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AGRICULTURE IN THE ELEMENTARY GRADES

Agriculture has been taught in the seventh and eighth grades in the schools of Minnesota for many years and is yet an unsolved problem for the majority of teachers of agriculture in this state. A discussion of underlying principles and suggestions is offered in the hope that teachers may be moved to attack this problem anew with better results. The writer bases his discussion on observations made in thirty Minnesota high school agricultural departments.

Teachers commonly say that the aim of grade agriculture is pre-vocational, but rarely teach it in a pre-vocational manner. A pre-vocational course gives the pupil an insight into a vocation by giving him such a view of it that he may decide whether he would like to enter it or not. It follows that pre-vocational instruction can not be limited to any one branch or phase of a vocation. If farming is conceived as a vocation, a course in field crops, for example, can not have a satisfactory pre-vocational effect; on the contrary, a pre-vocational course in agriculture should delve into many branches and phases of agriculture. That a pre-vocational course lacks unity is not a valid criticism of it.

It will be plain that there is a marked distinction between pre-vocational and vocational agriculture. A course in vocational agriculture deals with only one phase or branch of farming and its aim is to train for farming occupations. Some teachers are presenting to their grade classes in diluted form the same material that they present to vocational classes. It can not be said that these grade classes are getting a course in vocational agriculture, because such work is too often a question and answer exercise from a textbook. Yet these pupils are getting vocational subject matter presented in so unattractive and ineffective a form that many of them are likely to be discouraged from any desire to enroll for vocational agriculture in the high school. If they do enroll, the high school vocational

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PICTURES AID IN TEACHING AGRICULTURE

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Pictures, either original photographs or reproductions, are in many respects most important visual aids. The reasons for this are that they are inexpensive, readily secured, permanent, interesting to students, easily filed and simple to use in connection with class work. Pictures have been used by teachers for many years but usually only incidentally. Benefit has been derived without conscious effort on the part of the teacher. The following discussion gives definitely for what purposes pictures may be used, method of use, suggestions on selection, ways of mounting and filing, and the sources.

Purposes of Pictures

There are two general types of uses for pictures; (1) for the creating of the proper atmosphere and for general interest (2) for the teaching of definite facts, principles, and ideals. It is often impossible to be sure, from its appearance, whether an agricultural classroom is used for that purpose or not. The casual visitor would have difficulty in deciding whether or not the room was used for mathematics, general science, physics, history, or agriculture. There would be no doubt that agriculture is the subject taught if the walls displayed a few well selected pictures of livestock, farm buildings, or farm scenes. These pictures should be large, well taken, of good subjects, attractively framed, and well arranged on the walls. They should be replaced occasionally by others to add teaching value. Thus, livestock pictures should predominate during the animal husbandry course, changing to crop pictures when field crops are being studied.

The principal value of pictures as a teaching device is found in their use in a more definite way than that discussed above. In showing pictures a distinct purpose must be in mind if the best results are to be attained. Whether to show the pictures before, during, or after the recitation depends upon this purpose and also upon the character of the pic-

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tures. It will be helpful to list some of the ways pictures may be used in teaching.

1. To supplement concrete material—It is seldom possible to secure all the actual material it is desired to have for visualization. This is true of livestock, buildings, implements, and crops. A greater variety and often better impressions may be secured through well selected pictures. A winning team at the International Livestock Show some years ago was trained quite largely in this way.

2. As a substitute for concrete material—It is often impossible to secure specimens for illustrative purposes. If good models are not available, the next best thing of course is a good picture. A series of pictures showing several views and giving a complete conception of a subject is excellent.

3. As a means of teaching and establishing an ideal.—Pictures are particularly valuable for this purpose. An example may help to illustrate this point. It is desired to develop the ideal Holstein type in the students' minds. While there may be a large number of good Holstein cows available in the community it is doubtful if there is one that could be called ideal. A good picture of the grand champion cow at the national dairy show, however, would be considered a close approach to the ideal. This picture should be shown and studied by the students until they have a lasting image of an ideal cow. This ideal they will retain and use as a basis of comparison when viewing cows in the flesh.

4. To give variety to class work.—Under this heading it is possible to list a good many suggestions.

(a) A poultry show may be held with pictures as entries. The whole routine

should be carried out, electing managers and judges from the class and making the rest of the pupils exhibitors. The pictured birds should be classed and placed as in a regular show. This will be valuable in itself and valuable training for a real show later.

(b) The poultry show may lead to a livestock show or "Picture International." Each student should enter pictures of stock in various classes and ribbons should be awarded.

(c) In connection with the International a stock-judging contest may be held among the students of the class. With good pictures there is very little difficulty in arriving at a correct judgment. There are, of course, some points which can not be judged readily, as action in horses, pliability and texture of udder in cows, crimp of wool in sheep, and some others. Much valuable judging practice may be gained in this way, however.

(d) A picture gallery of contrasting types showing ideal and faulty conformation may be built up by students.

(e) Pedigree charts may be constructed by use of pictures. Much valuable information may thus be secured in an interesting way.

5. To encourage the use of pictures for the gaining of information.—Not enough attention is given to pictures. Most students glance at them carelessly and regard them merely as valuable in breaking up the monotony of the page and taking up space which might otherwise be used for print. While it may be admitted that many pictures have only this value, there are many more which it will be helpful to scrutinize more closely. A little direction on the part of the teacher, a little conscious effort on the part of the pupil, will result in increased acquisition of knowledge from pictures. If the habit of carefully studying pictures is developed in the agricultural class room, there will be a tendency for the student to make use of pictures as they are presented to him in all situations.

6. To assist in summarization, review, and drill.—Through the use of pictures on flash cards in the manner of an old-fashioned spell down, much drill may be carried on without fatigue because of the element of competition. The spell down idea may be varied in several ways, i.e., students may choose sides, one part of the room against the other, blondes against brunettes, or tall boys vs. short boys. Pictures of types and breeds of animals, of styles of farm buildings, and of crops and vegetables having characteristic shapes lend themselves to this use.

7. To place the work of the agricultural department before the public.—

When an interesting piece of laboratory or shop work is going on, it should be photographed. This may be used to good advantage in the local paper or on a poster for some particular purpose. Pictures may be cut from magazines and used to attract the eye to some poster advertising an agricultural event.

The uses of pictures given above should serve as suggestions. The wide-awake teacher will find many other means of taking advantage of pictures in his work. He should be constantly alert to use them in all places where they will assist in the teaching situation. This leads to the question of "how to use pictures" as distinct from the "purposes for which pictures may be used."

Technique in Use of Pictures

In discussing how to use pictures it will be helpful to keep the original general classification. It was stated that pictures should be used to create an "agricultural atmosphere" in the classroom. It should not be necessary to discuss the method of use of this type of picture, except to state that pictures should be changed frequently and that there should not be so many as to give the appearance of a picture gallery. Some persons would suggest that all pictures of this kind should be of standard size so that they might replace one another in the same frame. However, this uniform size is one element of monotony and frames may be made cheaply enough so that uniform size would not be necessary. Pictures used for this purpose should be not less than 12x16 inches. They should be of good subjects of real educational value. Sepia prints are especially desirable. Frames may be made of pine, stained and varnished, rather than oak, to reduce the cost.

In the use of pictures as a part of the direct teaching practice there is more to be said on the question of technic. In the first place, the teacher should have a definite aim in view for every picture or series of pictures he uses. He should know just what he expects to accomplish and plan his use of pictures accordingly. If he wishes a class to discover a general principle, his selection of pictures will be much different from that when he desires to emphasize some particular point.

It must be remembered that the range of vision for detail is somewhat limited even for persons of more than normal eyesight. This means that the size of the picture will govern the distance at which it is shown. If 4x6 inch flash cards are used in a spell down or similar exercise, it may be necessary to pass

along and present the picture to individuals as their turn comes. When pictures of about 10x12 inches are used in judging practice they may be placed on the chalk rail or other convenient place and the students allowed to pass from one to the other as they would in judging the actual animals.

Another point to be remembered is that a picture can not be well seen if it is held at an angle or tilted, if the person holding it shuts off the view of part of the group with his body or if there is not plenty of light on the picture. These are seemingly minor points, but they often mean the difference between success and failure in a class exercise.

In many instances there is a tendency to introduce too many pictures at one time. This is a mistake, the very profusion serves to confuse and to prevent the retention of a vivid image. This is particularly true when a problem is being taken up for the first time.

One of the most valuable and convenient ways of showing pictures is by means of the opaque projector. By the use of a strong light together with a series of mirrors and lenses, the reflection of a picture may be thrown upon a screen in a darkened room. The image is much enlarged, but in the proportions and color of the picture. Small pictures may in this way be shown effectively to a large group of students.

Selection of Pictures

In selecting pictures for visual instruction some precautions must be taken. Just because a picture is a picture is no guarantee of its usefulness for teaching. There are certain criteria which should be kept in mind as governing the value of any picture used as an aid in teaching. Among the most important of these are the following:

1. The picture should be of sufficient size for the use to which it is to be put.
2. It should be clear and distinct.
3. It should be well taken, showing well the points that it is desired to emphasize.
4. The picture should ordinarily show but a single subject so that attention may be confined to one detail at a time.
5. The picture should be truthful—"Touched up" photographs of livestock should not be used.
6. The pictures selected should represent actual conditions. For example, pictures of grand champion hogs of eight years ago would not at all represent the type of hog which is taking grand championships today.
7. For the flash card or judging work, pictures of uniform size are most satisfactory, then comparisons of weight, size,

and height may more readily be made.

8. Pictures should be selected so that connected series may be built up.

Mounting and Filing

The mounting of the larger pictures for wall displays has already been discussed. Simple, light frames should be used. Glass for smaller pictures may be obtained at no expense by getting old plates from photograph galleries, and washing off the emulsion with hot water.* The pictures should be trimmed evenly on the edges and carefully pasted on stiff cardboard. If a border or mat is desired, it should usually be light brown or gray in color. The picture should be held tightly against the glass and the glass against the frame. Paper should be pasted over the back to keep out the dust.

For pictures to be used in class exercises one of the most important factors is uniformity in size. For the smallest pictures, cards 4x6 inches are the best. These cards should be of fairly stiff material though not very thick. The advantage of this size is that it fits into standard card filing cases.

The next largest size pictures should be mounted on cardboard 8½x11 inches. This background will have to be somewhat stiffer than the 4x6 as the larger sizes have a tendency to curl. This size may be filed in manila folders or standard size letter filing cases. The size 11x14 inches may be used as it is a standard cut for cardboard but can not be as easily filed. For the largest pictures the standard size is 22x28 inches.

In mounting pictures neatness is of prime importance. There is no excuse for wrinkled, blistered, crooked, or smeary, mounts. There are just a few precautions to be taken. The hands must be absolutely clean. If not, finger marks are sure to result. A clean cloth will help in smoothing down the picture and wiping off surplus paste. The position of the picture on the background should be lightly marked with pencil so that margins will be even. A smooth, easy flowing photographer's paste should be used. Lay the picture face down on a clean sheet of paper and brush the paste over it evenly, being sure to cover corners and edges. This must be done rapidly as the paste dries quickly. Place the picture on the mat in the desired position and rub into contact with a clean cloth. The pressure should not be too great as the paper moistened with the paste is likely to stretch out of shape. With large pictures start at one edge and rub into contact.

*These plates may also be used as covers for plant, seed, or insect mounts.

It may be necessary in this case to apply paste to only a part at a time. As soon as the picture has been rubbed down well, place the mounted picture under a weight so it will dry flat.

For most purposes it is better not to have the name, legend, or description appear on the front of the picture. This should always appear, however, on the back. It should be placed at the top and in such a position that it can be read by the person holding the picture up to the view of the class. He will thus know what he is talking about without having to look at the picture. It is quite often convenient, however, to give each picture a number and this should appear on the front in the upper right hand corner. It should be clear but not conspicuous. This index number will be helpful both in filing and in class work.

Sources of Pictures

It can not be said that it is difficult to get good pictures or that it is costly. The principal sources of pictures are agricultural journals, and packing houses, feed manufacturers, and cement makers. The magazines printed on a heavy grade of glossy paper supply the most distinct pictures and those less likely to fade or discolor with age. Back copies of magazines should be saved and pictures clipped and mounted.

Most of the breed associations have pictures of ideal types which they will send for advertising purposes. A well-phrased letter will usually bring from one to a dozen pictures. Some of these are very fine specimens of photography. Catalogs of farm machinery, seeds, cement, and poultry supplies will all yield good pictures.—S. D.

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courses are deadened somewhat because the former grade pupils know just enough about certain agricultural problems to feel that they need no further exposure.

Perhaps vocational instruction in the grades may sometimes be justified. If the class is composed of non-farm pupils who are not likely to enter vocational classes some teachers offer poultry or gardening. While these pupils are too young to have any real vocational intent, they can be interested in vocational instruction in such a way that the instruction will function in a practical way. Such courses would not have a satisfactory pre-vocational effect unless we lead from poultry to other livestock enterprises and from vegetable gardening to crop enterprises. In other words such a course might or might not give the pupil a taste of many phases of animal and crop production.

Pre-vocational instruction means to some persons instruction which is given preparatory to vocational instruction. In be pasted over the back to keep out the ance is assumed to be the main function of pre-vocational instruction. As the junior high school organization develops in farming communities, it is probable that what is now grade agriculture will become pre-vocational agriculture in the latter sense of the term.

Subject Matter

If we accept the aim of grade agriculture as pre-vocational, the problem of subject matter resolves itself into the selection of content from a large number of different branches of agriculture such as horticulture, farm crops, dairying, entomology, forestry, animal production, rural engineering, and others.

Such a course in agriculture would include content of a vocational nature but scattered over such a wide range that the deadening effect on vocational agriculture would not result. Certain vocational skills also can be justified as part of a course in grade agriculture, for example, the Babcock test or rope work. While these skills are included in the courses in vocational agriculture, they are also a valuable part of a pre-vocational course. Neither will instruction in these skills cause a deadening in vocational courses, since the grade pupils will feel the need of more proficiency than can be obtained in the pre-vocational course.

Certain other kinds of content are valuable in a course in grade agriculture. Nature study is often included. If it has some relation to farm life it has a worth while pre-vocational effect. Boys' and girls' club work is said to be pre-vocational. Isolated from other content, the vocational guidance value of a potato club project, for example, is rather limited, since it deals with such a small part of the business of farming. As a part of a pre-vocational course it is very desirable because of its vitalizing effect.

In short the content of a pre-vocational course should have two qualities as far as selection is concerned. First, we need diversity of content, and second, we need some degree of completeness in the sense that all the important branches of agriculture are represented.

Methods of Teaching

A full discussion of methods of teaching grade agriculture will not be attempted here. One weakness in the present teaching methods will be pointed out and a possible remedy suggested. This weakness is the excessive use of the textbook quiz.

The textbook quiz fails because the pupils have usually no motive for study and because there is too little activity in the classroom. Seventh and eighth grade pupils, especially boys, want action. They are more interested in doing something than merely talking about it. The most successful teachers of grade agriculture observed by the writer are finding this principle the key to success. In other words, a series of exercises is more effective than a series of question and answer lessons. This does not mean elimination of the textbook but a moderate use of it which will supplement exercises.

There are some objections to the exercise basis. First, exercises require more preparation on the part of the teacher. This is not a serious objection; it may be raised against many practices which are worth while. Second, teaching materials are necessary. Some of these mean expense; many of the essential materials do not. Third, it is difficult to conduct an exercise with a large class. Sometimes this difficulty is met by recruiting high school vocational pupils as assistants.

Examples

The following are exercises which might be offered in a pre-vocational course in agriculture. The first are outlined in respect to aim, procedure, main points, and references.

Most of these exercises will consume the two forty-minute periods per week which are required. A double period will be more desirable than two single periods.

Exercise 1. Soil forming minerals and rocks

Aim—To familiarize the class with the most important soil materials and rocks and their relation to soil.

Procedure—

1. Each pupil should bring at least three kinds of rocks.
2. Assign any suitable reading matter.
3. Study several important minerals and rocks in detail.
4. Identification contest.
5. Discuss relation of important minerals and rocks to soil.

Main Points—

1. Distinguish between a rock and a mineral.
2. What are the most important minerals and rocks.
3. What effect do these minerals have upon the soil.
4. What kind of soils are formed from sandstone, shale, limestone.

References and Materials—

Set of minerals and rocks. Welch Scientific Company, Chicago.

Comstock, A. B.—Handbook of Nature Study. Pages 828-37.

Weir, W. W.—Productive soils, Chapter IV.

Exercise 2. The Parts of a Flower

Aim—To familiarize class with the parts of a flower and the function of each part.

Procedure—

1. Direct class to dissect several simple flowers.
2. Draw and name the parts of a flower.
3. Discuss function of each part and variations in flowers of important economic plants.

Main Points—

1. What are the parts of the flower?
2. What is the function of each part?
3. Describe the flower of rye, corn, alfalfa.

References and Materials—

Cook, M. T.—Applied Economic Botany. Pages 54-65.

The following is a list of exercises planned for one Minnesota class in grade agriculture.

Week Study

- First—Weed study
- Second—Weed study
- Third—Parts of flowers
- Fourth—Send for bulletins
- Fifth—Identification and study of trees
- Sixth—Minerals and rocks
- Seventh—The weather (based on weather maps)
- Eighth—The weather (based on weather maps)
- Ninth—Rope work
- Tenth—Rope work
- Eleventh—Rope work
- Twelfth—Wheat and its Products (using collection put up by the Washburn-Crosby Company)
- Thirteenth—Corn and its Products (using set of samples put up by St. Louis

Syrup and Preserving Company)

Fourteenth—The Babcock Test

Fifteenth—The distribution of corn in Minnesota (map exercise)

Sixteenth—The distribution of hogs in Minnesota (map exercise)

Eighteenth—Club work

Nineteenth—Planting vegetables

Twentieth—Planting vegetables

Twenty-first—The organization and work of the United States Department of Agriculture

Twenty-second—Club work

Twenty-third—The cuts of beef (diagram study of Wilson & Co. chart)

Twenty-fourth—The cuts of port (diagram study of Wilson & Co. chart)

Twenty-fifth—The cuts of mutton and lamb (diagram study of Wilson & Co. chart)

Twenty-sixth—Dairy feed identification and study

Twenty-seventh—Club work

Twenty-eighth—Important soils of United States (using set of samples prepared by United States Bureau of Soils)

Twenty-ninth—Tree study

Thirtieth—Varieties of poultry

Thirty-first—The parts of an insect

Thirty-second—Club work

The development of a collection of exercises which can be used in teaching grade agriculture is a work which can best be done by the teachers of agriculture working together. The exercises suggested above and others need to be worked out in detail and tried in the classroom so that suggestions may be made as to how they can be taught most effectively. New exercises need to be formulated and tried.

The Visitor will be pleased to serve as a medium in such a co-operative plan. Send in the exercises which you have used successfully, giving details as to aim, procedure, important points. Each teacher will be given full credit for the exercises which he contributes. A valuable collection of exercises may be developed in this way.—F. W. L.