for more general acquaintance with science by putting all the sciences into a short course. Such a general acquaintance can only be obtained by extending the time given to science instruction. My program, therefore, would be: enough time for science, so that its natural units may be developed, and also better teaching all along the line.

MATERIALS FOR A COURSE IN ANIMAL HUSBANDRY:

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The purpose of this paper is to discuss the subject matter and use of supplementary materials for a course in Animal Husbandry in the secondary schools.

As a basis for this discussion, I will define Animal Husbandry as that branch of agricultural science which deals with the history, judging, feeding and management of farm animals. The term "farm animals," as used above, refers to the various breeds and classes of domestic animals common to the farms of this country. When we realize that this includes over fifty distinct breeds, each having its own peculiar characteristics, adapting them to special uses and conditions of environment and management, we have a partial insight into the field of Animal Husbandry.

With only one semester devoted to the study of Animal Husbandry, it is plainly seen that it would not be wise or even possible to make a detailed study of all the various kinds of farm animals, even though most textbooks take up the subject matter in that way. Fundamental principles applicable to all classes of live stock may be studied, but the instructor should first study local conditions and find out the kind of animals most common in his section and easiest obtainable for class use, and center the work around them. It would be more advisable to make a detailed study of a few classes of animals common to the community than to touch lightly on many with which the student, perhaps in the course of a lifetime, would never come in contact.

1Read at the November, 1914, meeting of the C. A. S. & M. T. held at Hyde Park High School, Chicago.
For example, in a section where interest in beef cattle is keen, it would be well to take up the study of this class of animals and familiarize the student with the subject matter in some simple, yet definite way. The other classes of animals should be taken up afterwards in a similar way, so that at the end of the course, the student should have a fair knowledge of several classes of animals. The following outline will serve for this purpose:

I. THE LIVE STOCK INDUSTRY.
   A. Importance.
      1. Value of live stock in the United States and in the world.
      2. Live stock industry compared to other industries in this country.
      3. Basis of other industries.
   B. Advantages of Live Stock on the Farm.
      1. Maintains soil fertility.
      2. Distributed labor throughout the year.
      3. Utilizes the by-products and feeds of low market value.
      4. Develops interest in other farm work.
   C. Disadvantages.
      1. Amount of capital necessary.
      2. Risks of disease.
      3. Unstable markets.

II. THE BEEF CATTLE INDUSTRY.
   A. Origin and Development in this Country.
   B. Number and Value of Beef Cattle in Illinois, United States, and the World:
   C. Present Outlook; Market Conditions, Etc.

III. HISTORY.
   A. History of Four Beef Breeds:
      1. Shorthorn.
      2. Hereford.
      3. Aberdeen-Angus.

IV. FEEDING AND MANAGEMENT.
   A. Principles of Feeding:
      1. Food nutrients.
      2. Classification of feeds.
      3. Digestibility of feeds.
      4. Rations.
      5. Calculation of rations.
   B. Feeding Beef Cattle:
      1. Rations for fattening cattle.
      2. Rations for breeding cattle.
      3. Rations for baby beef.
   C. Barns and Equipment.

V. JUDGING.
   A. Judging Beef Cattle;
1. Fat cattle.
2. Breeding cattle.
3. Breed types and characteristics.

B. Market Classes and Grades of Beef Cattle.

1. Market Reports.

The object of Part I in the outline, "The Live Stock Industry," is to teach the student the importance of Animal Husbandry as one of the fundamental industries of this country, and at the same time to give a viewpoint which will establish and maintain his interest in the work that follows.

Under Part II the student should first become familiar with a few facts concerning the history of the most important breeds of the class of live stock studied. This should include a knowledge of the origin, development, and early improvers of the breeds, as well as the names of some of the noted breeders and leading show animals of the present day.

Before beginning the work on systems of feeding for any particular class of animals, it would be advisable to spend some time on the Principles of Feeding, to teach the student the fundamentals which are applicable to all animals. This work should include a study of: Food Nutrients and Their Uses in the Body; Composition, Classification, and Digestibility of Feeds; Balancing of Rations; etc. To supplement this work, samples of home-grown feeds may be obtained from the local feed stores or elevators, while the commercial feeding stuffs will be furnished gratis by the larger feed or milling companies and the packing houses. These samples, and others showing the chemical composition of feeds are extremely helpful in presenting this phase of the subject.

With the Principles of Feeding well in hand, the student may be assigned the study of various rations for fattening and breeding cattle, and for baby beef production. In connection with this work, visits to practical feeding plants may be made where rations can be studied to determine their nutritive value according to the principles already learned in the class room. It would also serve as a means of getting the school and practical man together for their mutual benefit. At the same time a study of barns and equipment could be made and later reported on by the student.

Likewise, animals could be obtained for teaching the fundamental principles of judging, which should include the names,

May be obtained from "Breeder's Gazette" fair reports.
location, and relative value of the various parts; the use of the score card, and comparative judging, general types and breeds of the various classes of animals. A large number of animals are not required for scoring work. One animal each day for several days will bring out the value of the score card in teaching the names, location, and relative value of the various parts fully as well as having several. When these points are well in hand, more animals should be obtained for comparative judging and the student thoroughly drilled in giving reasons for his placings.

At the University of Illinois we do not attempt to make finished judges of our first-year men, but endeavor to teach them the fundamentals of judging for a foundation with which they can, with practice, become more or less efficient judges. I believe in some of the advanced high schools this can be accomplished, likewise, at least to the extent of teaching the student to be able to distinguish between a good and an inferior animal and to point out intelligently the differences between animals. There are few branches of study that will be of greater interest and as helpful in developing the powers of observation and sound judgment in a student as that of judging live stock.

To supplement the judging work, the breed photographs and lantern slides can be obtained which will aid very materially in teaching the correct types and characteristics of the various breeds. Slides may be secured from the U. S. Department of Agriculture, and photographs may be obtained from the various breed associations.

When the study of market classes and grades of beef cattle is taken up, the introduction of the live stock papers and market reports should be made. These papers show the commercial application of this system of classifying animals, and interpret the value of them according to the differences that have been pointed out in the judging work. To get the student interested to the point of following the live stock market and interpreting its reports is worthy of the instructor's earnest efforts.

Besides the work with the larger domestic animals, poultry holds an important place in a course of Animal Husbandry. Professor Muckelroy of Southern Illinois State Normal, in speaking of poultry in this connection, says: "I hope that poultry will soon become standard school equipment; first, because practically every home, city or country, has poultry. Pure-bred poultry is growing in popularity. Its products are increasing in demand as pure food and cost of living concern us; it does not occupy much
space; it requires small investment, is self-supporting, and may be made a source of profit if properly managed. The same general principles of breeding and feeding apply equally to horses, cattle, sheep and swine. The rapidity with which poultry multiplies and the shortness of time for development makes it especially well adapted for such courses. This work I place as a very valuable accessory to the study of Animal Husbandry.”

In teaching a course of this kind, difficulties will arise, chief of which will be the securing of live stock specimens. This may be partially overcome by the use of supplementary material, but when animals cannot be provided at the school, the instructor should plan trips to places where animals may be secured. This of course means added responsibility and work on the part of the instructor, but the interest secured in the course makes it well worth while.

It is almost imperative that the instructor make the trip first to become acquainted with the general conditions and the owner of the live stock, who will usually lend assistance. Having done this, he can outline definitely the plans of his trip previous to the time of starting. This is the only method by which the trip can be made to serve its purpose.

References.

The Live Stock Industry:
U. S. Census Report.
Beef Production—Mumford.
Profitable Stock Feeding—Smith.

The Beef Cattle Industry:
Circulars 163, 164, 169, 175—Illinois Experiment Station—Mumford.

History:
Types and Breeds of Farm Animals—Plumb.

Feeding and Management:
Feeds and Feeding—Henry.
Beef Production—Mumford.
Numerous Experiment Station Bulletins.
Farm Structures—Ekblaw.

Judging:
Live Stock Judging—Craig.
Purdue University Extension Circular 29.
Bulletin 78—Illinois Experiment Station.