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A Method of Organizing Subject Matter in the New Course of Study in Agriculture for Minnesota

William Everett Dowdell

A METHOD OF ORGANIZING SUBJECT MATTER IN THE NEW COURSE OF STUDY IN AGRICULTURE FOR MINNESOTA

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William E. Everett Dowdell

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This thesis, presented by W. E. Dowdell in partial fulfillment of the requirements for the degree of Master of Science in Education, is hereby approved by the Committee on Instruction in charge of his work.

Committee on Instruction

A. V. Overn
Chairman

T. W. Cape

John C. West

J. W. Breitwieser
Director of the Graduate Division

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TABLE OF CONTENTS

LIST OF CHARTS

CHAPTER 1

THE PROBLEM

The problem involved in this study is to outline a method of course content selection in agriculture.

In its simplest form the vocational content of any course of study preparing for a vocation should consist of those knowledges and skills which are required for a successful pursuit of that vocation. The grouping and methods of presenting these knowledges and skills must be based on the development, ability, and interest of the child.

The primary purpose of this study is to outline a method of course content selection and presentation for three years of work in agriculture. The conclusions as to the method of course content selection will be based upon the experience gained in selecting the content for dairy husbandry, for it would seem that a method which has proved successful for one of the courses of the agricultural curriculum should prove equally so for other courses. The main difficulties involved in arriving at conclusions are these: first, to determine what items the future dairy farmer should know if he is to be successful; second, to come to some conclusion as to how these items are to be divided up and spread over three years of work; and third, to determine a method of pre-

senting these problems that will arouse and hold the interest of the pupil.

Limitations

The main function of courses in vocational dairy husbandry is to put the pupil in practical possession of those knowledges and skills which will aid him to become successful in his work. Agricultural instructions as organized under the Smith-Hughes act requires two types of work of the student. He is expected to spend his time in school acquiring knowledge pertinent to his future occupation. He is also expected to carry on supervised project work[1] on his farm under the supervision of the instructor. This supervised practice work is designed to aid in the acquisition and application of knowledge and skills. It is particularly valuable in giving the boy an opportunity to acquire skills in the knowledges he has acquired in the classroom. Knowledge and skills are mentioned here with a view to stating a limitation of this study ; i.e., the study is limited to the knowledges which should be included in a course in dairy husbandry, and includes a study of skills only incidentally as they may be acquired in laboratory work in school. To state it in terms of educational technique, this study is concerned primarily with classroom procedure, such as arrangement and selection of subject

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[1] The Smith-Hughes act. Section 10

matter, laboratory and demonstration work, rather than the device known as supervised study.

There are other limitations, which should be stated; no attempt will be made to proportion the time allotment for the various units of work, which seems to be desirable. The principal reason for such a limitation is the very real one of the variation in the amount of time which is allowed by the different schools, for the study of the various topics in agriculture.[1]

In a community where dairying is the major enterprise much more time should be, and is, devoted to the dairy industry than where dairying is only a minor enterprise, subordinated to the business of farming . It is the accepted practice in Minnesota to vary the time spent on the different farm enterprises, because the successful teaching of agriculture must be based on community needs.

The study makes no attempt to set rigid rules as to what should or should not be taught, or the time to be spent on each topic within the unit. The outline is meant to be flexible, to meet the varying conditions, needs, and abilities of the classes from year to year.

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1 A.M.Field. Relation of High Schools to Colleges of Agriculture and particularly The Curricular Adjustments. Reprinted from the 45th. annual proceedings of the Association of Land Grant Colleges and Universities 1931.

Method of Study

A brief outline of the method used in this study will be helpful in making the course of study more clear. The initial step was to make a study of the various state courses of agricultural instruction, with the purpose of learning the accepted practices carried on in different states. Accordingly courses of study from six states prominent in vocational agricultural instruction were selected.[1] A great variation in subject matter organization was noted among these states. This is probably due to the fact that when the Smith-Hughes law was passed in 1918, each state was given the right to draw up its own plan for carrying out agricultural instruction in high school departments. Each plan had to satisfy the legal requirements of the Smith-Hughes law before it could be accepted by the Federal Board. However, these requirements were general in nature, and as a result there is a marked dissimilarity in the organization, supervision, and methods used in the various

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1 Minnesota Department of Education. The Secondary School Curriculum, Bulletin No.C-6.State of Minnesota-1932.
Illinois Board for Vocational Education. Suggestive Course Outlines, Bulletin No.37. State of Illinois-1931 .
North Dakota Department of Agricultural Education. Syllabus for Animal Husbandry. North Dakota Agricultural College-1929.
Wisconsin State Board of Vocational Education. A Suggested Outline for a Course in Animal Husbandry-1930.
Indiana Department of Public Instruction Courses in Agriculture for High Schools, Bulletin No. 100-G-2. State of Indiana-1928.
J.D.Blackwell . The Organization and Supervision of Vocational Education in Maryland County High Schools. Twentieth Century Printing Co., Baltimore, Md. 1929.

states carrying on agricultural instruction. This variation may be explained by the fact that those in authority in each state tried to develop a plan for the work that to them seemed best suited to their conditions. The work was new at that time, and there was naturally some difference in opinion among agricultural leaders, as to what type of organization would function most effectively.

To illustrate the wide variation in organization of subject matter and methods the following cases are cited:

1. In Maryland[1] a four year program of work is offered.

   First year- Plant enterprise (including related farm shop) .

   Second year- Farm animal enterprise (including related farm shop).

   Third year- Agricultural Economics and farm management.

   Fourth year- Farm equipment and community specialties.

Five ninety-minute periods are required per week each year, and also an equivalent of ninety minutes per day to be devoted to project work at home for the first two courses. In the third and fourth year three ninety-minute periods per week are required, and also the equivalent of nine minutes per day devoted to project work.

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[1] J.D.Blackwell . op. cit., p. 34 .

The recommended method of instruction is to use the job analysis and seasonal sequence procedure. Each farm operation is broken up into jobs, which are to be taught at the season of the year when they are performed on the farm.

2. In Indiana[1] six courses of agriculture are suggested, allowing the teacher to select courses he deems most suitable for his community.

First year- Animal husbandry) required
Second year- Soils and crops
Dairying
Poultry
Horticulture
Farm Mechanics

Seven periods per week are required, and each subject is on the semester basis. The problem method of instruction is recommended with suggestions for selecting the season of the year in which to teach the problem or part of it.

3. In North Dakota[2] four courses of agriculture are offered:

First year- Farm crops and soils
Second year- Animal husbandry
Third year- Marketing

[1] Indiana Department of Agricultural Education. op.cit.
[2] North Dakota Department of Agricultural Education. op.cit.

Fourth year- Farm management

In connection with farm crops and animal husbandry farm shop is required two days of the week. The method of instruction is on the job basis, and each farm enterprise is broken up into its various jobs.

4. In Illinois[1] four courses of agriculture are offered:

First year- Crop production

Second year- Livestock production

Third year- Farm mechanics

Fourth year- Special courses in dairying

The recommended method of instruction is on the job analysis basis, leaving the teacher to decide the dates each lesson will be taught.

5. In Wisconsin[2] the course of study is in outline form, which is offered as a framework on which the teacher may elaborate.

6. In Colorado and Connecticut the state departments of agriculture do not believe in publishing a state course of study, leaving this to the teacher to develop, according to the needs of the local community.

7. In Minnesota[3] the recent recommendations are for a

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[2] Illinois Board for Vocational Education. op.cit.
[2] Wisconsin State Board of Vocational Education. op.cit.
[3] Minnesota Department of Education. op.cit.

three year course in agriculture.

First year- Agriculture I 9th grade-Junior High School

Second year- Agriculture II 10th grade students

Third year- Agriculture III 11th and 12th grade students

The subject matter is not grouped as crops, soils, animal husbandry, etc., but is based on the major and minor enterprises of the boy's farm. Minnesota has also accepted the principle that ninth grade students should be given exploratory courses rather than purely vocational courses.[1]

From this sampling of states-Maryland, Indiana, North Dakota, Illinois, Wisconsin, and Minnesota- we find the courses differing in three respects:

1. Courses offered
2. Subject matter grouping
3. Methods of instruction

The main types of methods seem to be these :

1. Job analysis with seasonal sequence
2. Job analysis with daily assignments
3. Problem basis

To say that any one of these methods surpasses the others is difficult. Good instruction can be obtained with them all, but the grouping of subject matter into definite problems or units of work seems to be the most recent development.[2]

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[1] Minnesota Department of Education op.cit. p.5
[2] Ibid p.17

The organization of agricultural subject matter into separate courses, such as field crops, animal husbandry, farm management, etc., can best be substantiated by saying that it has always been done that way. It is probably the easiest method of teaching, because practically all text books are organized on that basis. However, it is not the logical method. Dr. A.M.Field of Minnesota, has listed the objections to the logic of this method of subject organization.[1]

1. Placing the crop enterprises in one year and the animal enterprises in another is not consistent with the way a farmer farms.

2. The plan assumes that the students have the mental ability, the interests, and the experiences necessary to master all the needed information about each enterprise placed in each year without regard for the range of difficulty of the content for each enterprise. For example, there is much content that is too difficult for freshmen. Good organization in teaching puts the emphasis on appropriate material that the boy can learn and not on what the teacher can teach.

3. The plan tends to place emphasis on learning subject matter instead of learning how to farm. Books and bulletins should be used as sources of information rather than content to be learned. Emphasis should be placed on the vocational

[1] A.M.Field. The Type of Farming set up for Teaching Agriculture. University of Minnesota File No.69-p.1

set-up rather than the subject matter set-up.

4. The plan does not encourage the boys to study the home farm as a type of farming unit. Students should study the enterprises in their relationship to the proper management of the farm.

5. The plan is weak because students who take only one year of agriculture do not get a very good idea of how to farm.

6. The plan does not give proper emphasis to the problems of farm management in the early years of study. Only a few of the students continue through a four-year course in agriculture.

7. The plan places a premium on a superficial study of many enterprises instead of teaching well fewer of the enterprises that are most appropriate for the home farms.

8. The plan tends to narrow the scope and variety of the farm practice program.

9. The plan does not give adequate opportunity for recognition of individual needs and experiences.

Recently there has been a growing tendency in many states to modify the methods of instruction in agriculture to avoid these mistakes. Minnesota[1] has had a prominent place in attempting new and improved methods. As a result of several years of experiments the present program of

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[1] Minnesota Department of Education. op.cit.

work has been set up.

The course in agriculture is regarded as a continuous one, extending over three years, designated simply as Agriculture I, Agriculture II, Agriculture III. The community survey, the unit method of teaching, the unit assignment, and other usually accepted features of instruction are used. This organization breaks away from the system of teaching crops one year and livestock another, and permits the development of a program of instruction and study on the types of farming basis. The enterprises can be selected, distributed, and developed throughout the three years according to the abilities, interests, and needs of the students for each year, and can be arranged to progress in sequence of difficulty within the enterprise. A mere mixing of complete animal and plant enterprises the same year does not meet the last standard. Seasonal sequence and teaching sequence can be used to better advantage. The plan also provides excellent opportunities for individualized instruction and utilizes to the fullest extent the creative abilities of the student. [1]

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[1] A.M.Field. Relation of High Schools to Colleges of Agriculture and Particularly the Curriculum Adjustments. Reprinted from 45th annual proceedings of the Association of Land Grant Colleges and Universities 1931. p.4

A careful comparison of these various state plans indicate that the Minnesota plan is an improvement. A farmer operating his farm runs it on an enterprise basis. If he is a grain farmer his main and only enterprise is the production of grain. All soil problems such as fertility, preparation of the soil, power machinery and marketing are tied up with grain production. If he is a dairy farmer his major enterprise will be dairying, and the many contributory enterprises such as crops, soil fertility, equipment, etc., will be directly connected with the dairy enterprise.

A farmer does not handle animals one year and field crops the next. To present a real picture and problem to the young prospective farmer, it seems that the enterprise as a whole should be presented to him. The age of the boy should be considered in formulating his course of study, so that as he develops each year he will be given problems according to his ability. The average age of ninth grade students in agriculture I in 1931-1932 was 14 years 9 months.[1] One may question whether at this age boys are sufficiently mature to give much thought to selecting a vocation. This logical doubt encourages a plan in which pupils should be given the chance to survey

[1] A.M.Field. The Type of Farming set up for Teaching Agriculture. op. cit. p.2

the field, explore it, and see whether their interests lie in that profession.

Agriculture I then should consist mainly of general information rather than specific. The students should be given the opportunity to see the problems the farmer meets, study farming as an occupation, learn its advantages and disadvantages and the qualifications essential for success.

In Agriculture II the boys have reached the age where they begin to take a more active part in the real farm work. He should be given an opportunity to learn as much as possible about the various farm operations. The subject matter should be specific and farm enterprises should be studied in detail. Real vocational work should be carried out with appropriate project work.

By the time the farm boys reach Agriculture III they are juniors or seniors. They are mature enough to receive training in farm management, marketing and agricultural economics. They have reached the stage where they have become vitally interested in financial returns of the farm, and in farm management problems, and they should be given an opportunity to study this phase of the agricultural work.

The conclusions to be drawn from a study of the various courses of study previously noted may be stated as follows,

1. Agriculture I classes partake of the nature of exploratory courses.

2. Agriculture II sets up intensive vocational courses built on needs of the student along farm enterprise lines.

3. Agriculture III offers intensive vocational courses from the management viewpoint.

Subject Matter Selection

Having decided the principles upon which the course of study is to be built, the next step is to determine the scope of the dairy enterprise for the three-year course in agriculture.

There are at least three problems, which must be considered in deciding upon course content; they may be stated as follows: (1) What information is necessary for success ? (2) What part of this information do the farmers seem to lack ? (3) What part of this information do the students enrolled already possess ? These three questions are very important, for they constitute a guide as to what subject matter should be included and what omitted. A study in dairy husbandry by Dickinson[1] shows a scientific method of solving these problems. To determine what information was necessary for success in dairy husbandry he first analyzed and tabulated the items of information content of five leading text books.The tabulation was then sent to five leading dairy exports, who ranked each item as to its being, (1) necessary for success, (2) not necessary but helpful,(3) of

[1] S.D.Dickinson. A Method for Selecting the Desirable Content for Courses in Departments of Vocational Agriculture. University of Missouri, 1929.

doubtful value in success in farming. The next step was to distribute the tabulation to two groups of people, one a group of persons trained scientifically in dairy husbandry, the other a group of farmers in Missouri and Minnesota, each group making the same evaluation as did the specialists.

A study of the results[1] shows a very definite agreement as to the items considered of doubtful value in success. Generally speaking disagreement was practically to whether items should be considered necessary for success or merely helpful toward success.

To solve the second problem what part of this information do farmers seem to lack- a survey was made of farm magazines, and all questions which farmers asked pertaining to dairying were listed and classified.[2] The frequency clearly indicated a real need for the information as well as a lack of it.

The third problem may be solved by diagnostic test. The Dickinson test on dairy husbandry information[3] consists of over one-thousand questions, which were carefully composed with the aid of dairy specialists.

With this scientific method of course content selection considerable progress can be made. The opinion of dairy

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1 S.D.Dickinson. A Method for Selecting the Desirable Content for Courses in Departments of Vocational Agriculture op. cit. p.37

2 Ibid p.7

3 Ibid p.43

specialists and farmers as to the information which they think essential for success, and the questions asked by farmers in magazines may be used as a reliable guide in selecting the course for any special community. This method cannot be blindly followed, because it must be clearly understood that the character and needs of the community in which the course is offered must be considered. The amount of time and the character and experience of the students must also be considered.

The diagnostic test offers a reliable guide as to what should be included, and what should be omitted, and gives a definite clue as to the emphasis to be placed upon the various items within the course. The main weakness of the test lies in the fact that it is made up for one course of study in dairy husbandry while the Minnesota plans call for three courses.

The conclusions drawn concerning selection of course content may be summarized as follows:

1. The best guide in deciding the relative value of items of dairy information is the average of the judgments of dairy specialists and dairy farmers.

2. The questions on the subject of dairying which farmers ask of farm papers are valuable guides in selecting subject matter.

3. Prepared diagnostic tests should be used as a guide

in determining course content.

4. Community needs, as revealed by a survey of the community, must be considered.

5. The amount of time available for the topic, together with the importance of the enterprise in the community, must determine time allotment.

6. Ability and experience of the student should affect selections and arrangement of material.

Division of Subject Matter

The third and probably the most difficult step in formulating this suggested course of study is arranging the subject matter taught over the three years. What should be taught the first year, the second year, the third year? Aims, objectives, and methods will necessarily vary each year.

Course of Study

Agri. I Introduction and Choice	Agri. II Training on Selected Field	Agri. III Adaption to Home Conditions
Levels of Vocational Beginnings Projects	Mental Ability	and Interests Vocational Comprehensive Specialization Farming Skills Principles Long Time Farm Practice Individual Study Projects
Exploration Counselling Appreciation Attitudes Fundamentals Group Discussion		

Range of Difficulty

Chart I. Graphic Illustration Showing the Set-up for Agriculture in Minnesota High Schools

Reading from left to right, the chart[1] indicates that the work in agriculture is a continuous course: that the number of enterprises decreases as the students progress to a more intensive study of the home farm problems, and that the problems for study become more advanced and more complex as the students gain experience and maturity. Each student then emerges at the end of the three years with a rather complete plan of improved organization andprocedure for the farm home.[2]

To follow the plan as suggested in the chart the following criteria were used as guides in apportioning subject material over the three years :[3]

1. The content of each year's work should be based on the interests, abilities, needs, experience, and opportunities of the students.

2. Occupational information should precede specialization.

3. Important and difficult materials should be reviewed and extended into succeeding years.

4. Seasonal sequence should be recognized, but should not materially interfere with teaching sequence.

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[1] Minnesota Department of Education. Agriculture for Juniors and Senior High School Periods, Bulletin C-6 . St. Paul, Minnesota, 1932.

[2] A.M.Field. Relation of High Schools to Colleges of Agriculture and Particularly the Curriculum Adjustment. Reprinted from the 45th annual proceedings of the Association of Land Grant Colleges and Universities, 1913.

[3] A.M.Field. The Type of farming set up for Teaching Agriculture. op.cit. p.6

5. Farm management should be integrated throughout the three years of the course of study, according to the needs and abilities of the students.

6. The subject matter should be selected and treated as a medium for developing appropriate attitudes, ideas, concepts, appreciations, knowledges, habits, skills, and satisfying activities.

7. Mechanical activities should be given recognition as the need arises.

8. Provision for farm practice should come early in the course.

9. Provision for individual study should increase each year.

10. The program of instruction and farm practice should progress each year from the informational type of the first year to the more difficult and involved problems of management for the home farm the third year.

Teaching Units

After the subject matter has been selected for each year, the final step consists in grouping the subject matter into suitable teaching units, arranging their sequence, and preparing a general plan of teacher procedure.

In the following suggested outline the subject matter for each year has been divided into units on the basis of the Morrison plan of instruction.[1]

[1] H.C.Morrison. The practice of Teaching in the Secondary School. The University of Chicago Press.1927-p.220.

In the teaching of this material the following steps may be observed : (1) exploration , (2) presentation , (3) assimilation , (4) organization , (5) recitation .

The exploration is mainly the pre-test stage. The process may take the form of a written test, an oral quiz, or a class discussion. In agriculture the class discussion seems to be most satisfactory, because it enables the teacher to link farm operations and project work with the classroom lessons. What the discussion covers will depend on the class and the unit of work, but the teacher's objective should be to arouse interest in the unit of work by showing its actual value on the farm , and to ascertain what background of knowledge the student already has acquired.

The second step is presentation, in which appears the instructor's opportunity for direct teaching. The main purpose of this step is to give a clear understanding of the major essentials of the unit. Both presentation and exploration are motivating. When the presentation has been properly given interest motivation is then established, and the new unit "sold to the class".[1] Because of the importance of the presentation, a preview has been prepared for each unit of work, which may be used as part of the teacher activity of this step. These previews could be read by the teacher.

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1 H.C.Morrison. The practice of Teaching in the Secondary Schools. op. cit. p.226.

The third step is the assimilation period. It is in this step that the initiative passes from the teacher to the pupil, as the latter undertakes to acquire mastery of the subject matter. With the proper motivation and preview of the unit the student ought to have a foundation sufficient for beginning his work on the unit. The outline is to be considered a guide rather than a form to be followed blindly. It is in this period, also, that the teacher can best provide for individual differences. The stronger and more advanced students can go into the subject in detail and may receive special assignments; the slower students will complete only the essential points of the unit required for a passing grade.

The fourth step is the organization of the subject matter. After the students have covered the unit of work in the assimilation period, they should work out together in class, without any books or notebooks, an outline in which the topic is developed in a logical and convincing order. This gives the pupil an opportunity to assemble new ideas, to organize his knowledge, and to express his understanding of the unit.

The fifth step is the recitation period in which the students should be held responsible for topical recitations. For example, in Agriculture I , unit III [1], a suggested

[1] See page 54.

topic might be, " How I would raise my club calf ". The instructor's objective here is to induce the student to transfer the knowledge gained in the classroom to his own farm whenever possible, rather than merely recite facts he has learned.

In the following course of study the procedure for each unit of work will include,

1. Unit objectives and specific objectives
2. Preview of the unit
3. Outline with standards and references
4. Pupil activities
5. Desirable outcomes
6. Examination-covering the unit of work.

CHAPTER II

COURSE OF STUDY OUTLINE

AGRICULTURE I

The Dairy Enterprise

- Unit I Dairy Cattle
- Unit II Crop Production
- Unit III Management Problems

UNIT I

Dairy Cattle

Unit Objectives

1. To learn the importance of the dairy industry, both financially and from a food standpoint
2. To learn the characteristics of the dairy breeds
3. To develop an appreciation of the problem of the dairy industry

Specific Objectives

1. To learn the value of milk in the diet
2. To give the student a knowledge of the sources of agricultural information, such as is provided in books, bulletins, and periodicals
3. To provide the student with an opportunity for the studying of the dairying business, and to discover whether his occupational interests lie in this field
4. To learn how to test milk

PREVIEW

The dairy enterprise is one of the most important enterprises carried on by farmers. From it we receive such important items as milk, butter, cheese, buttermilk, skimmilk, meat, hides, and fertilizer.

It has been claimed that the keeping of dairy cows was the greatest factor in the history of the development of man from the state of barbarism. It is a well-known fact that the most prosperous nations, as well as the best developed physically and mentally, are those in which the dairy cow is the foundation of agriculture. The United States leads the countries of the world in the number of dairy cows. It is estimated that there are about one hundred million dairy cows in the world, and that of those one-fourth, or twenty-five million, are in our country.

The value of dairy products yielded by our farms amounts to many millions of dollars. Dairy farmers as a rule are more prosperous, and have better kept farms and homes than other types of farmers. Dairying enables a farmer to rotate his crops, and keep up the fertility of his soil, and provides an income the year round.

Because of the declining prices of dairy products during the last few years dairymen are meeting some rather serious problems, and are experiencing difficulties in making dairying a profitable enterprise. The progressive dairyman rea-

lizes that dairying on the farm must be run in a business like manner. Slip shod methods cannot succeed in the present economic depression. Farmers must study and analyze their problems in order to succeed.

One of the first things a dairyman should do is to study the conditions affecting his industry. The production and consumption trends in butter explain the present price situation. The number of cows in the United States has been increasing in recent years, and as a result of better feeding and breeding the production of butterfat per cow has also increased. The consumption of butter, however, has been declining, chiefly because of such factors as unemployment, foreign competition, and cheaper substitutes, as oleomargarine. What the farmer can do to rectify this situation is a problem. As an individual he has very little influence, except to reduce his own production and lower his own costs of producation. But by joining cooperative organizations and actively supporting them he can aid in developing a political power that may be very effective in such matters as tariff and cheaper substitutes.

The efficient production of dairy products on the farms requires the proper handling of such problems as (1) selection of a breed that will fit into the farm conditions best, (2) selection of the individual cow, (3) improvement of the herd, (4) selection and production of crops to meet

feed requirements, (5) proper feeding methods, and (6) proper equipment .

The main purpose of this study is to present as clearly as possible the problems that the dairy farmer meets and the solution of these problems in a general way.

UNIT I

Dairy Cattle

1. Present conditions of the dairy industry in the United States
   - A. Production trends
     1. Number of dairy cows
     2. Milk production
        - a. Butterfat
        - b. Cheese
        - c. Condensed milk
   - B. Consumption trends
     1. Demand for dairy products
        - a. Financial conditions
        - b. Competition of substitutes
   - C. Prices
     1. Dairy animals
     2. Feeds
     3. Dairy products
2. Importance of Dairy Farming
   - A. Milk as a food

1. Composition
2. Comparison of food value of a quart of milk with other foods

B. Dairying as an aid to Agriculture
1. Soil fertility relationships
2. Cow as a cheap producer of human food

C. Leading dairy states

D. Leading dairy countries

E. Historical development

3. Origin of Cattle

A. Early types

B. Present classification of cattle

4. Origin, characteristics and adoptations of

A. Holstein

B. Jersey

C. Guernsey

D. Ayrshire

E. Shorthorn

F. Red poll

5. Factors to consider in selecting a dairy breed

A. Relative efficiency of the breeds

B. Adaptability to farm conditions

C. Personal preference

6. Selecting the Individual

A. Necessity for selection

1. Importance of high production
2. Cause of individual variation

B. Methods of selection

1. Dairy records
   a. Importance of milk yield and fat test
   b. Methods of keeping records
   c. Cow testing associations
   d. Babcock tester
2. Judging dairy qualities
   a. Style type and general appearance
   b. Dairy conformation
   c. Constitution
   d. Capacity
   e. Mammary development

Standards

1. Explain why definite breeds of cattle were not established until recent years.
2. Why would'nt it be a good policy for farmers to cross the Jersey and Holstein breeds, and try to develop a new breed of high fat test with a large milk production ?
3. Is the dairy farmer of today benefiting from the recent inventions along dairy lines ? Give reasons.
4. Make a list of all the factors that should be con-

sidering the factors ?

7. Compare the advantages and disadvantages of the dual purpose breed for this community .
8. Would a scrub , grade, or pure bred tend to produce the best offspring ? Why ?
9. Explain why many grade cows are better producers than some pure breds.
10. What is the principle of the Babcock tester ? State methods used .
11. In what points does skim milk and cream testing differ from milk testing ?

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R.M.Washburn. Productive Dairying . Ch. 1-4-5-6-8-9-10.

Year Books . U.S.D.A., Washington, D.C.

Pupil Activities

1. Classroom Work
   A. Read preview carefully to get purpose and objectives of the unit of work.
   B. Use outline as a guide in reading and for written report .

C. Learn how to find information in the year books.

D. Work in drawings and illustrations in your report wherever they seem appropriate.

E. Turn in written report of standards with your outline.

F. Be prepared to give oral report on unit.

2. Demonstration Suggestions .

A. Test milk, cream, and skim milk .

B. By using water, butterfat, carbohydrates, lime, and protein manufacture a quart of milk.

C. Prepare a poster advertising milk .

3. Project suggestion (Keep dairy records).

Desirable Outcomes

1. An appreciation of the importance and value of the dairy enterprise
2. An appreciation of the value of milk as a food, which results in increased consumption
3. Keeping of milk records by the student on his farm
4. Ability to judge dairy cows
5. Ability to test milk

EXAMINATION
Multiple Questions

Name _____
Perfect Score____
Student Score____

1. The number of dairy cattle in the United States is declining, remaining the same, increasing.
2. The price decline of butterfat has very little effect on the price of dairy cows, increases the price, lowers the price.
3. The economic depression has affected the dairy industry more than, less than, about the same as, other farm enterprises.
4. The first cattle industry of any extent developed in a country is dairy production combined with more or less general farming, beef raising combined with more or less general farming, specialized dairying .
5. As population becomes more dense, and the value of animal feeds higher, the larger proportion of our meat supply will come from sheep, swine, beef cattle, dairy cattle.
6. The special value of the cow as a domestic animal arises from her ability to digest large quantities of roughage for conversion into milk and meat suitable for man, capacity to furnish labor the year around for the the farmers, her ease of handling and docility.
7. Dairy farming appeals to the farmer because of the steady amount of work, the element of speculation as to price,

the quickness and certainty of the returns.

8. Dairy "type" refers to the conformation of the animal, breed characteristics, height and weight.

9. Cattle are classified according to their geographical distribution, their anatomy, their economic value.

10. The three outstanding points of a dairy cow are extreme angular form with vigorous physical condition, short thick neck, development of the udder and milk veins, compact and blocky body, marked development of the barrel in proportion to the size of the animal, level underline, smooth even covering of flesh .

11. A cow that shows a tendency to fatten to a marked degree during the first six months of the milking period may be said to have, excellent, fair, poor, dairy temperament.

12. In selecting a dairy cow constitution, capacity, udder development, is the most important.

13. As a breed the Holsteins are first, second, third, fourth in disposition or temperament.

14. The Holstein breed shows more, less, about the same alertness and activity than the other breeds.

15. The Holstein cow is best adapted to hilly and scanty pastures, level rich pastures.

16. Holstein milk averages higher than, about the same as, lower in test than, that of other breeds.

17. The larger percentage of Jerseys in the United States is found in the northwest, south, middle west, west.
18. The Jersey is the smallest, next to the smallest, third from the smallest of the common dairy breed.
19. The Guernsey is best adapted to milk production, production of butterfat, production of milk for cheese manufacture.
20. The native home of the Ayrshire is England, Scotland, France, the United States.
21. The Ayrshire reaches maturity at about the same age as the Holstein, Jersey, Guernsey.
22. Jersey cows average about 500, 900, 1100, 1200 pounds in weight.
23. The most common color of the Jersey is black, red, faun, brown.
24. Guernsey cows are as a breed finer, coarser-boned animals than the Jersey.
25. Guernsey cows average about 600, 1000, 1200, 1300 pounds in weight.
26. The Guernsey breed are as a rule, slow, average, rapid in time of reaching maturity.
27. The Guernsey breed have,as a rule, the smallest amount, average amount, largest amount, of coloring matter in the milk of any of the breeds.
28. The fat globules of the Guernsey milk are smallest,

largest, average, of the dairy breeds.

29. Ayrshires are earlier, as early, later maturing than the Jerseys.

30. Holsteins average in weight 800, 900, 1000, 1200, 1600 pounds.

31. The highest percentage of fat in milk is produced by the Ayrshire, Guernsey, Jersey, Holstein.

32. Ayrshires are, as a rule, long, average, short period milkers.

33. The ability to do best on poor pastures lies in favor of the Holstein, Guernsey, Ayrshire breed.

34. The main difference between the efficiency of cows as milk and fat producers is the difference between low producers and high producers, differences of breed, difference in ability to digest food.

35. The more highly developed the animal the easier, more difficult, as a rule, is the retention of the required characteristics.

36. Profit from the dairy herd is determined by the quantity of milk produced, number of animals kept, income in excess of the cost of production.

37. A cow is a superior milk producer because of superior feed and care, internal stimulus, breed characteristics.

38. In keeping dairy records the greatest item of importance is test, weight of milk, cost of feed.

39. The first state to establish a cow testing organization was Minnesota, Iowa, Michigan, Illinois, Ohio.

40. A quart of milk weighs 1, 2, 3, 4, pounds.

Completion Questions

41. Cream is separated from milk by _____

42. Butterfat tests are made by the machine called _____

43. Watered milk can be detected by an instrument called _____

44. The best colored milk is produced by the _____breed.

45. The color of the Holstein is _____

46. The color of the Guernsey is _____

47. The Jersey breed originated in _____

48. The Shorthorn breed originated in _____

49. A heifer is a _____

50. A cow is a _____

51. In 100# of Guernsey milk there would be about ____# of butterfat.

52. In 50# of milk there would be about ____# of protein.

53. In 100# of milk there would be about ___# of water.

54. In 1# of milk there would be about ____# minerals.

55. In 25# of milk there would be about ___# of vitamins.

56. Butter is produced by a process called _____

57. The most important advantage of the Holstein breed is _____

58. The machine called _____ is used to remove dirt from milk.

59. Dairy conformation is indicated by _____

60. Well sprung ribs indicate _____

61. Mammary development is indicated by the size of udder and _____ veins.

62. The form of the _____ is especially symmetrical, although distinctly dairy, and shows great refinement. The head is short broad and deep, the face lean and distinctly dished between the eyes, the eyes wide apart and unusually prominent, ears small, fine, and showing rich yellow secretion within, muzzle black or dark blue surrounded by a light mealy-colored strip of hair and skin, the horns small, fine, white, shapely in curving, waxy in appearance, and usually black tipped.

63. The _____ has a long head, comparatively straight face line, no dish, although the orbits are raised with unusual prominence; the muzzle is flesh- or cream-colored, smutty appearance not being permitted, and the horns are medium sized, amber colored, and symmetrically shaped. The skin is yellow and carries an abundance of highly colored secretion.

64. _____cows are characterized by prominence of frame, as shown in the bone of the head, shoulders, and cannons. The head is long and dished between the eyes, the horns rather short and flat,

directed outward and upward with black tips. The hide is of more than usual thickness but soft and pliable. The color is a shade of brown or brownish fawn, varying from light to dark with a light tuft at the poll inside the ears and along the back, a mealy colored muzzle, black nose, tongue and switch. The udder is of good size with large and well placed teats.

65. The _____cow is characterized by symmetry of form, somewhat less refinement than is usually found in dairy cattle, and less angularity than is characteristic of popular dairy breeds. Although the most typical individuals give no suggestion of beefiness they are more short-legged and compact in body than is usual in dairy cows. The head is of medium length and width, not especially fine but surmounted with long, strong, symmetrical white horns inclining generally upward, forward, and outward, with considerable spread, and a peculiar backward turn at the tips. The fore-udder is highly developed and snuggly attached against the abdominal wall .

UNIT II

CROP PRODUCTION FOR DAIRY COWS

Unit Objectives

1. To develop an appreciation of the problems connected with the successful production of feed for the dairy herd
2. To develop an appreciation of the financial cost and labor required to produce farm crops
3. To learn the feeding value of the crops

Specific Objectives

1. To learn the cultural practices of producing crops
2. To learn proper selection of seed
3. To learn how to identify seeds
4. To learn the difference between legumes and other plants
5. To develop an understanding of soils

PREVIEW

One of the most important problems of the dairy farmer is to provide food for his herd. This food may be grouped into two kinds of feed : (1) grains commonly known as concentrates (2) forage or roughage .

Forage is known under a variety of names, depending on the way it is handled. If the forage crops are cut, cured, and fed in a dry condition, the forage is known as hay, corn fodder, corn stover or straw, depending on the kind of material.

The difference between corn fodder and corn stover is that in corn fodder the ear had not been removed, while in corn stover it has. If the forage crops are cut and fed immediately in the green state, the forage is known as soilage. If the forage crops are cut in a green condition and preserved in a silo, it is known as silage. Where animals are turned into the field and do their own harvesting the forage is known as pasturage, and the field itself is a pasture.

Many factors must be considered by the farmer in selecting what forage and grain crops to grow. He must also decide in what form to feed the crops. In making this decision a knowledge of feeding value, machinery requirements, labor requirements, and adaptability to soil conditions is necessary.

After a decision has been made as to what crops to

grow, it is then necessary to know the best cultural methods of producing them. This includes a knowledge of soil and soil management.

The production of crops to meet the feed requirements of the dairy herd requires special ability and information in solving the following problems :

1. Selection of crops
2. Cultural methods of production
3. Soil management

UNIT II

Crop Production necessary for Dairy Cows

1. Roughages
   - A. Legumes
     1. Alfalfa
     2. Clover
     3. Sweet clover
   - B. Non-Legumes
     1. Timothy
     2. Wild hay
     3. Corn fodder
     4. Silage
   - C. Cultural Methods
     1. Preparing the soil
     2. Seeding

3. Harvesting

D. Amounts required per cow

E. Machinery required

2. Grains

A. Cultural methods

1. Corn

2. Oats

3. Barley

B. Cost of Production

C. Feeding Values

3. Pasture Requirements

4. Soil

A. Origin

B. Types

C. Fertility

Standards

1. Why are legume roughages superior to non-legume roughages ?
2. Explain how legume plants improve the soil.
3. Compare clover, sweet clover, and alfalfa in yield per acre, cost of production, and feeding value.
4. List the advantages of rotating crops .
5. State crop rotation plan for your farm.
6. What is soilage ?

7. What are the advantages of a silo ? Disadvantages ?

8. Outline a plan to improve pastures on your farm.

References

F.T.Ullrich. Our Farm World ch. 2-5-6-7 .

Hover-Pittman . Profitable Farming-unit 2-11-13-14-18-19.

E.G.Montgomery . Productive Farm Crops-ch. 1-2-40-41 .

Pupil Activity

1. Classroom Work
   - A. Collect and prepare exhibit of common crops grown in your community
   - B. Collect and prepare exhibit of samples of soil found in your community
   - C. Judge sample of corn
   - D. Take sample of seed and work out purity
   - E. Find the percentage of germination
2. Demonstration Suggestions
   - A. Seed corn testing
   - B. Grass seed testing
   - C. Showing water holding capacity of various soils
   - D. Fertilizer experiments
   - E. Testing soil for acidity
3. Project Suggestions
   - A. Corn project-keep labor and cost records of corn crop

B. Alfalfa project

C. Sweet clover project

Desirable Outcomes

1. A knowledge of the various crops, as to how they are produced, equipment necessary, and feeding value
2. An appreciation of the value of legume crops
3. The ability to recognize various types of soil
4. An understanding of how soil is formed
5. The ability to select good seed
6. The ability to keep records of crop production

EXAMINATION

True-False Questions

Name _____
Perfect Score 115
Student Score _____

( ) 1. Timothy is a perennial crop.

( ) 2. Red top is a biennial crop.

( ) 3. Red clover and alsike are biennial plants.

( ) 4. Alfalfa is a perennial crop.

( ) 5. Sweet clover is a perennial crop.

( ) 6. Timothy is more commonly grown for the hay crop than any other plant.

( ) 7. Kentucky blue grass makes very good pasture.

( ) 8. Sudan grass is more valuable than timothy.

( ) 9. Red clover has a high amount of protein and mineral matter.

( ) 10. Kentucky blue grass varies in height from a few inches to 20 inches.

( ) 11. The stems of the blue grass plant are very rough and covered with fine hairs.

( ) 12. Kentucky blue grass has more protein than soybeans.

( ) 13. Sweet clover is the best of all hays for cattle feed.

( ) 14. Sweet clover has been a common forage plant for a long time in America.

( ) 15. Weeds are controlled in a rotation system by including a cultivated crop.

( ) 16. Oats are treated for smut by formaldehyde.

( ) 17. The two main types of oats are spreading and side oats.

( ) 18. The glumes grow tight to the kernels of barley.

( ) 19. The chinch bug lives over winter in rubbish.

( ) 20. Barley is used mostly as a feed for livestock in the United States.

( ) 21. In the corn plant the pith is the principal region for storage of foods.

( ) 22. The rind carries water to the leaves.

( ) 23. The rind gives stiffness to the stem of the corn plant and holds it upright.

( ) 24. The phloem carries food.

( ) 25. The xylum carries the water up to the leaves.

( ) 26. The tassels produce male flowers.

( ) 27. The seed corn should be picked after the plant freezes.

( ) 28. The brace root's main purpose is to absorb food from the soil.

( ) 29. Seed corn is selected according to the color of the kernels.

( ) 30. About three-fourth of the world's corn crop is grown in the United States.

( ) 31. Pollination is a form of reproduction or breeding.

( ) 32. Corn was first grown in England.

( ) 33. The corn stalks and pith are used for paper.

( ) 34. Alluvial soils are made by the wind.

( ) 35. Soil is made up entirely of organic matter.

( ) 36. Delta soil is very rich.

( ) 37. The principal physical soil agencies are wind, ice, water, plants, animals and temperature.

( ) 38. Cumulose soil is found in bogs and swamps.

( ) 39. The first layer of soil is called sub-surface.

( ) 40. Barnyard manure contains all the elements needed by the soil.

( ) 41. Legumes make the best green manure.

( ) 42. Green manure is growing crops plowed under.

( ) 43. Water logged soil warms rapidly.

( ) 44. Dark soils take heat more rapidly than lighter soils.

( ) 45. A dust mulch lets out much of the moisture from the soil.

( ) 46. Drought is more injurious to alfalfa than wet weather.

( ) 47. On account of its great root development deep soils are suitable to alfalfa.

( ) 48. Grimm alfalfa is better for this vicinity thsn common alfalfa.

( ) 49. For the starting of young alfalfa a seed bed from weeds is important.

( ) 50. The nodules of alfalfa are small and club shaped.

( ) 51. Sweet clover contains more protein than alfalfa.

( ) 52. The time to cut sweet clover for hay is just before blooming.

( ) 53. Sweet does not need to be innoculated.

( ) 54. There is but one variety of sweet clover.

( ) 55. Animals will readily eat sweet clover if they have never eaten it before.

( ) 56. The second year of a sweet clover crop should yield about three to four tons.

( ) 57. The length of the roots of sweet clover are much longer than of alfalfa.

( ) 58. Cattle like the young sweet clover plant much more than when it is mature.

( ) 59. Sandy soils are more permeable to the roots than clay soils.

( ) 60. The composition of our soil here is 95% humus and 5% rock.

( ) 61. Film water is greater in coarse gravel than in a loam.

( ) 62. Alfalfa grows better in slightly acid soils.

( ) 63. Plants require protein, carbohydrates, and iron from the soil.

( ) 64. Clay soils are more subject to erosion than sandy soils.

(+) 65. Lime on sandy soils make them more productive for most crops.

( ) 66. Alluvial soils are soils formed by falling from cliffs.

( ) 67. Aeolian soils are very productive.

( ) 68. Red clover is the most important leguminous crop in America.

( ) 69. Red clover is a crop for humid regions.

( ) 70. Clover seed should be planted shallow.

( ) 71. Red clover usually gives from 2 to 3 large cuttings a year.

( ) 72. Red clover seed is usually dark brown and sometimes tinged with black.

( ) 73. Clover diseases very seldom cause much damage.

( ) 74. Red clover is said to be a long-lived perennial.

( ) 75. Erosion is caused by heavy rains.

( ) Completion Questions.

76. The three main physical forces in soil formation are _____ _____ _____

77. The three classes of soils according to stratification are _____ _____ _____

78. The ten essential elements of the soil are

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

7. _____ 8. _____ 9. _____ 10. _____

79. Two methods of testing for elements or lack of elements in soil are _____ _____

80. The three most needed elements for crop production are _____ _____ _____

81. The four main reasons why we cultivate soils are _____ _____ _____ _____

82. The formula o-16-o in commercial fertilizers mean ___

83. About _____# of silage is fed to a cow in one day.

84. It costs about _____per day to feed a cow.

85. A harrow is a farm implement used to _____

86. A cultivator is used to _____

87. Ten farm implements necessary to raise feed for dairy cows are:

1_____2._____3._____

4._____5._____6._____

7._____8._____9._____

10._____

UNIT III

MANAGEMENT PROBLEMS

Unit Objectives

1. To develop an appreciation of the management problems of dairy farming
2. To arouse interest in dairy calf projects in club work
3. To create an appreciation of the importance of clean milk production

Specific Objectives

1. To learn how to select feed and exhibit dairy calves
2. To know how to judge stock
3. To acquire an appreciation of the value of testing cows for tuberculosis and abortion
4. To know the requirements of a good barn.

PREVIEW

One of the most beneficial organizations to which the farm boy can belong is the 4-H Club, the purpose of which is to give training and experience in agricultural work. Valuable prizes and trips to the State Fair are offered for various farm enterprises-rewards well worth your efforts.

The dairy calf project is one of the leading projects in club work. If you should choose this project you are sure to meet some strong competition. To prepare yourself to be among the winners you should make a careful study of your project. You will want to know how to select your calf, how to feed it, how to fit it for the show ring, and how to exhibit it properly.

The selection of the calf is of the greatest importance, because if you get a poor type animal you have very little chance of winning, no matter how well you feed it and exhibit it. Whether you select one out of your own herd or your neighbor's you must know what to look for. Study the type and body conformation of prize-winning calves if you can. Pictures of type calves are an excellent aid in fixing in your mind the ideal type.

After you have made your selection, the next step is to develop the inherited possibilities of your calf to the fullest extent. You must know what kind of ration

is best for your calf, being careful neither to underfeed nor to overfeed it. The calf must be kept in a healthy growing condition all the time. Clean feeding pails and pens are essential for avoiding setbacks and disease.

Before showing the calf at the fair or other contest you will need to use special care in feeding to get the animal in the best possible show condition. The calf will need to be clipped and the horns scraped and polished. Blanketing the calf tends to give it a soft pliable skin which is an indication of high quality.

No matter how good a calf you have, or how well conditioned and well groomed you have made it an inferior calf may win if you do not exhibit it properly while in the judging ring. Showmanship is of vital importance. You should train your calf to lead and stand correctly. You should know your calf's weak and strong points, and learn how to exhibit it so that the weak points are concealed, and the strong points emphasized.

Herd management problems are similar to the problems of raising the dairy calf, except that they are more complicated and are on a larger scale. Proper rations are important for economical production. Since milk or cream is for human consumption the need for a clean wholesome product is imperative. Medical science has proved that diseases may be carried and spread by milk. To obtain

a good quality of dairy products on the farm, proper shelter and equipment are necessary. When the product leaves the farm and starts on its marketing route, the middleman handling the product must exercise the same care and precaution as the farmer did, to insure a wholesome product for the consumer.

UNIT III

Management Problems

1. Developing the Dairy Heifer (4H club project)
   - A. Selection
     1. Pedigree
     2. Dairy characteristics
        - a. Type
        - b. dairy conformation
        - c. constitution
        - d. capacity
        - e. mammary development
   - B. Feeding
     1. Ration for calf for first month
     2. Ration for calf 6 months old
     3. ation for heifer
   - C. Care and Management
     1. Clean utensils
     2. Clean pens

3. Diseases

D. Preparation for show ring

1. Special feeds

2. Horns

3. Hair and skin

a. Blanketing

b. Clipping

4. Showmanship

2. Herd Management Problems

A. Feeding

1. Daily rations for cows

2. Value of commercial feeds

B. Producing high quality product

1. Diseases carried by milk

2. Factors affecting clean milk production

a. Clean utensils

b. Healthy cows

c. Milker

d. Barn conditions

3. Storage facilities

a. Cooling tanks

b. Refrigerators

C. Marketing

1. Milk routes

2. Selling to pasteurized milk plant

3. Creamery

D. Shelter and equipment

1. Types of barns
2. Location
3. Floors
4. Interior arrangement
   a. Stalls
   b. Feeding alleys
   c. Pens
5. Milking machines

Standards

1. What prizes are offered in 4H club work for dairy calves ?
2. On what side of the calf should one stand when the judge is examining it in the show ring ?
3. How should you make your calf stand in the show ring if she is a little weak in the back?
4. Explain proper methods in training calves to lead and stand properly.
5. What sanitary precautions should be taken at county and state fairs to prevent spread of contagious diseases ?
6. Describe methods of T.B. testing .
7. How can a farmer selling raw milk protect his customers from undulent fever ?

8. Compare the advantages and disadvantages of raw and pasteurized milk.
9. Taking present prices of butterfat estimate value of one quart of milk testing 4% .
10. What treatment should be given to a cow with milk fever?
11. Explain why milk should be cooled immediately.
12. What lines of employment are there in the dairy industry ?

References

Eckles- Dairy Cattle and Milk Production. ch. 16-17-18-19.

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Pupil Activities

1. Classroom work
   A. Make a drawing of the interior of your barn as it is now. Make another drawing showing possible improvements.
   B. Visit pasteurizing plant
   C. Visit creamery
2. Demonstration Suggestions

A. Prepare demonstration on dairy calf raising that would be suitable for club work

B. Prepare demonstration on fitting a calf for the show ring .

3. Project Suggestions

A. Carry on dairy calf project

B. Keep milk records of your herd

Desirable Outcomes

1. A large number of dairy calf projects
2. Ability to feed calves properly
3. Ability to exhibit a calf properly
4. Ability to judge
5. Ability to prepare a calf for the show ring
6. Production of sanitary milk on farms

EXAMINATION

Completion Questions

Name _____
Perfect Score 65
Student Score _____

1. The calf should be allowed to remain with its mother for the first _____days.
2. Start when the calf is about _____days old and gradually change from whole milk to _____, taking about _____weeks to make the change .
3. Good clean _____ should be kept before the calves right from the start.
4. Disinfect the navel cord of the new born calf with _____ to prevent disease infection .
5. Keep the calf in a _____ pen and change the _____regularly.
6. Never _____a calf out of a bucket in which you wouldn't put milk for your use.
7. Three causes of common scours in calves are _____ _____ _____
8. Fitting includes having your calf in _____flesh with _____and _____, showing good condition, and having her trained to _____ and _____ properly.
9. Begin to _____your calf several weeks before the contest to mellow the hide, and to make her hair lie smooth and sleek.

10. It is seldom advisable to clip very young calves except over the _____ _____ and _____

11. The horns should be _____to the desired shape, smoothed with a _____, finished with _____ and rubbed down with _____and _____.

12. Never wash _____calves, as it takes the oil out of the skin and hair. But with _____calves washing is necessary to make them clean for showing.

13. Just before leading the animal into the ring wipe down with a _____rag, to which a few drops of _____has been added, and finish off with a hand rub.

14. Show your calf every _____you are in the ring. Keep her _____on her feet with her head _____.

15. In fitting for show your calf must be smooth and well _____. To get this finish you must _____ correctly.

16. Fitting should start _____before the calf is led into the show ring.

17. Rub the horn buttons of the calf with _____when ten days to two weeks old if you wish to prevent the horns from growing.

18. Good dairy type in a calf is indicated by _____and ___.

19. A strong constitution is indicated by a deep wide full _____, a large open _____, and a

rugged healthy condition throughout.

20. Capacity is indicated by a large _____ with well sprung _____.

True-False Questions

( ) 21. Palatability is of little importance in the heifer ration.

( ) 22. Diseases may be spread to people through the use of unsanitary milk.

( ) 23. The cow's udder and flanks should be thoroughly cleaned before each milking .

( ) 24. There is no danger of the milker's getting the milk dirty if his hands are clean.

( ) 25. Milk strainers, if well made, clean out the germs, dirt, hair and chaff.

( ) 26. Cotton between cheesecloth makes a satisfactory strainer.

( ) 27. Flies do little serious harm in the way of making milk unsanitary.

( ) 28. For best results all milk containers should be sterilized with live steam.

( ) 29. The testing of milk for butterfat enables the farmer to feed his cows more economically.

( ) 30. The need for sanitation in milk production is one of the foremost arguments for proper housing of dairy cattle.

( ) 31. If a cow is properly fed there is no relation between her bodily comfort and her milk production.

( ) 32. The basement barn is the ideal type for dairy production.

( ) 33. It is important that the site for the dairy barn be well drained.

( ) 34. A dirt floor is unsatisfactory even when it is as well made as possible.

( ) 35. The most serious objection to the wooden floor is its short period of service.

( ) 36. Considering the lasting qualities of concrete in dairy barns it is cheaper than wooden planks for floors.

( ) 37. It is difficult to construct concrete floors so that they will be warm and dry.

( ) 38. The length of the platform is important in keeping the cow clean.

( ) 39. With cows facing in, it is easier to feed; with cows facing out the handling of manure is easier.

( ) 40. Light in the dairy barn is important for sanitation.

( ) 41. The milk house should be a part of the barn.

( ) 42. Cleanliness of water given a cow has no effect on the flavor of the milk.

( ) 43. The cow's feed may affect the taste of milk.

CHAPTER III

COURSE OF STUDY OUTLINE

AGRICULTURE II

The Dairy Enterprise

- Unit I Basis of Feeding
- Unit II Feeding
- Unit III Crop Production
- Unit IV Dairy Herd Management

UNIT I

BASIS OF FEEDING

Unit Objectives

1. To learn why certain nutrients are necessary in a dairy ration
2. To understand how these nutrients are digested
3. To learn how to evaluate the various common feeds for dairy cattle

Specific Objectives

1. To know what uses the cow makes of her feed
2. To understand the chemical compounds in a cow's body, and how these compounds are supplied
3. To learn how the nutrients in feeds are determined
4. To learn how to use the Morrison feeding standards
5. To learn the importance of minerals in the ration
6. To learn the importance of protein in feeds
7. To learn about the digestive trach of ruminants
8. To understand how nutrients in feeds are broken down, assimilated, and used by the cow's body
9. To learn the essential qualities of a good feed
10. To learn how to compare feeds on a nutrient cost basis
11. To learn the value of legume roughage
12. To understand mill feed labels, and how to compare their feeding values

PREVIEW

Proper feeding of dairy cows is one of the most improtant problems the dairy farmer must solve. To obtain a true knowledge of feeding it is essential to learn what food elements are needed to produce milk, and to maintain the body, and to understand the basic principles of food digestion and assimilation.

From a manufacturing viewpoint the dairy cow may be compared to a factory. The cow is fed certain raw material, which her body breaks down and rebuilds into the finished product "Milk". Man is primarily interested in milk production, but nature's way is to maintain the body first before very much feed can be used for milk production. The cow's feed must provide heat and energy for the body, food for the unborn calf, and body growth. Proper feeding then consists first in satisfying all body requirements; and secondly in supplying feed for milk production. The amount of food a cow can use for milk production depends on her inherited ability to produce milk. Heavy feeding of low producers results in the food being used to form excessive layers of fat. Economical feeding, therefore, consists in feeding each cow in accordance to her inherited ability to use the feed for milk production.

One of the big problems to understand is how farm feeds are transformed by the cow's digestive track into

forms that can be used by the cow's body to sustain its functions and produce milk. Chemical analysis of these feeds shows that the main elements- protein, minerals, carbohydrates, and fats- are present in them in varying degrees. Scientific investigations also give us the average digestibility of these elements in the feeds. The process of digesting plant food elements into forms that can be assimilated and used by the animal's body is very complicated. In many of the coarser feeds the real food elements are covered with a woody fibrous coat, which makes it difficult for the digestive juices to act on them. The cow's digestive track, however, is especially adapted for its work. The first stomach acts as a storage place where the food is moistened, and certain bacteria act on it to aid in breaking down the fiber. The second stomach forms the food into masses of a suitable size, which are forced back to the mouth to be thoroughly chewed. Next, the food is sent to the third stomach, where it is further broken down, and then to the fourth or true stomach. By the time the food reaches the fourth stomach it is in a liquid form, and can be acted upon by the various digestive juices. The digestive juices are produced by glands which manufacture enzymes. The enzymes break the food elements down to their simplest form, and assimilation takes place by means of blood and lymph vessels. In the production

of milk the food elements are carried by the blood stream to the milk glands in the udder. These glands have the power of taking the food from the blood and manufacturing milk.

Nature's feed for cows is grass, but unfortunately we can supply grass only a few months of the year. The dairyman's problem is to find proper substitutes. To do this he must understand the qualities that make grass an ideal feed. In the first place, grass is bulky, and so fills the pouch, or first stomach; second, it is succulent, and therefore it is easy to digest; third, it is palatable, and thus encourages the cow to consume large quantities; and last, it contains all the necessary food elements in the proportion the cow needs. Winter feeding problems, then, consist in supplying feeds that have bulk, succulence, palatability, and nutrients in the proper proportions.

An analysis of most farm feeds and farm rations show that one or more of these essential requirements may be lacking. Successful dairy feeding requires careful selection of crops to meet the specific requirements. Crops, such as alfalfa and clover, are rich in protein and minerals. Corn, in the form of silage, is much more palatable and succulent than corn fodder. One mill feed may be priced cheaper per hundred pounds than another but it may be the most expensive when compared with others on the nutrient

cost basis.

To have a clear understanding of the fundamentals of dairy feeding we must understand :

1. Various uses the cow makes of her feed
2. Nutrients in feeds
3. Digestion of feeds
4. Crops suitable for feeding

UNIT I

Basis of Feeding

1. Use cow makes of her feed
   - A. Body maintenance
   - B. Development of unborn calf
   - C. Growth
   - D. Fat
   - E. Milk production
2. Chemical compounds in a cow's body
   - A. Skeleton
   - B. Body tissue
   - C. Hair, skin, horns, hoof
   - D. Blood
   - E. Milk
3. Principal nutrients in feeds
   - A. Nature of protein, carbohydrates, fat and minerals
   - B. Changing fat to carbohydrates

C. Importance of protein and total digestible nutrients

D. Ratio of protein to total digestible nutrients

4. Digestion of food

A. Digestive tract of ruminants

B. Protein

C. Carbohydrates

D. Fats

5. Composition and characteristics of common feeds

A. Nature's feed- grass

1. Value of bulk

2. Value of succulence

3. Nutrients

4. Palatability

B. Winter feeds substituted for grass

1. Succulent roughages

2. Legume roughages

3. Non-legume roughages

4. Grains

5. Mill feeds

Standards

1. Compare the efficiency in use of food of the original cow with our present day dairy cow.

2. How are the percentages of nutrients in feeds found ?

3. How does the plant obtain its nutrients ?

4. Compare the digestion of the simple stomach with the digestion of ruminants .
5. What is the difference between total digestible nutrients and total nutrients ?
6. How does palatability aid in digestion ?
7. Illustrate by an equation how the nutritive ratio of corn is determined.
8. What are the two main reasons for the low average butterfat production for cows in Minnesota?
9. What are the five most important things to consider in selecting feeds for dairy cattle ?
10. Explain why alfalfa at $12.00 per ton might be a cheaper feed than timothy at $8.00 per ton .
11. If a cow producing 30 pounds of milk a day requires 2.5 pounds of protein daily in her feed, show how the protein is used.
12. If nature's feed for cows is grass why should the dairyman strive for a variety of feeds for his cows ?

References

Henry & Morrison- Feeds and Feeding. ch. 1 to 3, 9to 16.
Eckles- Dairy Cattle & Milk Production. ch. 28 to 32.
Van Pelt- How to Feed the Dairy Cow. ch. 1 to 23.

Pupil Activities

1. Classroom work
   - A. Read preview carefully to get purpose and objectives of the unit of work.
   - B. Use outline as a guide to prepare written report.
   - C. Take notes on all points brought out in discussion or demonstrations in class which could be used in your report.
   - D. Look up each topic as you come to it. Gather all the facts you can, and then explain it in your own words.
   - E. Work in drawings and illustrations in your report, wherever they seem appropriate.
   - F. Observe digestive track of any animals butchered on farm.
   - G. Assist in gathering and preparing samples for exhibit of common feeds.
   - H. Turn in written report of standards with your outline.
   - I. Be prepared to give oral report covering the entire unit of work.
2. Demonstration suggestions
   - A. Mineral content of milk
     1. Weigh sample of milk
     2. Apply heat
     3. Weigh, ask, and determine mineral content

B. Dry matter in feeds

1. Weigh sample of feed (exsilage)
2. Dry; use heat to complete process
3. Weigh sample and determine percent of dry matter in feed

Desirable Outcomes

1. A clear conception of the chemical processes feeds go through to be transformed into heat, energy, body maintenance, and milk production.
2. A realization of the importance of protein and minerals in the ration.
3. An appreciation of technical skill that has been developed in measuring the digestibility of feeds.
4. The ability to understand the analysis of a commercial feed, and be able to evaluate it.
5. The ability to select crops to grow on the farm that will be most productive in supplying proper nutrients for the dairy herd.
6. Knowledge of the chemical composition of milk.
7. An understanding of the value of bulk and succulence in dairy feeding.
8. An understanding of the cause of common diseases and how to cure them.

EXAMINATION

Completion Questions

Name _____
Perfect Score 115
Student Score _____

1. The economical production of milk depends largely upon _____and _____ .
2. Surplus feed is stored in the cows body in the form of _____ .
3. Our main purpose in feeding dairy cattle is to have them use it for _____ .
4. One of the first uses a cow makes of her feed is to _____ .
5. Cows will continue to use their feed for growth until they are _____old.
6. Another use the cow makes of her feed is to _____
7. The principal compounds found in a cow's body are _____ _____ _____and _____.
8. Blood is composed chiefly of water and _____.
9. The skeleton is composed chiefly of _____.
10. Body tissue is mainly _____.
11. The composition of milk is water 87% _____% _____% _____% and _____%
12. The principal nutrients in feeds which supply the needs of a cow's body are _____ _____ and _____
13. The principal nutrient that is liable to be lacking in farm grown feeds is _____.

14. Carbohydrates are composed chiefly of the elements _____, _____and _____.
15. The main element in protein is _____.
16. To change carbohydrate to fats, the carbohydrates should be multiplied by _____.
17. Total digestible nutrients means the total digestible _____, _____, and _____.
18. The protein ratio is the ratio of protein to _____ and _____.
19. A good dairy ration should have a protein ratio of 1 to _____.
20. A cow has teeth on the _____jaw.
21. When a cow chews her cud she is _____.
22. Bile supplies the _____which aids in the digestion of _____.
23. Pepsin aids in the digestion of _____.
24. Trypsin aids in the digestion of _____.
25. Invertase aids in the digestion of _____.
26. Eripsin aids in the digestion of _____.
27. Most of the digestion of food occurs in the _____.
28. A cow has _____stomachs.
29. The capacity of a cow's first stomach ranges from _____to _____gallons.
30. Besides the food nutrients which grass contains it is noted for its succulence _____and _____.

31. A cow uses her feed for milk production, _____ _____, _____, and _____.

Multiple Questions.

32. Succulent roughages are corn fodder, silage, alfalfa hay.

33. Legume hay is rich in fat, carbohydrates, protein.

34. The most common legume crops grown in this county are clover, timothy, alfalfa, and grass.

35. Non-legume roughages are corn fodder, silage, clover, timothy hay.

36. The two mill feeds that are richest in protein are bran, shorts, linseed meal, cottonseed meal.

37. The outstanding characteristic of bran is that it is high in protein, constipating, palatable, succulent.

38. The main characteristic of corn fodder is that it is laxative, high protein, high in fat content.

39. Alfalfa ranks high as a dairy feed because of its high protein content, palatability, mineral content, crude fiber content, richness in fat.

40. Timothy hay makes a poor dairy feed because it is unpalatable, succulent, laxative.

41. Feeds should be bought on the basis of cost per ton, cost per pound of digestible nutrients.

42. Ground oats makes a good dairy feed because it is high in fiber content, rich in mineral, relatively rich in protein.

43. A good dairy ration should have a ratio of protein to total digestible nutrients of 1:4, 1:8, 1:10, 1:12.
44. Nutrients are enzymes, food elements, minerals.
45. Palatable feed is one that is rich in protein, tastes good to the animal, contains vitamins.
46. A cow producing 30 pounds of milk per day will require about 1 pound, 2.5 pounds, 5 pounds, 8 pounds of protein in the daily ration.
47. A variety of grains is desirable in the ration to supply a variety of vitamins, a variety of proteins, a variety of carbohydrates.
48. The protein content of milk is about 1.5% , 3.3%, .2% , 5%.
49. The protein content of corn is about 7.5%, 12%, 30%.
50. The protein content of timothy hay is about 3% , 15%,20%

Matching Questions

Write in the parenthesis the numbers of the three outstanding characteristics of the feeds.

Illustration

Feed	Answer	Characteristics
Rye straw	(12-15-11)	

Indicating that rye straw is unpalatable, low in protein, and is high in crude fibre.

Feed	Answer	Characteristics
51. Alfalfa hay	( )	1. High protein content

52. Clover hay	(	)	2. High mineral content
53. Timothy hay	(	)	3. High fat content
54. Wild hay	(	)	4. High carbohydrate cont.
55. Corn fodder	(	)	5. Digestible nutrients high
56. Corn silage	(	)	6. Palatability
57. Oat straw	(	)	7. Bulky feed
58. Barley straw	(	)	8. Light feed
59. Roots	(	)	9. Succulent
60. Barley	(	)	10. Laxative
61. Corn	(	)	11. High crude fiber
62. Oats	(	)	12. Unpalatable
63. Wheat bran	(	)	13. Low mineral content
64. Middlings	(	)	14. Constipating
65. Linseed meal	(	)	15. Low protein content

UNIT II

FEEDING

Unit Objectives

1. To learn how to feed dairy cows
2. To learn how to feed calves and heifers to keep them in a healthy growing condition
3. To learn how to feed the sire properly

Specific Objectives

1. To understand how balanced rations are formulated
2. To know how to determine the feed requirements of a cow producing milk
3. To know how to prepare balanced rations for dairy cows
4. To know the limitations of a balanced ration
5. To know how to correct mineral deficiencies in a farm ration
6. To know how to feed a calf with skim milk in the ration
7. To know how to feed a calf without skim milk in the ration
8. To know how to feed at calving time
9. To learn what farm crops produce the most economical farm rations

PREVIEW

Perhaps you have noticed recommended rations for dairy cows in farm magazines or dairy bulletins. These rations are, as a rule, formulated by experts in dairy feeding. How do these experts determine whether or not each ration is good ? How can you judge whether it is suitable for your herd ? With very little effort you can learn not only to judge the value of suggested rations, but also to formulate them for your own herd.

The problem is simply to determine the amount of nutrients the cow will need for her body, and for the number of pounds of milk she is producing, and then to assemble a variety of feeds that will satisfy these requirements. Numerous scientific investigations have provided us with all the necessary information. For example, the average thousand pound cow will require approximately eight pounds of total digestible nutrients to supply her daily body requirements. Because of the fact that protein seems to be the element most frequently lacking in our common farm feeds, it is customary to figure protein requirements as well as total food requirements. According to investigations the daily protein requirements for the cows body is seven-tenths of a pound. Feed requirements for milk have also been estimated, and tables prepared, showing protein and total digestible nutrient requirements for each pound of milk of various tests of butterfat. To

obtain, then, the total amount of protein and digestible nutrients required per day for a cow, one needs merely to make use of the tables already prepared. To arrange a list of feeds, and the amounts of each, also resolves itself simply to the use of tables and a little arithmetic. Tables have been prepared, showing the digestible nutrients of practically all feeds. With the aid of a few general rules, concerning amounts of roughage and grain to feed, you can readily make up your own rations.

It must be remembered, however, that satisfying protein and total digestible nutrient requirements is not the only problem of dairy rations. Mineral deficiencies often occur, and must be combatted with proper mineral feeds. Salt and water requirements are also important, and palatability must be considered at all time.

The problem of summer feeding is often a serious one. Suitable grass for pasture should be selected and properly grown; grain feeding is often necessary, not only to keep up the production of milk, but to keep the cow in proper flesh. Proper rations for the dry cow is important because of its effect on milk and test yield during the ensuing lactation period.

Much of the success of future dairying depends on the proper feeding of the calves. Where whole milk is sold this problem becomes a difficult one, due to the shortage

of milk. Where calves can be raised on skim milk the task is much easier, but care must be taken to feed properly to keep the calves in a healthy and growing condition. One of the reasons for the lack of size in our dairy cows is improper feeding of calves and heifers. The heifer requires a grain ration, especially at the time of weaning.

Proper rations for the sire are necessary to keep him in proper breeding condition. Overfeeding the sire may make him a non-breeder, causing a loss to the owner; underfeeding may result in weak and sickly offspring.

To obtain a clear understanding of feeding one must know :

1. How to prepare a balanced ration
2. What crops to grow for best results
3. How to supplement short pastures with special crops
4. How to feed calves and heifers to keep them in a healthy growing condition
5. How to feed the sire to good advantage

UNIT II

Feeding

1. Winter feeding
   - A. Amount of feed
   - B. Maintaining summer conditions
   - C. Morrison feeding standards

1. Maintenance requirements for cow's body
2. Maintenance requirements for milk
3. Calculating rations

D. Rules for practical feeding

E. Water

F. Salt

G. Mineral deficiencies

2. Summer feeding

A. Pastures

B. Supplementing short pastures

1. Silage
2. Grain
3. Soilage

3. Feeding the dairy calf

A. Raising calves on skim milk

1. Comparison of feeding value of skim milk and whole milk
2. Importance of milk
3. Rations for calves
4. Importance of sanitary conditions

B. Raising the dairy calf when whole milk is sold

1. Methods
2. Results
3. Grains and roughages

4. Feeding the dairy heifer

A. Nature of growth

B. Relation of size of cow to total milk production

C. Feed and care of heifer after weaning

1. Winter rations

2. Relation of winter rations to summer gains

3. Age at which to breed

4. Care of heifer before calving

5. Feeding the sire

Standards

1. Illustrate by diagram the economy of liberal feeding.
2. What is the average annual feed requirement for a cow ?
3. What is the yearly cost of feeding a cow, basing costs of feed on local prices ?
4. Compare the value for cows of wheat, bran, cottonseed meal, linseed meal.
5. Why is corn silage an excellent feed for dairy cows ?
6. Would roots or corn silage be most practical on your farm ?
7. How should cows be fed and cared for before calving and at calving time ?
8. How many pounds of grass does a cow need to supply her body requirements if she is producing around 30 pounds of milk ?
9. What saving in grain is accomplished by feeding roughages

instead of non-legume roughages ? Illustrate by showing rations.

10. Prepare a ration for your best cow. State production.

11. Prepare a ration for your poorest cow. State production and give reasons why you should feed your cows according to production.

12. List the crops you believe you should grow on your farm for your dairy herd. State number of acres required for each crop to supply the annual need.

13. Why are milk records an aid in proper feeding ?

14. What benefits if any would you expect from belonging to a cow testing association ?

15. How do your calves compare with the normal growth for their breed ?

16. Why would you limit the amount of silage in the sire's ration ?

References

Henry & Morrison- Feeds and Feeding. ch. 7-8-20-21-22 .

C.H.Eckles- Dairy Cattle & Milk Production. ch. 25-26-27.

H.G.Van Pelt- How to Feed the Dairy Cow. Intro ch. 35 .

H.G. Van Pelt- More Milk .

Eckles & Gullicksrud- Raising Dairy Calf when Skim milk is sold. Bulletin No. 215.

Eckles & Gullicksrud- Special Bulletins No. 108- No. 132.

Pupil Activity

1. Classroom work
   - A. Read extensively on the subject of feeding before starting to work out your report.
   - B. Study tables carefully so that you not only understand them, but can find quickly any information you need.
   - C. Obtain government bulletins on feeding for your home library.
2. Demonstration suggestions
   - A. Prepare talk on feeding to be given at a farmer's club meeting.
   - B. Prepare a feeding demonstration for cows or calves that could be used in club work.
   - C. Prepare a talk for the class on how you would feed your dairy herd.
3. Project suggestions
   - A. Keep a milk record of your herd. Weigh milk once a month and estimate animal production.
   - B. Keep a daily milk record of your herd for a year.
   - C. Keep a feed and milk record of your herd. Show feed cost per pound of milk or pound of butterfat.
   - D. Try feeding experiments that would be of a practical nature on your farm.

Desirable Outcomes

1. An appreciation of the value of balanced rations
2. The ability to read intelligently articles on dairy feeding
3. The ability to prepare individual rations for the home farm
4. An improved feeding practice developed on the farm
5. The ability to select dairy feeds on the basis of their feeding value rather than price per pound
6. The ability to keep accurate records of milk production and feed costs
7. The ability to think, talk, and act intelligently on feeding matters

EXAMINATION

True-False Questions

Name _____
Perfect Score 125
Student Score _____

( ) 1. A balanced ration is one that meets the requirements of the cow in character and quantity of nutrients.

( ) 2. Balance in ration refers to the proportion of the various nutritive elements.

( ) 3. If a ration is properly balanced nothing more is required to make it a good ration.

( ) 4. In order to feed successfully a ration should be calculated for every animal.

( ) 5. To calculate a ration it is necessary to know only the feed requirements of the cow.

( ) 6. The nutritive ratio is the proportion between the proteins and the carbohydrates plus fats.

( ) 7. The cost of the nutrients in rations is a simple matter to figure.

( ) 8. Feed should be selected on the basis of their cost per pound of digestible nutrients rather than on the cost of the feed per ton.

( ) 9. A mixture of concentrates is usually more palatable than one feed alone.

( ) 10. Palatability of a ration has no direct bearing on feeding results.

( ) 11. Roughages vary less in palatability than do concentrates.

( ) 12. Variety in feeds appears to be important in feeding dairy cows.

( ) 13. Corn silage, corn meal, corn gluten feed, and corn bran would supply sufficient variety.

( ) 14. A cow will soon tire of a ration consisting of three different grains.

( ) 15. Economically it is usually desirable that roughage furnish the largest possible proportion of the ration.

( ) 16. As production increases a larger proportion of total nutrients in the feed must come from concentrates.

( ) 17. Protein is particularly important for the high producing cow.

( ) 18. It is best to have the protein of the ration from one plant source.

( ) 19. The proportion of protein to carbohydrates and fat should be about 1:10 .

( ) 20. Proper mineral matter in the ration is as important as protein supply.

( ) 21. Calcium and phosphorus are the mineral elements most likely to be lacking.

( ) 22. The cow gets her calcium from concentrates.

( ) 23. Succulence is an aid to efficient digestion.

( ) 24. A cow should never be given quite all the roughage she will eat.

( ) 25. It is not advisable to vary the amount of roughages between cows in milk and dry cows.

( ) 26. The amount of grain fed should be varied according to the milk produced.

( ) 27. The increasing of the grain ration beyond the animal's need will decrease the amount of roughage eaten.

( ) 28. The feed given a cow is the main factor governing the amount of milk a cow will give.

( ) 29. The cow should be given a ration to supply the nutrients needed, as indicated by her present yield of milk.

( ) 30. The inherited capacity of the cow very largely determines the limits of grain feeding.

( ) 31. Good cows fed good alfalfa hay and corn silage alone may be expected to yield some profit.

( ) 32. Feeding cows as individuals is an economical process.

( ) 33. Individual feeding will probably require a larger total amount of feed.

( ) 34. Silage and hay should usually be given after milking.

( ) 35. It is practically impossible for a farmer to make up a good balanced ration from home grown feeds.

( ) 36. The legume hays are the cheapest source of home grown proteins.

( ) 37. A good practical rule is to feed all the roughage and grain a cow will eat up clean.

( ) 38. Cows should be given all the legume hay and succulent feed they will eat up clean.

( ) 39. In addition to good roughage the Guernsey or Jersey cow should receive one pound of grain mixture per day for each three pounds of milk produced each day.

( ) 40. The principal objection to commercial feeds at the present time is one of cost.

( ) 41. Stock foods are especially valuable for sick animals and those lacking in thrift.

( ) 42. Grinding feed for cows in milk is an economical practice.

( ) 43. Cows will not decline in milk flow so seriously during the summer if soilage crops are fed.

( ) 44. Corn is probably the most universal soiling crop used.

()) 45. Silage should never be used to supplement pasture when it is fed during the winter .

( ) 46. Corn in silage form will have less digestible nutrients than it has as soilage.

( ) 47. The outstanding value of the silo and use of silage is that all of the crop is utilized.

( ) 48. Silage is probably the best succulent feed for winter rations.

( ) 49. Exclusion of air is the chief factor in preventing spoilage in silage.

( ) 50. Corn should be put into the silo when the kernels are dented and glazed.

( ) 51. Corn is probably the best silo crop.

( ) 52. For the production of heavy yields the cow should be in high condition at calving time.

( ) 53. Just prior to parturition all feed should be withheld.

( ) 54. Following freshening the cow should not be allowed to eat much for several days.

( ) 55. The main value of feeding standards is that they serve as a basis for a good understanding of feeding problems.

( ) 56. The feeding standard does not recognize the importance of succulence in a ration.

( ) 57. The nutritive ratio is found by dividing the total digestible nutrients by the amount of protein.

( ) 58. Condition of flesh at calving time has little effect upon milk yield.

( ) 59. Freshening in a fat condition a cow will probably have a fat test above normal for the first month.

( ) 60. Cows should be turned out on pasture as soon as the grass starts in the spring.

( ) 61. There is no necessity for a calf having the first milk or colostrum.

( ) 62. The spring calf gets more advantage from pasture the first year than the fall calf.

( ) 63. If the cow's udder is caked the calf should be removed at once.

( ) 64. It is possible to raise as good a calf on skim milk as on whole milk.

( ) 65. Faulty methods of feeding have more to do with poor results than lack of whole milk.

( ) 66. The calf can be raised successfully on skim milk alone.

( ) 67. Grain is not absolutely necessary for success with skim milk calves.

( ) 68. After a calf is three or four days old, it should receive about a pound of milk per day for each 8 to 10 pounds of weight.

( ) 69. The calf should always be kept a little hungry.

( ) 70. As the change is made from whole milk to skim milk one should gradually increase the total amount of milk.

( ) 71. Over feeding is one of the most common causes of inferior calves.

( ) 72. Milk should be fed to calves at body heat.

( ) 73. It is a good plan to feed warm milk in the morning and cold milk at night.

( ) 74. Withstrong calves it is safe to change from whole milk to skim milk all at once.

( ) 75. The calf should be fed three times daily for the first two or three weeks.

( ) 76. Linseed meal is a valuable supplement to skim milk.

( ) 77. Pasture is better than hay for the calf under three months.

( ) 78. The foam on skim milk after separating has no harmful effect on the calf.

( ) 79. Regularity of feeding is not important in calf raising.

( ) 80. The principal difficulties in milk substitutes are lack of vitamins, proteins, and mineral matter.

( ) 81. The grain ration which has given good results should not be altered at weaning.

( ) 82. Three parts of each, cornmeal, ground oats, and wheat bran, and one part oilmeal makes a good grain mixture for the calf.

( ) 83. A calf should be fed about five pounds of grain per day by the time it is six weeks old.

( ) 84. The principal objection to alfalfa hay for calves is its laxative qualities.

( ) 85. Damp, dirty pens often result in calves contracting pneumonia.

( ) 86. Full growth is reached at an earlier age when the calf is liberally fed.

( ) 87. Calves after six months of age should be given an abundance of succulent roughages.

( ) 88. Proper proportion of proteins, carbohydrates, and fats will give a good heifer ration.

( ) 89. Rate of growth depends to a considerable extent upon the amount of nutrients received.

( ) 90. There is a special danger of vitamin shortage for heifers on pasture.

( ) 91. The problem of feeding heifers is mainly one of winter feeding.

( ) 92. Corn is a good source of protein for the heifer's ration.

( ) 93. Plenty of alfalfa hay will produce normal growth in heifers.

( ) 94. Age at which to breed heifers varies with the breed.

( ) 95. A liberal grain ration hastens sex maturity.

( ) 96. A tendency for constipation in the heifer before calving should be guarded against.

( ) 97. Overfeeding the sire may result in loss of breeding power.

( ) 98. A sire should receive sufficient grain to keep him in good condition.

( ) 99. Timothy hay is a better roughage for the sire than alfalfa hay.

( ) 100. Silage is a poor feed for the sire.

Completion Questions

101. The digestible crude protein requirement of an average 1000 pound cow for body maintenance is _____.

102. A 1000 pound cow giving 30 pounds of 5% milk will require about _____pounds of protein daily.

103. The total digestible nutrients for the above cow would be about _____pounds.

104. A Guernsey cow producing 25 pounds of milk daily should receive approximately _____pounds of grain per day.

105. A Holstein cow producing 40 pounds of milk daily should receive approximately _____pounds of grain per day.

106. The best way to select a dairy cow is by her _____.

107. The first stomach acts as a _____ for the bulky feeds.

108. Feeds like cottonseed meal, linseed meal, water, and rechewed "cud" pass right through the slit of the first stomach and go into the _____stomach.

109. Authorities say that a cow should drink about _____ times as much water every day as she produces milk.

110. A cow requires about _____ounces of salt per day.

111. A heifer making below normal gains in growth during the winter will make _____normal gains on good pasture during the summer.

112. The length of time a cow should milk before she goes dry depends on her breeding and her _____.

113. A practical method of determining the grain requirements of a cow is to feed _____pounds of grain daily to each pound of butterfat produced per day.

114. The most economical pasture for our community is _____.

115. The crop that will produce the most digestible protein per acre in our community is _____.

Problem

116-125. Prepare a ration for a 1000 pound cow, giving 30 pounds of 5% milk per day. Show total feed requirements of cow, and digestible nutrients of the feeds.

UNIT III

CROP PRODUCTION

Unit Objectives

1. To learn how to plan a crop rotation system that would meet the requirements of the farm.
2. To know how to grow alfalfa
3. To know how to estimate feed requirement of stock
4. To know how to improve the fertility of the soil

Specific Objectives

1. An understanding of soil types, composition, and factors affecting its fertility
2. A knowledge of fertilizers, value, rate of application, and methods of applying them
3. The ability to evaluate fertilizer formulas
4. To know what varieties of grain are best suited for the farm
5. To know the rate of planting, cultural methods, and proper time to harvest crops
6. An understanding of the nitrogen cycle and the value of nitrogen-fixing bacteria
7. To know the common crop diseases and methods of control

PREVIEW

Our present price situation makes it almost compulsory for the farmer to raise practically all of his feed for his dairy herd. If he is unable to do this he should ask himself the following questions : First- Have I too many cows for the size of my farm ? Second- Am I growing the right kinds of feeds ? Third- Is my crop production below normal ?

If after a careful analysis of his conditions the farmer does decide he has too many cows, it would be far better for him to cull out the poorest producers and reduce his herd to the proper size than to buy feed. In most cases, however, it is the improper planning or lack of planning that causes feed shortages.

As a rule, it is more expensive to buy roughage feeds than concentrates; consequently enough acres should be set aside for roughage production to satisfy all needs before any acres are used for grains. The type of roughage selected also determines the number of acres required. Roughages should be selected on the basis of quantity and quality of feed units. On this basis alfalfa and corn (in the form of fodder or silage) excel all other crops.

The acres used for pasture may be reduced by proper methods of pasture improvement, or by growing special pasture crops, such as sweet clover. On an acre basis sweet

clover will support more head of stock than any other pasture crop.

For grain, barley and oats are usually the most satisfactory. These crops may be grown together, provided the right varieties have been selected to get even ripening.

Careful planning is necessary in working out a satisfactory rotation plan for these crops. By proper rotation the fertility of the soil is maintained and even improved. In some cases rotation needs may even decide what crop to grow, as in the case of clover and alfalfa. Alfalfa does not work into rotation plans very well, because a good field should be left for four or five years. Clover fits nicely into rotations, and comes fairly close to equalling the feed and soil improvement value of alfalfa.

The dairyman's crop production problems may be summarized as follows : (1) He must make a rough estimate of the amount of feed he will need ; (2) He must select the feeds to be grown on the basis of quantity and quality yield; (3) He must develop a rotation system that will satisfy his needs, fit in well with his soil conditions, and improve his soil.

UNIT III

Crop Production

1. Basis for selecting crops
   - A. Feeding value
   - B. Soil conditions
   - C. Rotation plans
2. Total feed requirements for dairy herd
   - A. Roughage
     1. Hay
     2. Corn fodder or silage
   - B. Grain
     1. Barley
     2. Oats
   - C. Pasture
3. Alfalfa Production
   - A. Productive soil
   - B. Well prepared seed bed
   - C. Inoculation of seed
   - D. Weather conditions
   - E. Management of old alfalfa fields
   - F. Curing and handling crop
4. Clover production
   - A. Soil requirements
   - B. Soil preparation
   - C. Methods of planting

D. Cutting and curing crop

5. Corn growing

A. Silage corn

1. Varieties
2. Fertilizers
3. Soil preparation
4. Cultivation
5. Maturity-time to cut
6. Factors affecting feeding value

B. Corn fodder

1. Varieties
2. Planting time, rate.
3. Harvesting
4. Curing

6. Grain production

A. Barley

1. Varieties
2. Soil preparation
3. Rate of planting
4. Harvesting

B. Oats

1. Varieties
2. Soil preparation
3. Rate of planting
4. Harvesting

C. Oats and barley mixture

1. Advantages and disadvantages
2. Varieties
3. Rate of mixing seed
4. Rate of planting

7. Grain diseases
8. Pasture
   A. Care of old pastures
   B. Methods of preparing new pastures
      1. Varieties adapted to local conditions
      2. Good seed
      3. Planting methods

Standards

1. Make a list of the crops grown in your community and state what you believe is the average yield per acre.
2. Show in chart form the protein and total digestible nutrients produced per acre of the above crops.
3. Judging from the above results what crops should you grow on your farm ?
4. Explain what effect nitrogen, phosphorus, and potash have on plants.
5. Compare the value of manure and commercial fertilizers.
6. Explain factors to consider in selecting seed corn.
7. Suppose you are in the market for 50# of alfalfa seed. Your neighbor, who has a good Grimm alfalfa field,

offered you some seed from this field at 40 cents per pound. According to his test it was 85% germination and about 87% purity.

Your local dealer has some Grimm alfalfa seed at 48 cents testing 98% germination and 97% purity.

A big seed company in the East offered you some fine Grimm seed at 50 cents testing 99% germination and 99% purity.

Which seed would you buy and why ?

8. Why is it one farmer can get a good stand of alfalfa with a nurse crop while his neighbor has a complete failure ?

9. If a farmer objected to packing his seed bed for alfalfa, because it was heavy soil and would become hard and baked, what would you tell him ?

10. If a farmer had light sandy soil and only an old log roller, how would you advise him to pack his soil ?

11. If a farmer told you he would like to top dress his alfalfa field with manure, but that he was afraid there were weed seeds in it, and also that the manure would be raked up in the hay the next year, what would you advise him to do ?

12. If you had an old alfalfa field that wasn't doing very well, what treatment would you give it to bring it back to good production ?

References

Cox - Crop Production and Soil Management. ch.1 to 16,18, 27 to 31.

W.W.Weir- Productive Soils. ch. 7-8-10.

Whitson & Walster- Soils and Soil Fertility.

E.C.Parker- Field Management and Crop Rotation.

K.C. Davis- Field Crop Enterprise.

Piper - Forage Plants and their Culture.

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Pupil Activities

1. Classroom work
   - A. Prepare a chart showing feed requirements of your stock.
   - B. Draw a plan of your farm and indicate a crop rotation system that would fit in well with your conditions.
   - C. Draw a plan of your farm as you would like to have it five years from now. Show field reorganization, and cropping system.
2. Demonstration suggestions
   - A. Demonstrate treating grain for smut.
   - B. Identify grass seed.
   - C. Judge seed corn and small grains.

D. Demonstrate rag doll tester.

E. Have weed seed identifying contest.

3. Project suggestions

A. Keep cost account records of all crops grown for dairy herd.

B. Run an alfalfa experiment with and without a nurse crop.

C. Lay out a series of fertilizer experiments on several crops, showing rates of application and results.

Desirable Outcomes

1. A practical crop rotation plan developed and put into operation on every farm.
2. Alfalfa acreage increased on the farms.
3. A sweet clover pasture started on each farm where it is practical.
4. All small grain seed treated for smut
5. Barberry plant eradicated on every farm
6. A knowledge of the feeding value of the various crops at different stages of maturity

EXAMINATION

Completion Questions

Name _____
Perfect Score 100
Student Score _____

1. The proper rate of seeding alfalfa is from _____lbs.
2. The proper rate of applying gypsum is _____per acre.
3. The best weather for sowing alfalfa is _____.
4. The four important things to know concerning alfalfa seed are _____ _____ _____ _____.
5. Alfalfa seed weighs _____ per bushel.
6. The best time to cut alfalfa is _____.
7. Alfalfa excels all other roughages in _____.
8. The majority of the food value in alfalfa hay is in the _____.
9. A good alfalfa field should yield _____tons.
10. For every cow a farmer owns he should have _____ acres of alfalfa.
11. The common farm legume crops are _____ _____.
12. Soil losses are caused by _____ _____ _____.
13. Fertility in soil is gained by _____ _____ _____.
14. Oats do best in a cool _____climate.
15. The disadvantages of spring plowing are _____ _____ _____
16. The advantages of fall plowing are _____.
17. Marl beds are formed by deposits of _____by _____.

18. Marl is used as a fertilizer to supply _____.
19. The legal weight of a bushel of shelled corn is ____.
20. The legal weight of a bushel of corn on the cob is _____.
21. The legal weight of a bushel of blue grass is _____.
22. The legal weight of a bushel of clover seed is ____.
23. The legal weight of a bushel of alfalfa seed is ____.
24. The legal weight of a bushel of oats is _____.
25. The legal weight of a bushel of barley is _____.
26. A fertilizer with the formula 4-8-6 contains ____% nitrogen, ____% phosphorus, and ____% potash.
27. Stinking smut may be controlled by _____treatment.
28. The Government is trying to control rust by eradicating the _____.
29. When planting oats and barley together the mixture for seed should be ____lbs. of oats ____lbs. barley.
30. A cow will need about _____lbs. of silage per year.
31. When silage is included in the ration a cow will require about _____lbs. of hay.
32. A good rotation plan for your farm would be _____ _____.

True-False Questions

( ) 33. Origin of seed is more important than variety.
( ) 34. Common alfalfa seed is as good as Grimm here.
( ) 35. Spring plowing of sod ground is as good as fall plowing.

( ) 36. It is more important to have the soil well packed than to have a fine seed bed.

( ) 37. Rain just before planting is better than just after.

( ) 38. Spring toothing a field good once a year is enough.

( ) 39. Alfalfa fields should be spring-toothed three times a year.

( ) 40. If you can spring tooth only once a year, the best time is after the second crop.

( ) 41. Soil inoculation is more practical than commercial inoculation.

( ) 42. Soil inoculation is cheaper than commercial inoculation.

( ) 43. Run down, heavy land is better than light sandy land even if it is in good condition.

( ) 44. Poorer soils should not be planted as heavy as the richer soils.

( ) 45. Deep spring toothing is liable to injure the alfalfa crowns.

( ) 46. Spring plowed ground should be seeded earlier than fall plowed ground.

( ) 47. June grass is as serious a pest to alfalfa as quack grass.

( ) 48. Alfalfa leaf rust spoils the hay for dairy cattle.

( ) 49. Dodder roots spread all over the ground and choke out alfalfa plants.

( ) 50. Dodder is a serious pest because it is injurious to cattle.

( ) 51. The most serious pest to alfalfa around here is the pocket gopher.

( ) 52. Alfalfa cannot be grown on acid soils.

( ) 53. June grass and alfalfa mixed makes a better pasture than alfalfa alone.

( ) 54. Feeding fresh cut alfalfa to dairy cows is very likely to cause bloat.

( ) 55. Alfalfa meal is made by grinding alfalfa hay.

( ) 56. A thick stand of alfalfa will produce more seed under similar conditions than a medium to thin stand.

( ) 57. Wet weather reduces the amount of seed produced by alfalfa plants.

( ) 58. Average yields of alfalfa seed per acre range from two to five bushel per acre.

( ) 59. Cross pollination increases alfalfa seed yields by about 30%.

( ) 60. Bumble-bees are better able to cause cross pollination of alfalfa than honey-bees.

( ) 61. Alfalfa seed will not germinate after it is three or four years old.

( ) 62. The best alfalfa seed is plump and of a yellowish color.

( ) 63. Dead alfalfa seed turns reddish brown.

( ) 64. Dodder is spread from one alfalfa field to another by birds and the wind.

( ) 65. The best way to select seed corn is to select the best looking ears from the bin.

( ) 66. If corn is to be used for silage, seed can be saved by cutting selected stalks and shocking them up at one side.

( ) 67. The average yield of corn per acre for this community is about 25 bushels.

( ) 68. There is more demand for good seed in the fall than in the spring.

( ) 69. Seed should be adaptable to the soil and climate in which it is to be used.

( ) 70. Seed used for ensilage production should be planted two or three weeks earlier than the variety grown for grain.

( ) 71. Seed corn should be left in the husks to dry out slowly for at least a week.

( ) 72. The vitality of seed is often reduced by leaving it in a sack or pile for even a day after gathering.

( ) 73. Purity tests show the per cent of germination.

( ) 74. If heat is employed in a poorly ventilated room it will do the seeds more injury than good.

( ) 75. Freezing injures seed ears, even when thoroughly dry.

( ) 76. When seed corn contains about 15 or 16% moisture, it is dried out enough.

( ) 77. When seed corn is first picked it contains about 20% moisture.

( ) 78. Minnesota #13 is a recommended variety for Minnesota.

( ) 79. Heavy seed is usually good seed.

( ) 80. Sweet clover seed is shaped like a bean with the point of attachment near the center.

( ) 81. One pound of alfalfa seed, if evenly sown on an acre, would average over five seeds per square foot.

( ) 82. Hard seed refers to alfalfa seed having a thick seed coat, which will not take up water and sprout for a long time.

( ) 83. Grimm alfalfa is the best seed for this region.

UNIT IV

DAIRY HERD MANAGEMENT

Unit Objectives

1. To learn how to manage the dairy herd effectively
2. To understand breeding principles
3. To learn how to select good stock
4. To know how to produce clean wholesome dairy products

Specific Objectives

1. To understand the laws of heredity
2. To be able to evaluate a pedigree
3. To know the factors that affect the quantity and quality of milk production
4. To know how to care for the common diseases
5. To develop an understanding of, and a cooperative spirit for, government measures in controlling such diseases as tuberculosis and abortion.
6. To appreciate the fact that managing a dairy farm is a real business, and that business principles should be applied

PREVIEW

Success in the dairy business depends chiefly on three main factors, namely, heredity, feeding, and management. The relative importance of each may be illustrated by picturing an equilateral triangle.

Heredity may be regarded as the base upon which feeding and management rest. With a poor inherited ability to produce milk, a cow cannot be made to produce a large amount no matter how well she is fed and cared for. The same result holds true with the other factors. A well-bred cow cannot be a high producer without proper feed and proper care.

It is within the last one hundred years that man has made great advancement in the knowledge of breeding. Mendel laid the basis for this advancement through his experiments with peas. The essential feature of Mendel's law is that hereditary characters are usually independent units. These unit characters are present in both male and female reproductive cells; and when the female cell is fertilized by the male, a fusion of the male characters occurs with the female characters. Some of the characters dominate and conceal other characters, and are called dominant, others are called recessive. When Mendel crossed tall peas with short peas all of the first cross were tall, showing that the unit character "tallness" was dominant.

However, when this second generation was crossed again, three were tall and one was short. This shows that the plant possessed the character "shortness", but it did not appear until the third generation. We have many examples of dominant and recessive characters in animal breeding; for instance when a Hereford is crossed with an Angus the offspring has a white face and black body, illustrating that the white face of the Hereford is dominant, while the black body of the Angus is dominant over the red body of the Hereford. An example of the recessive character segregated and appearing is occasionally noticed with the Holstein breed. Originally Holsteins were red and white as well as black and white . Our present day Holsteins are black and white, but occasionally a red and white calf is dropped.

Our knowledge of breeding is still limited, but a great advancement has been made since Mendel's time. Breed associations have been organized and records kept of pure-bred stock. It is necessary for the breeder to understand and be able to evaluate pedigrees. To do this requires a knowledge of breeding principles.

In buying stock the dairyman is faced with the problem of proper selection. The most reliable method of selecting good producers is by their milk production records. Unfortunately, authentic milk records are seldom

available, so the prospective buyer must rely on certain dairy qualities, such as type, conformation, constitution capacity, and mammary development. To be a good judge of dairy cows one must have a mental picture of the ideal cow firmly fixed in his mind; he must know what to look for and where to look for each of the dairy qualities.

Frequently, disease and injuries cause serious losses in a dairy herd. A knowledge of diseases and control methods may be a great aid in preventing many of these losses. Such diseases as abortion and tuberculosis are a serious menace to the health of the public. A progressive dairyman should know the danger of having these diseases in his herd, and be willing to cooperate with the authorities in stamping them out.

Where the dairyman is selling whole milk directly to consumers, he should realize his responsibility for selling clean wholesome product. Bacteria multiply rapidly in milk if not controlled; therefore, it is of vital importance to keep the milk at the proper temperatures. Every precaution should be taken to prevent harmful bacteria from entering the milk. Clean hands, utensils, and barns, and disease free workers are absolutely necessary.

Besides business ability the manager of a dairy farm must have a working knowledge of bacteriology, genetics, veterinary practice, stock judging, and marketing.

UNIT IV

Dairy Herd Management

1. Selection of individual
   - A. By milk and butterfat production
     1. Records
     2. Testing
   - B. By judging dairy qualities
     1. Style, type, and general appearance
     2. Dairy conformation
     3. Constitution
     4. Capacity
     5. Mammary development
2. Breeding
   - A. Principles
     1. Mendel's law
     2. Variation
     3. Heredity
     4. Sex determination
     5. Inbreeding
     6. Linebreeding
   - B. Herd improvement
     1. Keeping pure bred sire
     2. Joining bull associations
     3. Weeding out unprofitable cows
     4. Selecting heifers

3. Problems in handling
    A. Kindness and regularity
    B. Dehorning
    C. Fly annoyance
    D. Preparing cow for lactation period
        1. Need of rest period
        2. Care of cow at calving time
4. Milking factors influencing the quantity and quality of milk
    A. Milking
        1. Proper methods of hand milking
        2. Milking machine
        3. Number of milkings per day
    B. Factors affecting quantity and quality
        1. Breed
        2. Feed
        3. Seasonal influences
        4. Stage of lactation
        5. Age
5. Common diseases of dairy cattle
    A. Medical equipment for farm
    B. Bacterial and fungus diseases
    C. Bloat
    D. Udder troubles
6. Producing sanitary dairy products

A. Standards desired in milk

B. Methods to obtain them

C. Grades of cream

D. City milk ordinance

1. Health requirements

2. Barn requirements

3. Sanitary conditions required on farms

4. Bacterial count

7. Marketing Dairy Products

A. Cooperative creamery

B. Centralizers

C. Milk routes

Standards

1. What are the four essential factors in the production of milk of low bacterial content ?

2. Estimate yearly milk production of each one of your cows from basis of a day's production.

3. Explain how cows are tested for abortion.

4. What are the objections some farmers have to Federal T.B. testing ? Do you believe the Iowa farmers were right in resisting the Federal plan for testing ?

5. Many people are afraid to buy raw milk. What kind of a sales talk would you give to a prospective customer to get his trade ?

6. Considering all factors, do you believe it pays to sell bottled milk ? Give reasons.
7. Estimate as accurately as you can the yearly costs of keeping the herd sire . Does it pay to have a good one ? Why ?
8. At what age should the heifers be bred ?
9. Explain free martin, prepotency, outcrossing, line-breeding, and nicking.
10. What will a pedigree show ? What does it fail to show ?

References

Eckles- Dairy Cattle and Milk Production. ch. 13-15-21-22-23.
Henry & Morrison- Feeds and Feeding. ch. 20.
Walters & Kind- Animal Husbandry. ch. 36-37-38-39-40.
Gay- Principles and Practice of Judging Livestock.
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U.S.D.A. Bulletin No. 642. Washington, D.C.
University of Minnesota- Special Bulletin No. 152.

Pupil Activities

1. Classroom work
   A. Study judging cards in preparation of judging trips.

B. Form a mock bull association in class. Work out by laws and elect officers.

C. Work out management program for your herd, and present to class for discussion.

2. Project suggestions

A. Keep farm account records of your farm for a year. Show percentage of income from your farm, due to the dairy enterprise.

Desirable Outcomes

1. The ability to judge dairy cattle
2. An understanding of the problems and complications that arise in the breeding of stock
3. The ability to select a sire that will improve the herd
4. The ability to treat and care for the more common dairy ailments
5. The ability to produce on your farm sanitary dairy products, that will satisfy all health requirements.
6. Sufficient knowledge and ability sufficiently developed to enable you to assume at least some of the management duties of the dairy herd

EXAMINATION

Completion Questions

Name _____
Perfect Score 115
Student Score _____

1. The most important part of a dairy cow is her _____.
2. The udder of a dairy cow should be attached _____ in the rear, be _____on the bottom, and extend well _____.
3. The udder of a dairy cow should be _____and _____.
4. The _____carries the milk making materials from the _____and _____to the udder.
5. The milk vein contains _____, which is on its way back to the _____.
6. Milk veins on a dairy cow should be _____and _____.
7. A dairy cow should be long from the _____to the hips, and very _____bodied, with _____ribs.
8. A strong constitution is indicated by a deep, wide, full _____, a large open _____, and a rugged healthy condition throughout.
9. A dairy cow that has a _____eye, a _____ _____ skin with _____hair, and that acts _____ is in good condition.
10. The five major points to consider in judging cows are _____ _____ _____ _____ _____.
11. Inbreeding is the mating of _____.

12. An animal having exceptional ability to pass his good characteristics on to his offspring is called _____.
13. A variation which suddenly appears in a plant or animal is called a _____.
14. The animal having this variation is called a _____.
15. When an Angus is crossed with a Hereford the offspring has a _____face and this character is called _____.
16. A red calf from a Holstein herd would be an example of _____.
17. Linebreeding is the mating of _____.
18. A pure bred animal is _____.
19. Heredity is the inherited tendency for _____.
20. Variation is the tendency to _____.
21. It would be impossible to have definite breeds of cattle if it was not for the principle of _____.
22. No progress in the development of dairy cows could be made but for the principle of _____.
23. A free martin is _____.
24. Abortion in cattle may cause _____ in people .
25. Milk from sore and inflamed udders may cause an infection in people's _____.
26. The bacterial count in good market milk should be over _____.

27. The _____ of bacteria in milk is more important than the _____ in the milk.

28. The two most important factors in clean milk production are personal _____ and clean _____.

True-False Questions

( ) 29. If dairy farming is conservatively and intelligently carried on it usually brings good returns.

( ) 30. The time consumed in weighing milk is extremely short if a scale and record sheet are conveniently placed.

( ) 31. Cow testing associations usually cost more to operate than the value of the benefit gained.

( ) 32. The principal result of the cow testing association work should be the improvement of the dairy herd.

( ) 33. Selection by man is the most important factor in increasing the number of cows capable of producing high yields of milk.

( ) 34. It is more satisfactory for a farmer to select good cows of no particular breeding and develop a breed to suit his own needs, rather than to choose one of the well known breeds.

( ) 35. A scrub is a cross between two pure bred animals of different breeds.

( ) 36. Line breeding involves more risks than inbreeding.

( ) 37. The better dual purpose cow will produce as much milk as the better dairy breeds, and as much beef as the better beef breeds.

( ) 38. The leading dairy breeds differ very little in real efficiency.

( ) 39. The selection of the individual cow within the breed is probably of more importance on the basis of economic production than is the selection of the breed.

( ) 40. The sire is half the herd.

( ) 41. Lacking prepotency a bull will fail in improving a herd of cows.

( ) 42. A farmer should attempt nothing in case of sickness in the herd, but should call a veterinarian.

( ) 43. Strict sanitation is the outstanding safeguard against disease.

( ) 44. When drenching a cow the head should be fastened up as high as possible to insure the swallowing of the medicine.

( ) 45. Milk fever may be expected to occur usually in the heifer with her first calf.

( ) 46. Paralysis is the first symptom noticeable in milk fever.

( ) 47. A farmer should own equipment to care for milk fever cases.

( ) 48. Extreme constipation is a prominent symptom of scours in calves.

( ) 49. Sanitation is a great aid in preventing scours.

( ) 50. About 10% of all dairy cattle are tubercular.

( ) 51. Tuberculosis is a slow spreading disease.

( ) 52. The symptoms of tuberculosis are numerous and reliable for diagnosis.

( ) 53. Straining the milk will remove any germs of tuberculosis which may be present.

( ) 54. A good veterinarian can diagnose a case of tuberculosis.

( ) 55. The introduction of tuberculin into the animal's body serves as a cure for the disease, as well as a test of its presence.

( ) 56. "Lumpy jaw" disease may always be recognized by swelling on the jaw.

( ) 57. The application of hot cloths is a help in reducing the inflammation in garget.

( ) 58. Bloat is usually caused by the feeding of an excessive amount of dry matter.

( ) 59. The use of the trocar for bloat is a dangerous practice.

( ) 60. Impaction is generally due to improper feeding.

( ) 61. The symptoms of indigestion are loss of appetite and constipation.

( ) 62. The feeding of large quantities of laxative feeds is the best treatment for indigestion.

( ) 63. Ringworm is a highly contagious disease transmissible to man.

( ) 64. The affected latches should be thoroughly washed and painted daily with iodine.

( ) 65. The cure of ringworm may be effected within a few days if properly cared for.

( ) 66. Isolation of newly purchased animals for sometime after arrival at the farm is a safe precaution in guarding against introduction of disease.

( ) 67. The most satisfactory method of marketing products, such as milk and butterfat, is to develop a specialized trade.

( ) 68. Cooperative marketing of butterfat is a satisfactory plan.

( ) 69. Creameries owned and operated by farmers associations cannot compete successfully with large creamery companies.

( ) 70. If you take a cow producing 160 pounds of butterfat and properly feed and care for her, and increase her production to 225 pounds, you have increased the inheritance of her calves.

( ) 71. When the male and female cells unite the inherit-

ance of the offspring is fixed, and nothing in the way of feeding and management can be done to change it.

( ) 72. The milking machine produces cleaner milk than hand milking if properly cared for.

( ) 73. There is no danger of the milker's getting the milk dirty if his hands are clean.

( ) 74. Milk strainers, if well made, clean out the germs, dirt, hair, and chaff.

( ) 75. The rapid cooling of milk has very little effect upon its keeping qualities.

( ) 76. Milk should be allowed to stand for about thirty minutes before being put into the cooling tank.

( ) 77. A temperature of about fifty degrees is satisfactory if milk is to be cooled.

( ) 78. The speed of the cream separator has nothing to do with efficient skimming.

( ) 79. The temperature of the milk is important in efficient separating.

( ) 80. Winter milk usually skims better in the separator than summer milk.

Multiple Choice Questions

81. The crossing of two families within a breed is called inbreeding, outcrossing, line breeding.

82. The most important factor in improving a herd is ,

prepotent sire, special feed rations, expensive barn.

83. The butterfat test of a cow's milk is controlled chiefly by feed, care, breed.

84. A cow producing 40 to 50 pounds of milk per day on two milkings will increase her production about 10%, 20%, 30% on three milkings per day.

85. The main purpose of cow testing associations is to keep milk production records, find cost of production, weed out unprofitable cows.

86. The usual drop in production in the summer is due chiefly to fly annoyance, hot weather, less care given.

87. Jersey heifers should be bred at the age of 15 months, 17 months, 20 months, 24 months.

88. Guernsey heifers should be bred at the age of 12 months, 16 months, 22 months.

89. Holstein heifers should be bred at the age of 15 months, 20 months, 26 months.

90. Young sires should not be used for service until they have reached the age of 12 months, 18 months, 24 months.

91. The butterfat test of old cows tends to increase, decline, remain the same.

92. When butterfat is worth 20 cents per pound a quart of milk is worth 2 cents, 5 cents, 10 cents on a butterfat basis.

CHAPTER IV

COURSE OF STUDY OUTLINE

AGRICULTURE III

The Dairy Enterprise

- Unit I Agricultural Situation
- Unit II Basis of Marketing
- Unit III Cooperative Marketing

UNIT I

AGRICULTURAL SITUATION

Unit Objectives

1. To visualize the economic position of the farmer
2. To develop an understanding of business cycles
3. To develop an interest in the present political movement to aid the farmer
4. To develop an appreciation of the need of marketing information

Specific Objectives

1. To understand index numbers and how to use them
2. To know how to analyze government reports
3. To understand the factors causing business cycles
4. To learn the sources of economic information
5. To learn how to determine the purchasing power of a dollar
6. To acquire an appreciation of the difficulties of determining a tariff policy

PREVIEW

The main reason for the farmers' present condition is a financial one. The prices the farmer receives for his products are out of proportion with interest payments, wages, and prices of commodities which the farmer buys. In order to show the comparative position of the farmer index numbers are used.

An index number is a number showing the average rise or fall of prices. For example, if butterfat was 20 cents yesterday and rose 10% to 22 cents today, the index number would be 110. This is obtained by letting yesterday's price of 20 cents be the base or 100%. A rise of 2 cents in price is a 10% increase; therefore, it is 110%. of the original price 20 cents. For convenience, the per cent sign is dropped, and we call the index number 110.

Any date or year may be used as a base in figuring index numbers. However, as a rule a normal period is desirable. This is why the average price of products in 1913 is used. If the average price the farmer received for his products in 1913 is used as 100% or the base the price he is receiving today can readily be compared with 1913 prices.

To illustrate, let us take the average price of butterfat in 1913 which was 32 cents, according to reports of the Agricultural Department at Washington. This 32 cents

equals 100%. Today's price is about 18 cents. If we divide 18 cents by 32 cents the result is 56. Therefore, today's price is 56% of the 1913 price. Using index numbers we say that today's index number for butter, based on 1913 prices, is 56. Index numbers are more conveniently used than percentages. Having obtained the index number of butter as 56, we can say that where a farmer received a dollar for butterfat in 1913 he now receives only 56 cents for the same amount. To illustrate further how index numbers may be used, let us assume that in 1913 your farm produced the following goods, which were sold at the average 1913 prices, and let us assume also that the same amount of goods will be produced this year and sold at present prices ;

Product	Price per unit	Total	1933 Price	Total
2500# Butterfat	.32	800.00	.18	450.00
750 bu. Potatoes	.69	517.50	.25	187.50
500 dz. Eggs	.22	110.00	.10	50.00
1000# Pork	.07	70.00	.03	30.00
Total Farm Income 1913		$1497.50	Total Farm Income 1933	$717.50

Index number 717.50 ÷ 1497.50 = 48

This means that the farm's income, assuming no increase or decrease in production, is 48% of what it was in 1913. In other words, whereas the farmer was receiving $1.00 he

is receiving only 48 cents today.

If prices of other commodities had declined in the same ratio, the farmer could buy as much today on his reduced income as he could in 1913, but other commodities have not. In fact, the average index number for the things the farmer buys today is 103 , meaning that they are 3% higher than in 1913 ; this difference only serves to increase the farmer's troubles.

Perhaps you have heard your parents complaining about taxes. The following illustration will show how difficult it is for the farmer to pay his taxes. Let us assume that the taxes on your farm in 1913 was $50.00 . Today taxes on an average are 250% greater than they were in 1913, so the taxes on your farm would be about $125.00. In 1913 about 156 pounds of butterfat at 32 cents per pound would pay the taxes. Today practically 700 pounds of butterfat at 18 cents would be required to pay the taxes. In 1913 the taxes took about 6% of the income of the dairy herd; now, in 1933, the taxes take nearly 28% of the dairy income.

There are many conflicting opinions as to the reasons why farm prices are so low. Some say it is overproduction, while others claim it is due to underconsumption. Neither of these views covers all the factors. There is a wave of political unrest throughout the world, as evidenced by

political revolutions in South America, Europe, and even in America. The whole world seems to be in financial turmoil, and prices are on a downward trend. The prices of the farmers' goods have not been able to withstand the downward pressure anymore than have goods of other industries. Government attempts to check the drop in farm prices have thus far failed. Just what our government can do is a problem. A new policy for farm relief is being drafted, which may be of some help.

The present system of marketing farm products reveals many weaknesses under existing conditions. In many sections of the country farmers are entering the field of marketing through their cooperative marketing associations. Many people believe that the solution of the farm problem lies in cooperative marketing. If this is true, then it will be fully as important for the farmer to know marketing methods as it has been in the past for him to know how to farm.

UNIT I

Agricultural Situation

1. Prices for farm products
   - A. Price cycles
   - B. Commodity prices
   - C. Index numbers

D. Purchasing power

2. Business conditions

A. Business cycles

B. Business indicators

1. Stock market quotations

2. Bond quotations

C. Effect on farmers

3. Causes of present conditions

A. World affairs

1. Financial

2. Political

3. Tariff

B. Production

C. Consumption

D. General trend of prices

4. Remedies

A. Political

1. Tariff readjustment

2. Taxes

3. Governmental attempts to control prices

B. Economic

1. Lower costs of production

2. Improved marketing system

Standards

1. Explain the statement " The farmer's dollar is worth only 55 cents " .
2. Whose products have had relatively the greatest purchasing power the grain farmer, the dairyman, or the livestock farmer ?
3. What are the results of low price levels of farm products ?
4. List the characteristics of depression periods, and prosperity periods.
5. What phase of the business cycle are we in now ?
6. Make a list of world events that have occurred in recent years, which you think have affected the farmer adversely.
7. Explain the principles of the income tax. Do you believe this tax would aid the farmer ? Why ?
8. Will chain farms assume the same position in farming as the chain stores are in marketing ?
9. Is the trend of population toward the farm, or away from it ?
10. Why should the farmer belong to some organization such as the Farm Bureau or Grange ?

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Pupil Activity

1. Classroom work
   - A. Keep daily chart of prices of farm commodities.
   - B. Keep daily chart of average stock prices.
   - C. Make a list of all the factors you believe affect the prices of farm goods.
   - D. Outline a plan of farm relief, which you think would work.
   - E. Chart prices of butterfat from 1913 to 1933. Show purchasing power of each year's price.

Desirable Outcomes

1. Ability to think correctly along economic lines
2. Ability to read the financial reports intelligently
3. Ability to talk intelligently on tariff matters
4. Ability to work with index numbers
5. An appreciation of the financial troubles of farmers

EXAMINATION

Problems

1. If a farmer had an income of $800 in 1932, what was the purchasing power, using 1913 as 100 ? The index number of commodities bought in 1932 was 114 .
2. In 1918 the index number of all farm commodities was 200, using 1913 as 100. The index number of commodities bought by the farmer was 187. What was the purchasing power of the farmer's dollar ?
3. In 1919 a farmer had an income of $3500 . In 1932 his income had dropped to $1100 . Using 1919 incomes as the base or 100 what was the index number of the farm income in 1932 ?
4. If the above farm had a $5000 mortgage @ 6% what per cent of the total income was the interest in
   a. 1919
   b. 1932
5. If this farm had $75 taxes in 1919 and $150 taxes in 1932 what per cent of income went for taxes in
   a. 1919
   b. 1932
6. What is the total percentage of the income for taxes and interest in
   a. 1919
   b. 1932

7. Explain what is meant by the following statements :

   a. Index for taxes in 1930 was 266 .

   b. Index number of prices paid by farmers for commodities they bought was 127 .

   c. Index number of all farm products today is 50 .

8. Using 1913 as normal or 100, work out the purchasing power or real price of the farmer's butterfat for each year,

Year	Price of butterfat	Index No. other commodities	Purchasing power
1913	.32	100	.32
1914	.25	101	
1916	.28	126	
1917	.26	150	
1918	.43	178	
1919	.50	205	
1930	.42	146	
1931	.30	126	
1932	.20	109	

UNIT II

BASIS OF MARKETING

Unit Objectives

1. To learn the services of marketing
2. An appreciation of the complicated process of distributing economic goods
3. An understanding of the marketing channels through which farm goods travel

Specific Objectives

1. To learn the value of proper grading and standardization laws
2. To know the work of the various kinds of middlemen
3. To learn how central livestock markets are operated
4. To learn the value of producing high quality products
5. To learn how grain markets operate
6. To learn market terms and be able to understand radio and newspaper reports on the markets
7. To show possible vocations in marketing

PREVIEW

Since the war there has been considerable agitation against our system of marketing by both farmers and consumers. The farmer has felt that his returns are too low, while the consumer has objected to the high prices he has to pay. There has been a great deal of sentiment combined with a lack of real facts, which has aggravated the confusion of ideas and brought resulting demands for changes.

Chiefly because of the dissatisfaction in regard to prices offered by middlemen farmers have entered the marketing fiel d. Cooperative marketing associations have been formed to handle nearly all of the farmers' products, such as cooperative livestock shipping associations, creameries, egg pools, poultry associations, flour mills, and slaughter houses. The results of this movement have not always been pleasant for the farmer. Many cooperative agencies have failed through inexperience of personnel and lack of funds. The movement, however, is gaining in strength and knowledge in spite of numerous failures.

Marketing is a complex business; growth and development must be based on knowledge and experience. It is a difficult task for anyone to enter a new field without training. If the cooperative movement is to continue, the cooperators must learn to understand the fundamentals of their new business.

To be a "good" member of a cooperative association, or to serve on the board of directors or in some other official position, requires at least a knowledge of the basic principles of marketing.

The process by which economic goods are made available to satisfy human wants is called production. Where production is carried on, as in primitive days, by the individual desiring the goods, there is there is no other process connected with production. In our present condition of civilization, however, specialization has developed. Farmers devote all their time to the production of a few articles, with the intention of selling their surplus and buying needed articles produced by others. This act of trade or barter means that the goods must be transported, so transportation must be included in our idea of marketing.

Nature produces seasonally, while our wants are continuous. To supply these wants storage is necessary and must be included in our idea of production. In fact our present conception of production includes all the necessary services of marketing, as well as the original idea of production.

Farm goods in order to satisfy human wants must have certain qualities such as right form, right place. The farmer's wheat is not a "good" in the sense of satisfying human wants until it is in the form of flour or bread. The

farmer may produce milk on his farm, but it is not a "good" until it is placed where the consumer wants it, and when he wants it. These qualities are called economic utilities, and may be classified as follows :

1. Elementary utility- Farmer's part, or actual production.
2. Place utility- includes many marketing services .
3. Form utility- " " " " .
4. Time utility- " " " " .
5. Possession utility" " " " .

The farmer's part of production, then, is to produce the potential economic goods, while the marketing processes carry out the necessary functions or services to make them actual economic goods.

In a study of what marketing is and does, therefore we must examine the various marketing services and determine why they are performed. The principal marketing services may be stated as follows : (1) assembling (2) grading and standardizing, (3) Packaging, (4) processing, (5) transporting, (6) storing, (7) financing, and (8) distributing.

While these services are necessary, the methods by which they are rendered are equally important. A product may be expensive to the consumer because a poor method had been employed. The expenses of operation may be too high, or the quality of the product may be low, because of

the poor method of rendering service. A creamery for instance performs all the usual services, but if its methods are poor it may turn out a product so inferior that it cannot be used. Or if the methods are too expensive, the cost of the finished goods will be unreasonably high. The farmer and the consumer, therefore, are vitally interested in having all the marketing services rendered in the most efficient manner.

UNIT II

Basis of marketing

1. Marketing functions
   - A. Assembling
     1. Purpose
     2. Kinds
     3. Results
   - B. Grading and standardization
   - C. Packaging
     1. Need
     2. Costs
     3. Results
   - D. Processing
     1. Benefits
     2. Cost factors
   - E. Transporting

1. Modern methods
2. Trucks vs railroads
3. Factors affecting costs

F. Storing
1. Need
2. Value
3. Agencies
4. Market feeding

G. Financing
1. Methods
2. Seasonal requirements

H. Distributing
1. Needs of distributing system
2. Wheat and flour distribution
a. Middlemen
b. Market information
c. Financing
d. Processing
e. Grain exchange
3. Livestock distribution
4. Distribution of dairy products

Standards

1. Why do farmers often object to grading and standardization laws ?

2. When do farmers gain the most by producing high quality goods in depression or prosperity periods ? Give reasons.
3. State your reasons for or against our present methods of packaging food in small packages.
4. Farmers' cooperative organizations have never proved much of a success in the processing field. Why ?
5. What is meant by Pittsburg plus ?
6. Do you believe that trucks should come under the same supervision as the railroads ?
7. Has the storing of wheat by the farm board proved successful ?
8. Why did many middlemen object to the farm board financing cooperative associations ?
9. Show by diagram the distribution system of marketing wheat .
10. List the kinds of middlemen and name the services they perform.

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Norton & Scranton- Marketing of Farm Products. ch. 1-2.
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Pupil Activities

1. Classroom work

A. Use outline as a guide in writing on each marketing function.

B. Illustrate route of butterfat from the farm to the consumer.

C. Illustrate the route of wheat from the farm to the consumer.

2. Demonstration suggestions

A. Debate on trucks vs railroads.

B. Debate the question "Resolved that our present method of packaging is wasteful".

Desirable Outcomes

1. A knowledge of our marketing system
2. Ability to use market information in selling farm products
3. An appreciation of the work and costs of processing various farm products
4. Better grading of farm products on the farm before selling
5. A desire to produce high quality products

EXAMINATIONS

Completion Questions

Name _____
Perfect Score 130
Student Score _____

1. Marketing provides the following services _____ _____ _____ _____ _____ _____ _____ _____ _____.
2. The market agencies are _____ _____ _____.
3. The reason for grading and standardization are _____ _____ _____ _____.
4. Good roads reduces local transportation costs by _____ _____.
5. Farm products vary in size, shape and _____.
6. Expenses of processing are packaging, interest and _____.
7. Storing adjusts supply to _____.
8. Storing stabilizes _____.
9. Storing aids regularity in _____.
10. Storing stabilizes prices by _____.
11. Relatively fixed capital is capital invested in _____.
12. Permanent capital is capital invested in _____.
13. Circulating capital is capital invested in _____.
14. "Peak season" means _____.
15. "Two per cent ten days, net thirty" means _____.
16. "Selling agents" refer to _____.
17. "Buying agents" refer to _____.

18. A broker is a middleman whose main service is to _____.

19. A broker assumes _____risk.

20. A broker _____see the product with which he deals.

21. A broker _____own the product with which he deals.

22. Brokers deal in _____units.

23. A commission dealer is a middleman whose service is to sell _____.

24. Commission dealers work on a _____margin.

25. Commission dealers are located in the _____markets.

26. A wholesaler performs the service of a _____for the factory, and a _____for the jobber and retailer.

27. Jobbers stand between _____and _____.

28. _____is one of the main services performed by the jobber.

29. Raw material means _____.

30. Finsihed product refers to _____.

31. Auction companies usually handle products that are _____.

32. Processing benefits _____and _____.

33. Efficient local marketing requires good _____.

34. Credit extended to poor risks is called _____.

35. Credit extended to putchasers slow in paying is called _____.

36. The first essential in successful marketing is a _____.

True-False Questions

( ) 37. Local transportation costs average about 5% .

( ) 38. The cost of processing butter is greater than the processing cost of peas.

( ) 39. Processing tends to increase production.

( ) 40. The packaging costs of canning peas exceed any other cost.

( ) 41. The processing costs of canning peas are more than the cost of the peas.

( ) 42. Processing conserves the surplus.

( ) 43. The costs of processing are so high that it is not justified in most cases.

( ) 44. Processing helps only the middlemen.

( ) 45. Freight charges average about 5% of value of product hauled.

( ) 46. Freight costs on potatoes are lower than freight costs on wheat.

( ) 47. Grain represents more than one-third of the total farm products hauled by railroads.

( ) 48. Bulkiness and perishability are important factors affecting cost of transportation.

( ) 49. Consumption is seasonal.

( ) 50. Middlemen render their services for the purpose of profit.

( ) 51. Seasonal demands for money vary.

( ) 52. Roundabout methods of production are more expensive than direct methods.

( ) 53. Direct methods of production have been recently established.

( ) 54. Production is justified even if the consumer is not willing to pay for it.

( ) 55. Our present type of agriculture is self-sufficient.

( ) 56. High prices affect demands for financing.

( ) 57. Low prices affect demand for financing.

( ) 58. Hard times have little effect on seasonal demands for money.

( ) 59. Poor sales efforts affect seasonal demands for financing.

( ) 60. The unit costs of producing or selling have little effect on the current financial needs.

( ) 61. The length of time the goods are in preparation for market affects the financial needs greatly.

( ) 62. Postponing payment is one way of financing a marketing organization.

( ) 63. Short time notes run from three to six months.

( ) 64. Commission dealers' services vary in different markets.

( ) 65. Commission dealers collect for shipper and pay all bills.

( ) 66. Commission dealers do considerable warehousing.

( ) 67. Commission dealers hold title to property.

( ) 68. Commission dealers finance local shipper in many cases.

( ) 69. Commission dealers handle products in their own name.

( ) 70. Wholesale dealers buy the products.

( ) 71. Wholesale dealers do very little packaging, sorting and grading.

( ) 72. Wholesale dealers do considerable storing.

( ) 73. Wholesale dealers assemble the product.

( ) 74. Wholesale dealers are an important agent in the work of distribution.

( ) 75. The jobber finances the retailer to some extent.

( ) 76. The jobber assumes a great many risks.

( ) 77. The jobber buys in car lots and sells in smaller lots.

( ) 78. The farmer has to wait for his money until the consumer pays for the product.

( ) 79. Marketing concerns need capital of two kinds.

( ) 80. When farmers wait for the consumer to pay for the product, they perform the services of financing.

( ) 81. As a rule, more circulating capital is needed than permanent capital.

( ) 82. About two-fifths of the consumers are scattered.

( ) 83. Compulsion saving is a situation in which people are forced to deposit past of their income in banks.

( ) 84. Banks are rapidly developing standardized methods of financing.

( ) 85. Three-fifths of the consumers are concentrated in a very small place.

( ) 86. Thirty-eight percent of the average man's wages is spent for food.

( ) 87. There are about ten million farms in the U.S.

( ) 88. Most of the farmer's products are finished products.

( ) 89. There is a direct demand for the farmer's raw product.

( ) 90. There is a direct demand for the farmer's finished product.

( ) 91. Between the farmer and the consumer are varying and unavoidable distances.

( ) 92. The bulk of our wheat goes through the following channels: farmer, local elevator, mill, jobber, retailer, consumer.

( ) 93. A large number of failures among marketing companies has been due to insufficient working capital.

( ) 94. Two-thirds to four-fifths of total capital should be free for current use.

( ) 95. There is a relation between quantity of business done and cost of operation per unit.

( ) 96. Volume of business done has very little effect on cost per unit.

( ) 97. Capable managers though highly paid are less expensive than poor managers poorly paid.

(,) 98. High quality goods usually returns the highest profits.

( ) 99. An example of direct marketing methods can be illustrated with farmers' cooperative organizations, where the farmers sell direct to the consumer through their organization.

( ) 100. "Regular marketing methods" means that the products go through the various middlemen's hands.

( ) 101. The integrated marketing method is the most economical marketing method.

( ) 102. The farmer should do the processing.

( ) 103. It is easier for the farmer to standardize his products than for the manufacturer.

( ) 104. Farmers can control production as easily as the manufacturer.

( ) 105. One advantage of volume control is that the producer can plan his production.

( ) 106. Unbalanced production exists when the farmers the world over produce too much.

( ) 107. Production consists of all those essential human efforts, which contribute to the creation of utilities.

( ) 108. Assembling is not a true utility.

( ) 109. Standardization is sorting products into groups of uniform kinds, quality, and size.

( ) 110. Ungraded products can easily be sold by advertising.

( ) 111. Packaging lowers the selling price.

( ) 112. The chief function of the agricultural market information is to regulate the flow of farm supplies to meet the demand.

( ) 113. Marginal land is land produced at a loss.

UNIT III

COOPERATIVE MARKETING

Unit Objectives

1. To develop an appreciation of the importance and value of cooperative marketing
2. To provide a training for future membership in a cooperative association
3. To learn how a cooperative marketing association is operated
4. To develop knowledge of cooperative principles

Specific Objectives

1. To learn the various types of cooperative organizations
2. To learn the factors controlling success of cooperative marketing
3. To learn how the Federal Board operates
4. To understand contracts and by-laws
5. To learn the legal rights of the association and cooperator
6. To learn how the Land O'Lakes organization operates

PREVIEW

In pioneer days farmers cooperated with one another to "raise" their buildings, "roll" their logs, and complete other tasks for which great physical strength was required, but they did not buy or sell together. Today farmers do not have their working "bees", but there are still tasks they can accomplish better by working together than as individuals. Producers are generally beginning to believe that buying and selling together in a cooperative association is one of those tasks. Farmers are learning to cooperate with their neighbors in packing, hauling, advertising, and marketing their products, and in buying supplies. The cooperative movement among farmers is growing rapidly, and with the government support recently instituted it may become one of the most powerful means of returning prosperity to the farmer.

Cooperative marketing has developed very rapidly in recent years, because farmers have become dissatisfied with the share of the consumer's dollar, which they have been receiving under the old system. Farmers feel that private marketing agencies are too often concerned solely with their own profits, and therefore exact all that the "traffic will bear" both from producers and consumers.

Because of this strong sentiment against the middlemen many farmers have been induced to join ill advised

cooperative agencies. In some cases unscrupulous persons have even organized a farmers' cooperative firm with the sole aim of "fleecing the farmer". It is true that a good sound cooperative association is an advantage to the farmer, but that does not mean that any cooperative organization that is initiated will succeed or will benefit the farmer. Before a farmer joins a cooperative association he should take steps to inform himself of the advantages and disadvantages of becoming a member of that particular association.

Any survey of examples of successful cooperative marketing enterprises will reveal certain definite benefits. Probably the most appealing one is that the middleman's profit goes to the producer either directly in cash or in increased farm prices. Professional organizers make a great appeal to the farmer on this point. The farmer must remember, however, that all middlemen are not successful, and that many of them have very little profits : He must remember also that in most cases the profit the middleman does make is due to his efficiency . The farmer must look ahead and decide whether the cooperative personnel will be equally efficient.

Cooperative enterprises properly managed provide a more direct and therefore more economical route from producer to consumer. Some of the larger cooperative organizations have greatly improved such services as standardization, reducing

risks, and elimination of speculation in marketing operations. Farmers selling through a cooperative organization continue to own their product until it is in the hands of retailers or of the consumers themselves. What the farmer must remember, however, is that the regular services of marketing must be performed, and whenever they displace a middleman who is performing one or more of these services the farmer must either do the work himself or hire someone to do it.

In business there are certain fundamentals that must be observed to obtain success. The same holds true with cooperative marketing. The cooperative association must be built on sound principles. There must be a real need for it. No successful cooperative organization has ever been built on a foundation of hatred and prejudices. The organization must be of such a nature as to invite the loyal support of its membership, and the members in turn must loyally support the management. It requires time to build an organization of this kind, and members must be willing to support it through its early stages until it has weathered the storm of difficulties that beset every young enterprise.

To illustrate and interpret all the conditions affecting cooperative marketing and to give some experience and training in the duties of cooperators, we shall form a mock cooperative creamery within this class.

UNIT III

Cooperative Marketing

1. Cooperative Associations
    - A. Benefits
    - B. Factors controlling success
    - C. Cooperative features vs corporation
    - D. Management
    - E. Types
    - F. Federal Farm Board
        1. Purpose
        2. Organization
        3. Operations
            - a. Farmer's reaction
            - b. Public reaction
        4. Future possibilities
2. Formation of a mock cooperative creamery by class
    - A. Publicity
        1. Newspaper articles
        2. Suitable speeches for farmers clubs
    - B. Meetings
        1. Speeches
        2. Election of temporary officers
        3. Appointment of committees
            - a. For constitution and by-laws
            - b. Contracts

UNIT III

Cooperative ?arketing

1. Cooperative Associations
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        4. Future possibilities
2. Formation of a mock cooperative creamery by class
    - A. Publicity
        1. Newspaper articles
        2. Newspaper articles

4. Election of permanent officers
5. Board of directors
    a. Problems to be solved by board
    b. Selecting manager
    c. Buying plant and equipment
    d. Management problems
        1. Operating efficiency
        2. Overrun
        3. Finances
        4. Enforcing contracts
            a. Law suits
            b. Cooperative laws
    e. Joining Land O' Lakes organization
    F. Operating
        1. Turkey pool
        2. Poultry and egg pool
        3. Stock feeds

Standards

1. Some farmers believe that by joining a local cooperative association they can control prices. Is this true ?
2. What facts would you want to know before you joined a cooperative association ?
3. Explain how a cooperative association could enforce their contracts.

4. What rate of depreciation should creameries charge off each year on their plant and equipment ?
5. List the services the Land O'Lakes organization performs for the farmers besides finding a market for their butter.
6. In what ways do you believe the Farm Board could aid the farmers of this district ?

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Pupil Activity

1. Classroom work
   A. Act out part assigned to you in the cooperative association to the best of your ability.
   B. Start a political group of your own, and see whether you can control the election of officers.
   C. Make an attempt to break your contract legally.

D. Try to get yourself or a friend of yours elected manager.

2. Demonstration suggestions

A. Hold court trial of middleman for inducing a co-operator to break his contract.

B. Hold trial of cooperator who broke his contract.

Desirable Outcomes

1. Ability to determine the advantages and disadvantages of joining a cooperative association
2. An understanding of the value and purposes of the Federal Farm Board
3. Ability to aid in drawing up suitable by-laws for a cooperative association
4. An appreciation of the duties of the officers of a cooperative association
5. Ability to distinguish propaganda from real facts concerning cooperative associations

EXAMINATION

State what you would do in the following situations and give reasons for your decision :

1. A certain town had two large independent creameries. The farmers received good prices, but became dissatisfied with test and weight, and started agitation for a co-operative creamery. If you lived in this community and were asked to join the cooperative association what decision would you come to, and what factors would you consider in forming your decision ?
2. If you were a dairyman in your community and ran a milk route, what would you do if the other farmers started an agitation for a cooperative milk distributing plant? You are selling a high quality grade of milk, and have all the customers you can handle. There has been considerable price cutting among the farmers in the milk price, but you have maintained your price, and have had very little trouble holding your customers. Would you give up your customers and join the cooperative association, or would you refuse to join ?
3. After several years of effort you have developed a reputation for growing good seed potatoes, and as a rule you can sell all of your crop at fairly good prices. If a movement were started to develop a cooperative seed potato selling association would you join and be-

come very active in the organization, or would you refuse to join ?

4. Assuming that you had joined a cooperative association and that you became convinced that it was going to fail, but might hang on for a year or two, what would you do ?

5. If you were selling cream to a creamery which you knew was cheating you on test and weight, what could you do in the way of getting evidence that would hold in court?

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