at least six months of practical experience in a creamery, a cheese factory, or some dairy manufacturing enterprise. The records show that those pupils who have had experience before coming here make the most rapid advancement, are the best students, and are the best pleased with what they learn. Students with no dairy plant experience may enter the Summer Dairy Course. (See page 12).

Those who have previously taken the Winter Dairy Course, or who have had equivalent training at some other university are eligible to take the last half of the course or any three weeks part thereof. *Permission to enroll in the second six weeks period MUST be obtained in advance from the chairman of the Dairy Department.*



GETTING ACQUAINTED WITH THE COMPOSITION OF MILK

## COST OF TAKING COURSE

Tuition is free to residents of Wisconsin. For the dairy course of 12 weeks the tuition for non-residents is \$41.33 in addition to the other fees given below.

All students in the twelve weeks course pay the following fees: Incidental fee \$9.50, laboratory fee \$10, breakage and key deposit \$2 (unused portion returnable). Bacteriology laboratory fee \$3.00, Memorial Union \$1.00. Total \$25.50.

Fees for students taking a special part of the Winter Dairy Course are as follows:

For a period not exceeding six weeks.

Resident Students: Incidental fee \$4.75, Memorial Union \$1.00, laboratory fee \$3.50, breakage deposit (partly returnable) \$2.00, Total for resident students, \$12.75. Additional tuition for non-resident students \$20.67. Total for non-residents \$33.42. All students who take the first six weeks only pay an additional \$3.00 fee for bacteriology laboratory.

For a period not exceeding three weeks:

Resident students: Incidental fee \$2.38, Memorial Union \$1.00, laboratory fee \$3.50, breakage deposit (partly returnable) \$2.00. Total for resident students, \$8.88.

Additional tuition for non-resident students \$10.34. Total for non-residents, \$19.22.

Students obliged to leave school before completing the course may have a percentage of their fees returned on the same basis as all University students—any time before 10 days from opening date of the course, 80 per cent of fees are returnable; before 20 days, 60 per cent, and if student remains not over 30 days, 40 per cent. The breakage deposit is to cover the breakage of test bottles, glassware, etc., and loss of key to locker. At the close of the term a portion of the deposit is returnable if the key is not lost and all apparatus is found to be in good condition. Breakage which cannot be located will be divided equally among the students.

Each student will provide himself with not less than three regulation white suits, including caps, to be worn during the working hours in the manufacturing laboratories and one blue suit to be worn in the shop. These suits may be obtained in Madison.



## APPROXIMATE LIVING EXPENSES

Students usually secure rooms and table board separately. Furnished rooms may be had for \$2 to \$4 a week. Table board ranges from \$6 to \$8 a week. The estimated average expenses of a student in the Winter Dairy Course may be summarized as follows:

|  |          |          |
|--|----------|----------|
| Room rent 12 weeks at \$2.50-\$3.50 .....                          | \$ 30.00 | \$ 42.00 |
| Board, 12 weeks, \$5.00-\$7.00 .....                               | 60.00    | 84.00    |
| Three white suits .....  | 9.00     | 10.00    |
| One blue suit .....  | 1.50     | 2.00     |
| Fees, Mens Union \$1.00 (Incidental \$9.50, Laboratory \$13) ..... | 23.50    | 23.50    |
| Text Books (approximately) .....                                   | 10.00    | 10.00    |
| Breakage deposit (partly returnable) .....                         | 2.00     | 2.00     |
| Totals .....   | \$135.00 | \$172.00 |

Non-residents pay \$41.33 additional.

In addition to the foregoing it is customary for each student to purchase a class picture and also a class pin. These incidental expenses amount to about \$5.00.

The heaviest part of the estimated expenses must necessarily be borne the first week the student is in attendance. It will be noted that the estimated expense given above does not include the railroad fare to Madison and other personal expenses.

**First Semester**

November 7 to December 17

## DAIRY BACTERIOLOGY

The relation of bacteria to milk and its products. Instruction is given in the care and handling of milk and the relation this bears to the quality of products manufactured from it. The methods of determining undesirable bacteria in milk, the different kinds of fermentation that occur, and the use of pure culture starters will be studied.

Lectures: Room 314, Agricultural Hall, Laboratory: Agricultural Hall, Room 216. (E. G. Hastings).

## MILK COMPOSITION AND TESTS

This course will cover the composition and secretion of milk and the factors affecting it. Instruction will be given in the use of the Babcock test, acid test, lactometers, salt test, moisture tests, and enough dairy chemistry will be included to explain the theories underlying these tests and the changes that take place in milk and its products.

Lectures: Dairy Building, Room 302, Laboratory, Room 204, (H. C. Jackson and K. G. Weckel).

#### DAIRY MECHANICS

Instruction will be given in the operation of boilers and power plants, soldering, pipe-fitting, belt lacing, installation and arrangement of machinery, use of exhaust steam, reading blue prints and drafting, refrigeration and the principles and practices involved in the operation of a plant from a dairy engineering standpoint.

Lecture: Dairy Building, Room 302, Laboratory; Dairy Mechanics Laboratory, Room 303 (L. C. Thomsen).

#### DAIRY ARITHMETIC AND BOOKKEEPING

Instruction will be given in the methods of solving the various problems in arithmetic that ordinarily arise in the dairy plant, such as deal with yields, standardization, fat and solids calculations, methods of paying for milk and manufacturing record-keeping. Particular emphasis is placed on management problems. In addition to this, a set of dairy plant accounts will be kept by the student.

Laboratory: Dairy Building, Room 302. (L. C. Thomsen).



ICE CREAM MAKING FROM NEW INGREDIENTS TO PACKAGING OF THE FROZEN PRODUCT



## MARKETING

The marketing of butter; American and foreign cheese; and fluid milk; the factors affecting the price of dairy products; the importance of quality, trade brands and sales policy; storage; imports and exports; and cooperative marketing.

Dairy Building, Room 302. (M. A. Schaars).

## VETERINARY SCIENCE

A series of lectures on the common diseases of dairy cattle. Various stable and laboratory tests for detecting mastitis (garget) are demonstrated to help students understand the importance of this disease and how to improve the quality of raw milk.

Genetics Bldg. Lecture Room. (F. B. Hadley).

### Second Semester

January 2 to January 19 and January 20 to February 8.

During the second semester the student is urged to select two of the subjects, but will be permitted to take just one subject if he so chooses.

## CREAMERY OPERATION AND MANAGEMENT

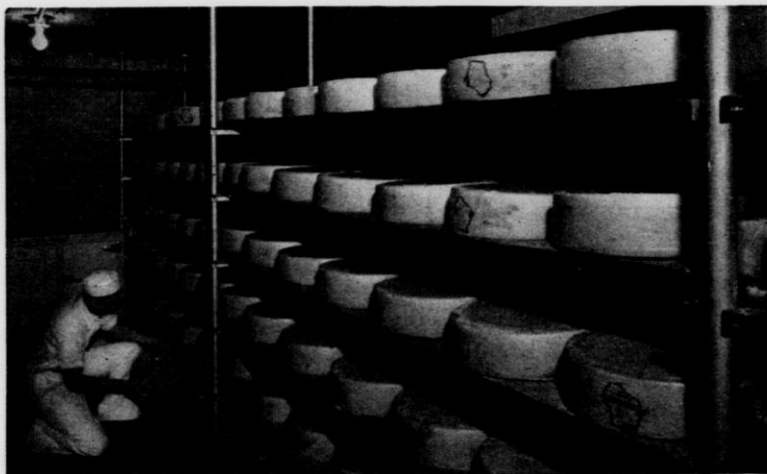
January 2-19, 1939

L. C. Thomsen, and C. W. Vilbrandt

This course deals chiefly with the manufacture of butter and the management of a creamery. Instruction is given in the handling of milk and cream from the time it is received until the products made from it are sold in the finished package.

Practice will be given in weighing, grading and sampling milk and cream; operating power separators, fore-warmers, milk heaters, cream pasteurizers and ripeners, and different types of factory churns. The student will receive instruction in the pasteurization of cream, neutralization of cream, ripening of cream and the culture and use of a starter. During the churning exercises, composition control will be demonstrated and daily tests for fat, moisture and salt will be made on the butter before it is printed.

Throughout the course daily records will be kept and special emphasis will be placed on the checking of factory losses and the necessity



STUDENTS GET PRACTICE IN CHEESE CURING AND GRADING

of improving the milk and cream supply by frequent scoring of cream and judging of butter.

This work is carried on in the dairy department creamery where power equipment of the latest design is used.

Lectures in the Dairy Building, Room 302. Laboratory in Creamery Room.

## ICE CREAM MAKING

January 2-19, 1939

H. H. Sommer, and J. C. Pfeffer

The course in ice cream making aims to teach the science and art of making ice cream, starting with the discussion of the raw material used and considering the various phases of the subject up to the time the product is consumed.

Class room instruction includes the following: raw materials, their composition and quality; composition of ice cream, legal standards, factors to consider in deciding on the composition to use; figuring the mix; preparing the mix, pasteurizing, homogenizing; standardizing and aging; freezing the product; the construction and operation of freezers,

changes occurring in the freezer, hardening rooms, and retail cabinets; factors that affect the viscosity, whipping ability, body and texture of the product.

In the laboratory work the aim is to teach not only the practical operations of making and testing cream mix and freezing, but also to illustrate the effect of various practices on the quality and characteristics of the finished product. A few of the comparisons to be made are to illustrate the effect on overrun, body, texture and flavor produced by differences in fat content, differences in S. N. F. content, differences in gelatin content, differences in sugar content, using eggs, homogenizing, aging, ripening and neutralizing and variation in the freezing process.

Ice cream made in these and other comparisons will be judged by the class so that the students will become thoroughly familiar with the factors that affect the quality of ice cream.

Laboratory facilities for this work include a compressor and hardening room, automatic retail cabinet, mixing vats, two-stage homogenizers, freezers, overrun testers, Draw-rite controller, packaging machine and other accessory equipment. In addition, vacuum pans are available, so that the class will have laboratory instruction on pan-made mixes.

The above equipment is in daily use; thus an ample outlet is assured so that we are not limited in the amount of ice cream to be frozen for class demonstrations.

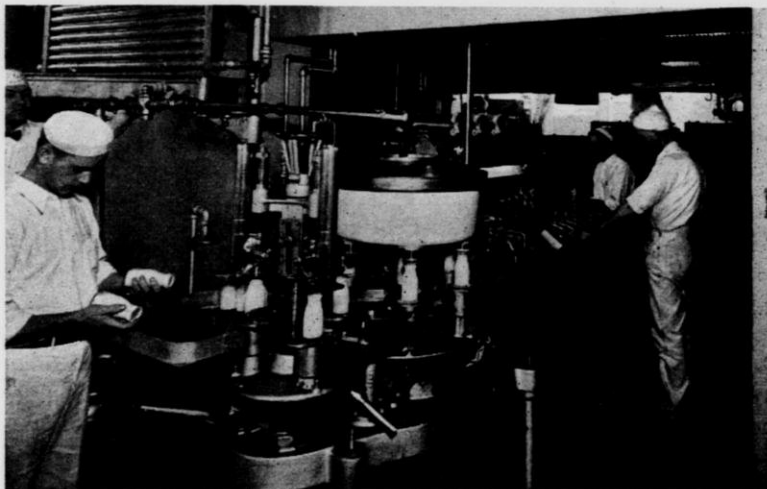
Lectures in the Dairy Annex Lecture Room 201. Laboratory in Ice Cream Room.

## MARKET MILK COURSE

January 20-February 8, 1939

L. C. Thomsen, and L. L. Smith

The aim of the market milk course is to familiarize the student with the handling of such products as are generally distributed by milk plants, from the time of their production to the actual sale of the



MODERN BOTTLE WASHERS AND FILLERS ARE USED IN MARKET MILK PRACTICE

products. This will include instruction in the methods and means of securing a clean sanitary product from the farm, what constitutes a satisfactory raw material, and a thorough knowledge of the various quality tests applied in the receiving room. Instruction in the processing of the product is on a thoroughly practical basis since the daily output of the market milk department includes pasteurized fluid milk, pasteurized coffee and whipping cream, chocolate milk, cultured buttermilk, cream cheese, and cottage cheese.

Particular emphasis is placed upon cleaning and sterilizing of equipment. Exercises and instruction on feathering of coffee cream, skim-milk layer beneath coffee cream, cream plug, and cream whipping, as well as the handling of market milk so as to obtain a maximum cream layer are part of the daily routine. Particular attention will be given to quality control work in the processing of the product. Bacterial counts are a regular feature.

The market milk laboratory is well equipped with modern machinery, including a soakertype washer, automatic capper and filler, and pasteurizers. The lectures and discussions, in addition to the fore-

going, will include material on milk borne diseases, milk plant layout and construction, management, and the sale of dairy products.

Lectures in Dairy Lecture Room 302. Laboratory in Market Milk Room.

## CHEESE FACTORY OPERATION AND MANAGEMENT

January 20-February 8, 1939

W. V. Price and Leo Germain

It is the object of this course to present in a brief practical manner the principles and practices involved in the manufacture of the common varieties of cheese. The course consists of lectures and laboratory practices.

In the lectures the following subjects will be discussed: the constituents of milk and their relation to cheese-making; principles of curd-making and cheese-ripening; manufacture of the common varieties of cheese; problems of cheese-factory operation and management; manufacture and uses of casein, milk sugar, and albumin; and other topics related to the industry which may be particularly timely.

In the laboratory the students will be given the opportunity to observe the principles of cheese-making which are explained in the lectures.



PRACTICE AND EXPERIMENTS TO ILLUSTRATE PRINCIPLES  
OF CHEESE MAKING

The laboratory practices include the manufacture and curing of the common varieties of cheese, such as American, brick, and soft unripened cheese including cream cheese, neufchatel, and cottage cheese. Practice is given in the manufacture of casein. During these laboratory periods the students will be required to apply their knowledge of the inspection and analysis of milk, cheese, casein, whey cream, etc.

The equipment in the laboratory and curing rooms is identical to that which is used in the modern cheese factory and is adapted in size and arrangement to meet the special requirements of laboratory conditions for teaching, demonstration and experimental work. It includes such apparatus as a separator, clarifier, pasteurizer, curd agitator and mechanical refrigeration, as well as the ordinary equipment and apparatus which are necessary to operate a modern cheese factory.

Lecture Room 302. Laboratory in Cheese Rooms daily after lecture.

#### EXAMINATIONS

At intervals during the term, and at its close, practical, written examinations are given. Students are marked on the scale of 100 as "perfect" and less than 60 as "failing to pass." After the close of the term written statements of grades in each course, signed by the Dean and Chairman of the Dairy Department, will be given to students who have attended the full term and have taken all the examinations.

#### DAIRY COURSE CERTIFICATE

After completing the course every dairy student should work for a certificate. To secure a certificate the student must have spent a full term of twelve weeks in the Winter Dairy Course and passed a satisfactory examination in all exercises. A standing below 60 in any one examination makes the student ineligible to receive a certificate. He must also have worked in a creamery, cheese factory or other plant for two seasons. One of these seasons must follow the period spent here, and during this time the candidate must have practical charge of a department of the factory in which he is working. He will report the operations of his factory monthly, or as often as directed, on blanks furnished by the college.

The university will send an authorized person to inspect the factory of the candidate, and no certificate will be issued if an unfavorable report is made by the inspector. If all of the conditions are satisfactorily



complied with, the candidate will receive a certificate. Owing to the expense of inspection, the university does not agree to grant certificates to students operating factories in other states, but arrangements will be made to do so if possible.

#### OUTSIDE ACTIVITIES

In addition to the opportunity offered for study, the winter course student will find many forms of outside recreation and enjoyment. Madison is especially well located for winter sports and offers exceptional opportunities for skating, ice boating, tobogganing and skiing.

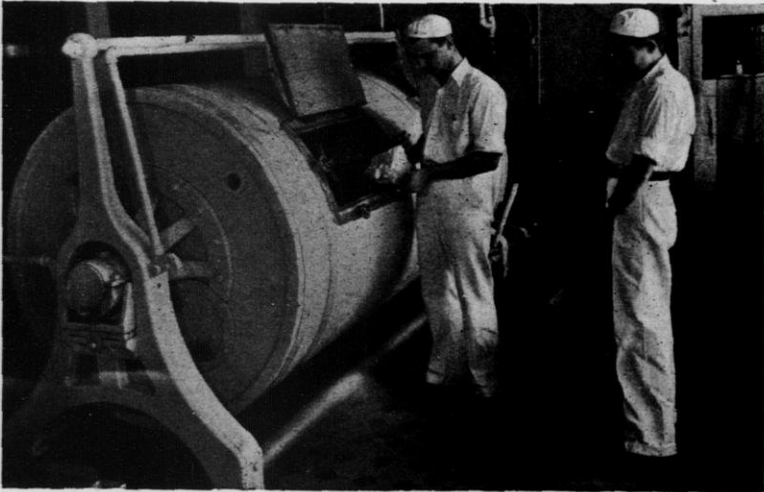
Students interested in music are urged to bring their musical instruments.

Each year the student Y.M.C.A. offers the students the use of their lounge or reading room; and the Memorial Union is well equipped for student activities. There are many points of interest in Madison, such as University Laboratories and displays, Historical Library and Museum, U. S. Forestry Laboratory and the State Capitol.

#### OTHER DAIRY COURSES

##### SUMMER DAIRY COURSE

A summer dairy course is offered for the convenience of those who wish to become familiar with modern applied methods of dairy plant



THE STUDENTS GET PRACTICE IN THE OPERATION OF  
COMMERCIAL CHURNS

operation. The course is given at any time between March 1 and November 1. No lectures or recitations are given. General instruction is given by consultation with members of the staff, library work, and active practice in the manufacturing laboratory. The dairy laboratory is in full operation throughout the course. No previous experience in dairy work is required for admission to this course, which is intended for beginners. Students are expected to remain at least five weeks, although they may register for a longer period if desired.

All summer students pay an incidental fee of \$6 and a laboratory fee of \$5, Memorial Union fee \$1, and make a breakage deposit of \$2, total \$14. For non-residents an additional fee of \$3.45 a week is charged, or a minimum of \$17.25 for five weeks.

#### SWISS CHEESE MAKERS SHORT COURSE

A two-week course of practical and theoretical instruction for experienced Swiss cheesemakers is given (January 9 to 20, 1939) in cooperation with the Federal Bureau of Dairy Industry, State Department of Agriculture and Markets, and Southern Wisconsin Cheesemakers Association at Monroe, Wisconsin. Application for admittance should be made before December 15 so that provision can be made for all who apply.



PASTEURIZING CREAM FOR BUTTER MAKING

SCHEDULE OF CLASSES  
FIRST SEMESTER, NOVEMBER 7—DECEMBER 7, 1938

|            | Monday                               | Tuesday                              | Wednesday                            | Thursday                             | Friday                               | Saturday                             |
|------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 8-9 a.m.   | Veterinary Science                   | Milk Composition and tests           | Milk composition and tests           | Milk composition and tests           | Milk composition and tests           | Dairy Mechanics                      |
| 9-10 a.m.  | Marketing                            | Bacteriology                         | Dairy Mechanics                      | Bacteriology                         | Dairy Mechanics                      |                                      |
| 10-12 a.m. | Milk composition and tests Section A | Bacteriology Section A               | Milk Composition and tests Section A | Bacteriology Section A               | Milk composition and tests Section A | Dairy Mechanics Section A            |
|            | Dairy Mechanics Section B            | Milk Composition and tests Section B | Dairy Mechanics Section B            | Milk Composition and tests Section B | Dairy Mechanics Section B            | Milk Composition and tests Section B |
| 12-1 p.m.  | Lunch                                | Lunch                                | Lunch                                | Lunch                                | Lunch                                |                                      |
| 1-3 p.m.   | Dairy Mechanics Section A            | Arithmetic and Bookkeeping Section A | Dairy Mechanics Section A            | Arithmetic and Bookkeeping Section A | Dairy Mechanics Section A            |                                      |
|            | Arithmetic and bookkeeping Section B | Bacteriology Section B               | Arithmetic and Bookkeeping Section B | Bacteriology Section B               | Arithmetic and Bookkeeping Section B |                                      |
| 3-5 p.m.   | Arithmetic and Bookkeeping Section A | Dairy Mechanics Section A            |                                      |                                      |                                      |                                      |
|            | Dairy Mechanics Section B            |                                      |                                      | Dairy Mechanics Section B            |                                      |                                      |

#### FOUR DAY DAIRY COURSES FOR CHEESE MAKERS

A series of special four day courses in cheese manufacture are given in schools held in various localities throughout the state. No fees are charged. For information concerning the dates for the four day courses, write the Department of Dairy Industry, University of Wisconsin, Madison, Wisconsin.

#### SPECIAL MANUFACTURER'S CONFERENCE

A special three day dairy manufacturers' conference will be held March 14, 15 and 16, 1939. The conference consists of lectures and demonstrations on recent developments and subjects of current interest on the manufacture of butter, cheese, condensed milk products, ice cream and market milk. This conference is of value to health officials, dairy plant operators, dairy plant laboratory men, manufacturers of dairy equipment and representatives of dairy supply companies. The lectures and papers presented by university, state and visiting authorities are available in bound mimeograph form for which a nominal charge is made.

#### BUTTER AND CHEESE SCORING EXHIBITIONS

The Dairy Department conducts a monthly scoring exhibition during the year to aid the butter and cheese makers of the State of Wisconsin in manufacturing better products. The packages of butter and cheese sent here by the makers are scored by competent judges; the scores are returned to the makers with letters of criticism and suggestion. The butter and cheese are then sold and the net proceeds sent to the exhibitors. By this means plant operators may have at low cost a report of the quality and composition of their products, as well as a laboratory record by which they can gauge their own operations.

#### OTHER COURSES IN THE COLLEGE OF AGRICULTURE

Opportunities for advanced instruction in Dairy Industry are given in the regular four-year courses in agriculture. Information regarding the four-year and two-year courses in agriculture may be obtained by writing to I. L. Baldwin, Assistant Dean, College of Agriculture, Madison, Wisconsin.

Those who wish to become dairy farmers should take the course in farm dairying of the Short Courses in Agriculture. Write to the Director of the Short Course, College of Agriculture, Madison, Wisconsin, for illustrated circular.

APPLICATION

DAIRY DEPARTMENT, COLLEGE OF AGRICULTURE, MADISON, WISCONSIN

I hereby apply for admission to the Winter Dairy School Course for 193.....I have had ..... months experience in a .....factory.

If this application is accepted, I promise to conform to all the rules and regulations of the school as to payment of fees, attendance, etc. Should I change my address before November 1, I promise to notify you at once so that a letter will promptly reach me at any time. I further promise that if anything occurs which will prevent my attendance, I will write at once, giving up the place held for me so that someone else may be admitted instead.

Name ..... Age .....

Post Office .....

State .....

I hereby certify that I am personally acquainted with ..... and know he has worked in ..... factory at ..... for a period of ..... months, serving as .....

I further certify that during that period he has worked faithfully and has shown good ability, and I believe that with proper training he will make a good factory operator.

(Signed) .....

(Signed) .....

(Signed) .....

(Signed) .....

(Signed) .....

County ..... State .....

(The signatures of at least two of the persons named are requested.)

When you are through with this catalog  
please pass it on to a friend