

T H E S I S

on

GUIDING PRINCIPLES FOR EFFECTIVE TEACHING

OF VOCATIONAL AGRICULTURE

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GUIDING PRINCIPLES FOR EFFECTIVE TEACHING
OF VOCATIONAL AGRICULTURE.

Martin A. Schreiber.

Introduction.

The aim of this thesis is to formulate principles essential for the most effective teaching of vocational agriculture in the secondary schools of the state. Part I consists of a list of these principles and an exposition of each; Part II includes a number of type lesson plans and an exhibit of a suggested course for the first year of agriculture; Part III attempts an evaluation of the lesson plans in the light of the principles set up.

Vocational Education in Agriculture as defined in the federal act must meet four specific requirements :

1. It shall fit for farming occupations.
2. It shall be less than college grade.
3. It shall be designed to meet the needs of persons who have entered upon or who are preparing to enter upon the work of the farm.
4. Provision shall be made for at least six months of directed or supervised practice in agriculture.

These purposes have been kept in mind in the preparation of this study. Although the methods here discussed and used are particularly designed for pupils attending all-day schools, they are also applicable to the conduct of part -

time classes in vocational agriculture. The evening school for farmers is a somewhat different case and the informal conference plan of procedure supplemented with statistical data will no doubt bring the best results.

Three years of work are ordinarily offered in each of the several vocational agriculture departments located in about thirty of the high schools in the state. Some schools offer courses for four years. The usual succession is livestock management, farm crops and farm management. Farm shop work is incorporated as a regular part of the first two years' work and farm engineering with the third year.

Lesson planning is generally considered a matter of individual opinion among teachers. Yet, there is a felt need, especially by the inexperienced teacher, for the type lesson plans that are suggestive and adaptable to a variety of teaching situations. Even the experienced teacher is sometimes at a loss to know if he is making a practical application of approved teaching methods, or if his teaching will stand the test of good principles of teaching and learning.

The lesson plans here incorporated were used in the regular teaching in the Department of Vocational Agriculture of the Corvallis High School, during the year 1928-9. The lesson on "Farrowing Problems" was also used in the departments in the Lebanon and Forest Grove High Schools. The same lesson unit was criticized by several other teachers of vocational agriculture and experts in agricultural education.

This is the only unit that has been incorporated in its original form, the others having been slightly revised as experience with them has indicated it to be desirable.

PART I

For guidance in effective teaching of vocational agriculture a number of recognized principles of education have been set up. These principles include other than those usually designated for use in agricultural course planning for the reason that we are training boys not only to be good farm managers but to take their places in society as intelligent and useful citizens and as heads of happy homes .

Following is a list of the guiding principles :

- 1 . Have the course outlines and lesson plans been subjected to careful analysis to determine content that will function effectively in the occupations of the pupils ?
- 2 . Is teaching carried on in settings or an environment typical of, or simulating, the environment in which the occupation is conducted and in which the pupil is working or will subsequently work ?
- 3 . Is the unit of teaching based on the farm job or the unit of work occurring in the occupation ?
- 4 . Are the purposes and objectives based on the requirements of the jobs and the needs and limitations of the pupils ?
- 5 . Have study materials been chosen with the view of satisfying the problems determined by a job analysis ?
- 6 . Has care been exercised to avoid duplication of work done by other agencies than the school or other agencies in the school ?
- 7 . Has provision been made for recognition of individual

differences in pupils ?

- 8 . Is sufficient emphasis given to the development of desirable attitudes toward farming as a calling ?
- 9 . Is adequate emphasis given wherever possible to those additional principles considered basic in all education, - namely health, family, industry, recreation, citizenship, and religion ?
- 10 . Have the several possible teaching methods been evaluated for the teaching of the particular unit of work ?
- 11 . Has the pupil's procedure for studying the lesson been indicated with sufficient definiteness ?
- 12 . Has provision been made for a motivating approach and procedure ?
- 13 . Does the lesson unit provide for adequate pupil participation ?
- 14 . Are the lessons so planned that the pupils will develop habits of study and research ?
- 15 . What provision has been made for determining whether pupils have realized the objectives and the standards of efficiency set up for the jobs and for individual pupils ?

EXPOSITION OF PRINCIPLES.

1. Have the course outlines and lesson plans been subjected to careful analysis to determine content that will function effectively in the occupation of the pupils ?

Course outlines and lesson plans must be based on surveys of the farm enterprises, activities, practices and conditions found in the community. Even though local practices and activities are not of the best, it is of vital importance to be cognizant of these practices and activities in order to draw up adequate plans. Authentic experimental information and statistical data must be made use of to supplement or correct information gathered on local practices and activities.

" The facts and truths that enter into the child's present experience, and those contained in the subject matter of studies, are the initial and final terms of one reality."¹

To get the most effective functioning on the part of the pupils it is important to remember the principle of the immediacy of application. One means of doing this is to use a seasonal sequence of teaching farm jobs, giving the pupils an opportunity to put into immediate practice the lesson learned. Carry-over experience is in direct proportion to the degree of identity of the job and observation of seasonal activity makes it possible to get maximum results on this score.

1. " The Child and the Curriculum" -- John Dewey.

Some vocational teachers have carried on numerous experimental undertakings through the pupils' home projects with the idea of getting data from results obtained. This would seem a doubtful practice when undertaken on too large a scale because after all the farm is not an experiment station. However, it may be used as a means to stimulate the pupil's interest, making it, of course, only a part of his project work.

The vocational teacher is often not adequately trained as an enumerator for making accurate rural surveys and, furthermore, his numerous tasks would not permit him time for detailed surveys. Farm management departments of colleges and government agencies make numerous and accurate surveys that are available to the vocational teacher and his classes. Information of sufficient accuracy can often be obtained for class use by pupils themselves. The practice of collecting data is in itself valuable training for the pupil, developing in him an attitude and a habit of research to replace the blind methods heretofore followed.

A caution that was expressed by Dr. G.F. Warren¹ over twenty years ago may not be out of order here. He determines what the aim of the survey is and delimits it to this aim, which should be specific, and not too inclusive.

1. Cornell Bulletin 344 -"Agricultural Surveys."

It is a mistake to base conclusions as to numbers of livestock, acres of crops or even practices on information to be had from the farms represented by the members of a particular class only. A much wider sampling is necessary to give reliable data. However, if the pupils are to be given first hand experience while learning, it is important to consider the particulars of the farm layouts represented by the pupils in the class.

2. Is the teaching carried on in a setting or in an environment typical of, or simulating the environment in which the occupation is conducted and in which the pupils are working or will subsequently work?

The actual farming situation in the community is the best guide. Too close an adherence to this rule will sometimes break the school work up into such small units that natural connections are broken and the learning process retarded. For example, an attempt during the course of a week to teach each day a farm job from different enterprises would result in an unnecessary confusion. However, it is readily conceivable that it might be advisable to undertake two or even three jobs in the course of a single week, though this is not ordinarily necessary.

Dewey says in substance that school is not a preparation for life but it is life. There is no better way to vitalize school activity than that of tying it up immediately

with the activities the pupil engages in outside of school. In the case of vocational agriculture the connecting bond is the farm job that is being done on the home farm, either entirely or in part by the pupil. The experiences of the pupils can then be used directly in the discussion carried on in the class.

If proper care has been exercised in the selection of home projects for the boys this gives an excellent means to carry on in a proper setting. The teacher who fails to capitalize the pupils' experience, both in his project work and other farm activities, loses one of the best means for motivating the class work.

A trip to each boy's home farm with the entire class for the purpose of getting first hand information and mutual knowledge of prevailing conditions and problems on each farm is a good way to start the year's work. A definite outline of procedure should be followed and a subsequent tabulation of data collected must be made. A copy of this tabulation should be in every pupil's note book for ready reference.

Field trips are an essential part of vocational teaching. A definite objective must prompt the trip and a definite plan of procedure be mapped out before going afield. As in other units of work, better results may often be secured if the pupils have a part in the planning. The teacher must in all cases make definite arrangements with the farmer to be visited and, for the best results, have

accurate knowledge of his layout. A careful follow-up of a field trip is as essential as the trip itself. Pupils and the teacher will have taken notes. These must be compared, discussed and finally conclusions drawn and written into the note book.

In every case, where possible, study the object or condition itself and not about it.

3. Is the unit of teaching based on the farm job or the unit of work occurring in the occupation ?

"A farm job is an actual unit of farm work which is distinguished from other farm jobs by it's specific purposes, it's particular setting and the amount of special equipment required, if any." 1

Some authors carefully distinguish between manipulative or operative jobs and managerial jobs. This is sometimes an advantage. Often, however, an attempt to do so is of no value or may even cause confusion. More and more we stress the importance of management in farming and in many cases the economic reason for doing a certain manipulative job may be best considered along with the actual manipulation. It may be a saving of time.

When the results of one job are closely related to another job it is well to consider them together. This is especially true in case of jobs that fall in the season that

1. Federal Board for Vocational Education Bulletin #118, Agricultural Series #32, page 3.

school is not in session. School time does not permit full consideration of every farm job. For the sake of economy of time two or more jobs may sometimes be combined in one unit of study, particularly if the jobs all point to the same objective, ultimately. These points are illustrated by the unit of work included in Part II, entitled "management, care and feeding of ewes from time prior to breeding until after lambing time", The flushing of ewes and even breeding occurs before school takes up in the fall. The objective "to produce high lamb yields", quite naturally refers back to the management of the ewes in the late summer and early fall. However, winter management should not have been included in this unit of study, as doing so defeats the principle of studying the job in the actual setting.

Using the current job as the teaching base, we employ the psychological procedure as opposed to the ordinary text book method which gives a logical presentation. Quoting Dewey again, "experiences do not come to the learner in a pigeon-holed form."

4. Are the purposes and objectives based on the requirements of the jobs and the needs and limitations of the pupils?

No job should be taught without having a definite purpose and a well defined objective as the motive for undertaking the study. The objectives should be based on the conditions and requirements of the actual job in the normal setting.

With a beginning class of fourteen year old boys it is

well to consider their limitations and begin with rather simple and obvious objectives, gradually considering the more involved issues as the pupils become adapted to the new learning method.

The most patent needs of pupils is information, skill and ideals that will help them to carry on their projects in a satisfactory manner. In determining the jobs to be considered and the objectives to be attained the teacher must constantly keep in mind the home project and other farm practice work of the pupils.

In selecting method of teaching the job, he must keep in mind the fact that the boy is living in his world now and not ten years hence. Yet, future probable needs must not be overlooked.

Time allotment for the various jobs should be determined by several considerations among which may be stressed the home project of pupils, the importance of the enterprise in which the job is found, and the relative importance of the job within the enterprise.

Obviously the pupil's projects in order to be typical should be in those enterprises that are of economic importance on the home farm. If proper care has been exercised to this end there is no great difficulty in making time allotments. A word of caution may here be in place. If poor type projects have been selected by a few of the pupils, these pupils are bound to suffer from lack of attention to the problems that they encounter. The very fact that the enter-

prise is unimportant prompts the teacher to give it a minor place in the course, if any place at all. Proper selection of projects is the basis for good teaching in vocational agriculture.

5. Have study materials been chosen with the view of satisfying the problems determined by job analysis ?

Study materials are found in books, bulletins, charts, on farms, in feed, seed and implement houses and in numerous other places. To decide the best source is not an easy task. Other factors being equal, the study of a thing itself is preferred to a study about it. This is particularly true of the manipulative jobs, and often the case of managerial jobs as well. Culling hens, a manipulative job, certainly can best be learned in a hen house, though a preliminary study may speed up the actual doing of the job. The managerial job of why culling is necessary might be studied in the class room but successful poultrymen's opinions gathered by visits to poultry farms would be more effective teaching and possibly more applicable than text book information.

State college publications are perhaps the best source of authentic information. This is particularly true of those published by the experiment station. Recent cost studies should be of help to vocational teachers as it is no longer necessary to estimate costs.

Former project records are a source of information and greater use of them should be made in our every day

teaching. These prove to be of higher value in motivation than many other sources, being of contemporary interest.

6. Has care been exercised to avoid duplication of work done by other agencies than the school or other agencies in the school ?

Farm boys learn much that is good on their home farms and neighboring farms. Teachers must capitalize this experience and knowledge.

If the pupils' curricula have been properly planned they should get supporting knowledge from the other subjects studied, e.g. biology, botany, physics, chemistry, physiology and even mathematics and English. The wise vocational teacher will make every effort to coordinate and cooperate with the other teachers in the school, not as a means to further his own work only, but for the greater good of the pupils.

Recognizing the fact that pupils spend comparatively little time, less than 300 hours a year, in our vocational classes it is needless to point out the importance of spending this time with the greatest possible economy. How may we know what experience or knowledge the boy has before we make our assignments ? A pre-test, covering the particular job being considered, may be given. An analysis of the job with the class and opportunity for the pupils to relate experiences, will sometimes provide the necessary information if a careful check is kept on the class members, though this is more easily done in the case of a written pre-test. The two meth-

ods may be combined by reversing the order. Perhaps one period or less will be necessary for this part of the planning.

A check on the pupil's present status should be made before the lesson is planned in detail. The pre-test will indicate to the teacher the points in which all pupils are strong and those in which all are weak as well as those in which some are weak or entirely lacking. He can plan his lesson accordingly and make special assignments to fit special needs of individual students.

7. Has provision been made for recognition of individual differences in pupils ?

Though the number of pupils in a single class is small it will generally be found that the normal distribution curve will apply to the group; and individual differences must to some extent effect the teaching content and method. Individual differences may be of a considerable variety and caused by a variety of influences. Some common differences will be found among all children, such as physical differences, temperamental differences and mental differences. Perhaps the most important differences as they affect the teaching of vocational differences are found in the variety of situations found on the home farms of the pupils.

Physical differences must be taken into account in assignment of tasks that require strength or skill; in making seating arrangements, to accommodate eye and ear deficiencies. Lesson units should be so planned as to challenge the ability

of every pupil in the class. Degrees of difficulty and extent of assignment with no differentiation for various mental abilities will often discourage the slow or dull pupil. The assignment having been suited to his ability, he feels that an attainable goal has been set. The assignment suited to the dullest pupil will soon be mastered by the brilliant lad and, unless he is inventive or has unusual initiative, he will then begin to waste time. By an assignment that challenges the respect and capacity of each pupil regardless of his ability the time wasted will be cut to a minimum.

The home farm situations vary in numerous respects, as to the size of the farm, the type of farming, the degree of diversification, the number and kinds of livestock, the type of soil, the distance to market, the productive value of the farm, the amount of working capital. Several of these factors may have to be taken into consideration when the boy's individual program for the year is planned.

Then, we find wide variation of experience among our pupils. This may be due to the length of time he has lived on a farm, the native initiative of the boy, the degree of confidence of the parents in the boy, and the general attitude of the parents toward education, farming and life in general.

Individual interests, if valuable for social good or individual satisfaction should be recognized and given opportunity for expression and development by the teacher through

the medium of the home project and the study connected with it.

There are so many farmers, and quite a few of our pupils who cannot for example work out a balanced ration for livestock. Others of our pupils can do this in addition to the minimum assignment that has been set up for the slower pupil.

Where one pupil should perhaps learn how to make balanced rations for his livestock, another no doubt should learn that he can get the County Agent or the teacher of vocational agriculture to do this for him.

We find great differences in the attainment of skills and if we have a boy who can do things better with his hands than with his head, let us encourage him in the development of skills. This may act as a motivation for a more devoted application to the other phases of his work. If a chance to work in the shop is dependent upon maximum application in the class room, he will usually show improved activity.

The home project, being considered the basis for our vocational teaching schedule, should be given more thought than commonly is given to it. Teachers have been forced, either through supervisory influence or by experience, to lay increasingly greater emphasis on this phase of the work. In the early days of vocational agriculture projects were considered a side issue, almost entirely unrelated to class instruction, an evil to be endured as one of the requirements for federal reimbursement. Today those teachers who are doing the most effective teaching would be lost without this

foundation. Yet, we find many examples of undesirable projects. This fact is not always the fault of the teacher though frequently it is. It is well to make an occasional analysis of our entire teaching to find our weak as well as our strong points.

Because home conditions vary, it is not possible to set a definite standard of scope and ownership for each pupil. A minimum scope may be determined. The boy with the smaller project may be required to do more farm practice work under the direction of the teacher. The boy with the large one may be given more grade points or credit. To this day separate credit is given for class and project work, as if the former could be divorced from the latter. This attitude indicates a mistaken idea of the relationship.

8. Is sufficient emphasis given to the development of desirable attitudes toward farming as a calling ?

This involves both the economic and social problems of farm life. It's limitations are not the farm property line.

The pupil must be inspired with the desire to make his home an attractive place to live. This statement is a justification for the so-called "improvement" projects sometimes carried by the pupils. It is not difficult to convince farmers of need of good housing and sanitary conditions for livestock, or the advisability of a better feeding method, or the resultant efficiency of investing in labor saving machinery. Too many farmers have fine barns and poor houses, devoid entirely of labor saving devices. This condition is

being unfair to the farmer's wife, is responsible to a considerable degree for the children leaving the farm for city employment. and is responsible for the relatively low standard of living in the more remote rural sections. Eventually, it would drive even the better farmers from the farm in order that they might improve their conditions by a change of environment.

Experts in vocational guidance tell us that the average intelligence of farmers is about that of semi-skilled laborers. Farm Management experts and experts in Agricultural Education maintain that it requires at least average intelligence to carry on a business of farming at the present time. Increasingly, a farmer, to be able to compete with modern industrial business, must be able to apply a relatively high degree of intelligence to his own business. This means that we must either have intelligent farm owner or tenant operator or a system of farm tenancy under the direction perhaps of trained farm managers who would have supervision over a string or group of farms, each of which is under the direct control of a foreman.

Good management of a farm , which means that it be
"organized and operated for continuous and permanent profit-

1. Charts 36 and 37, -pages 308-310, " Organization of Vocational Guidance" -Dr. Arthur F. Payne.

making¹, challenges the intellect of the average man, or above average man. Farming requires considerable capital and therefore offers a good opportunity for returns on investment other than the operator's labor. The farm furnished a good living; and there is no better place for a home, which fact is attested to by the many business men who live even considerable distance from the suburbs of the cities.

As vocational teachers, we should imbue those of our pupils who may reasonably be expected to make a success of farming as eventual farm owners and operators with the idea and the ideal that the farm offers not only a means for a living but is a mode of living which is not isolated or apart from contacts with the more populous centers.

Many farmers at the present time believe that their income is very considerably below that of the man who has a small business in town or who works for a good wage in town. They often forget to consider the income the farm furnishes in farm living in the form of food, fuel and shelter. Also, they not infrequently forget to consider the increased value of their farm due to increased land prices and to improvements made with their farm earnings.

King, in his "Income of People in the United States", says that seventy per cent of the wage earners receive less

1. H. D. Scudder, Head of the Farm Management Department,
Oregon State College.

than \$1,000 a year and only fifteen per cent receive over \$1,500. Income tax data for 1916 indicates that only one and one-fourth per cent of income earners receive over \$3,000.

A survey made in Yamhill county by the Farm Management Department of Oregon State College gave the following approximate figures: Gross receipts \$2,300 with farm expenses other than operative labor \$900, leaving farm income of \$1,400. The approximate average capital of \$20,000 at five per cent interest is an interest charge of \$1,000, leaving \$400 as the operator's (including family labor) labor income. Adding to this the \$600 which is the value of the average farm living we have a true labor income of \$1,000. The true labor income plus the interest earned gives him a total annual income of \$2,000, which is considerably in excess of that earned by seventy per cent of the wage earners of the United States. Boys of all our vocational classes should be made to appreciate that the farmer is more of a capitalist than a laborer. Even a tenant farmer must usually have a working capital of \$2,000 or over.

Charles J. Galpin¹ speaks of the "inertia of the standard of living", or the tendency to continue a certain mode of living because of custom. Rural folk are slow in adopting the advantages and conveniences of their urban neighbors. For this very fact, there is often a feeling that these things are not for the farmer.

1. "Rural Social Problems" -Charles J. Galpin.

Boys and girls must be educated to the fact that farmer folk are as much entitled to take the good things of life as are the city folk. They must be educated to spend wisely as well as to earn. If this is not accomplished by education we may indeed be in danger of a condition of farm peasantry. This is a challenge to the educator and particularly to the rural minded educator, for if he or she does not assume this task, then who will? However, we have strong allies in the task. Improved highways, the motor car, radio, telephone, and the better farm papers are some of the factors that have reduced isolation. A new task may grow out of this development in that some of the modern improvements tend to destroy the rather stable family unit for which the farm in the past has been noted.

We see a beginning toward a new standard of living in the fact that quite a few farm houses are being built with a thought for the appearance as well as for utility and are equipped with modern sanitary conveniences, labor saving devices, and comforts in heating, lighting and entertainment. This is as it should be, though perhaps a note of warning should be given the young people starting out in the farming business that too great an expenditure for luxury now will retard their chance for future prosperity. This will, of course, apply to others as well as to the young farmer.

9. Is adequate emphasis given whenever possible to those additional principles considered basic in all education,-

namely health, family, industry, recreation, citizenship and religion?¹

Space does not permit a lengthy exposition on this important question. Some may say that this principle has no place in a vocational program. It is fair to say that generally only incidental attention can be given this principle, but it is safe to say that the incidental things in our teaching often result in the most significant outcomes. "He is to be educated, not because he is to make shoes, nails and pins, but because he is a man," Channing says.

"Particularly, also, must be stressed actual participation in those concrete activities whereby a socially enlightened community will induct the individual into fuller physical, family, economic, civic, recreational and religious life."² This summarizes in a single sentence the philosophy of education as expressed by Chapman and Counts. Our chief concern in teaching a specific vocation deals directly with but the economic life, and important as this is, we cannot overlook the other five major activities of life if we do our full duty as teachers.

A farmer does not have the same health needs the city man has. It is not difficult to see the relationships between this activity and the jobs of installing plumbing and a water system that will bring pure running water into the

1. "Principles of Education." - Chapman and Counts.

2. "Principles of Education." - Chapman and Counts.

house and farm buildings where it is necessary.

The civic activities of the farmer involve some knowledge in laws directly affecting his business interests, as well as an interest in the state and national legislation affecting his occupation and life; he has the right to suffrage as have other citizens.

Rural recreation centers and community churches play an important part in the life of the farmer and his family. These few statements are probably sufficient to give the point of view regarding the attitude of the teacher of vocational agriculture toward the major activities of human life.

10. Have the several teaching methods been evaluated for the teaching of the particular unit of work ?

In the selection of a method of teaching we must constantly consider the learning process as it occurs in the adolescent mind. Perhaps we should think more in terms of learning and less in terms of teaching method. The method selected for teaching any given unit or job must be determined before a complete outline of a unit can be made. Several considerations that must be kept in mind when deciding which teaching method or methods to use, are time element, interest of the pupils, availability of needed materials, weather conditions and other numerous factors.

Some common methods used in teaching agriculture are the recitation, lecture, discussion, conference, demonstration, laboratory (including farm shop), field trip,

supervised study, reports, surveys, or the combination of two or more of these methods. Perhaps the worst types are recitation and lecture methods, though they play an important part in teaching when used in combination with one or more of the other methods.

When an operative job can be observed in its natural setting on a farm, and this requires no more time than it would to study about it from bulletins or books, then surely we will choose the field trip. Nor would it be wise to study a managerial job from book information based entirely on different conditions when a survey in the community regarding this job will give the local situations and practices.

The printed page has had, and probably always will have, a tremendous influence on our actions. A boy must learn to read understandingly and be able to analyze to some extent semi-technical bulletins and books if he is to be a successful farmer. Supervised study, if properly carried on, will develop this skill in reading, analyzing and evaluating. Assisting the boy in the formation of such habits is worth more than the information he gets.

Special reports by individual pupils and a discussion of these is good teaching method. A boy should learn to get up before the class to give reports of special reading and be trained to defend his statements. Discussion may take the form of debate, pupils taking sides on the question.

The conference method may be used to a limited extent, to the extent that pupils have had previous experience in, or knowledge of, the job. Home project experience is a good basis for conference procedure, particularly after the first year in the agriculture course.

The laboratory method, including farm shop, has an important part in vocational agricultural teaching. Milk testing, egg grading, limited soil studies, grain judging and seed treating will illustrate this method. Special emphasis is given to farm shop and engineering to-day. The justification for this is based on a number of obvious facts. Repair of all kinds of farm equipment materially reduces depreciation, and the increasing use of farm machinery and mechanical power makes knowledge and skill in handling these very important items of reducing costs; desire for a modern home requires that the farmer know considerable about sanitation, water and light systems, building plans and so on.

11. Has the pupil's procedure for studying the lesson been indicated with sufficient definiteness?

The boy in early adolescence is restless and often lacks definiteness of purpose; he follows the lead that is most apparent and if it proves of interest will continue to follow. The older boys in school, partly because of added years and partly because of training already received, need less instruction and should be given more opportunity to use their own initiative for the pursuit of a given object-

ive.

A lesson plan should satisfy several essentials. These may vary with the subject and with the maturity of the pupils as above indicated. The following steps are basic in the development of a lesson plan.

1. It should provide means to determine the pupils present knowledge and his background of actual experience in the doing of the job. Some form of pre-test or an analysis of the job by the class, if closely observed and each pupil checked by the teacher, will accomplish this end.
2. The plan should be based on a survey of the various practices, conditions, and needs of the community in doing this job. The survey will point out the need for studying the job. It must include the items that will make it possible to determine the best practices. Such a survey may be made prior to a study of a job or as a part of the study. Availability of time will largely determine this question.
3. The teacher should keep in mind the important item of study habits. New material will present to the pupil new terminology. He should be encouraged in finding the meaning of new words. The lesson plan should provide for a check on this essential. If possible, this should be set up in problematical form.

4. A definite statement of the method or methods to be used should be included.
5. Definite instructions must be given to the pupils as a guide for the pupil's procedure.
6. Numerous questions and factors should be listed as a guide for the pupil's study.
7. A list of carefully selected sources of information must be provided. For the younger boys rather specific reference to sections and pages is desirable.
8. A list or statement of essential facts and skills or attitudes should be formulated as a result of a discussion by class and teacher. The teacher should work out this list prior to the discussion period.
9. A final testing of results must be made. The type of test to be used will depend on the nature of the job and other factors. A rather extensive objective test is more satisfactory than the essay type as it is possible to cover more ground and results are more accurate.
10. Perhaps the carry-over to the actual project and farm job the pupil is engaged in is the best basis for checking teacher-learning results. "What man knows should find expression in what he does", Bovee says. If what the boy has studied prompts him to make necessary changes in the performances of farm jobs we may say with assurance that the teacher has taught well and the pupil has learned.

12. Is provision made for a motivating approach and procedure ?

The ideal situation for learning is self motivation. Project difficulties may be named as an example, providing a boy has chosen a project that has a personal interest to him.

Perhaps the next best motive is the setting up of a problem that challenges a solution and gives irritation until the answer has been found. Often a question is more motivating than a statement. A statement that is or seems to be false sometimes induces mental activity. Definiteness and clearness are essential. Avoidance of lengthy and involved sentences assists in a clear understanding of the problem.

In the setting up of lesson plans on the job basis we must consider the various problems and factors that are involved in the job. A factor we understand to be " an element, condition, or influence affecting a result." ¹ To secure maximum motivation it is quite necessary for the teacher to consider carefully the method of stating the factors. As indicated above, the question form is perhaps the best.

Drawing constantly on the pupils' present project and other farm activities is an excellent way to motivate the unit being studied, and this in turn will motivate their project activities. Net teaching results have been more than doubled.

1. Federal Board for Vocational Agriculture Bulletin no.118
Agriculture series no. 32.

Competition as a motivating force has a place in vocational teaching. Excess must be avoided and fair play stressed. In case a number of boys have the same kind of projects, considerable ^{interest} can be created by introducing a friendly rivalry. Rules must be carefully set up and a close check kept on procedures, and an adequate basis used for final testing of results. Prizes by local farmers or merchants may be offered for excellent work.

Perhaps the most serious objection to the idea of prizes is the fact that some of the boys are seriously handicapped in carrying on projects and there is chance of negative results in the matter of attitudes established, causing discouragement rather than stimulation. However, numerous prizes, each of smaller value, will make it possible to give point values to a greater number of factors.

13. Does the lesson unit provide for adequate pupil participation?

Participation stimulates interest and interest is a basic factor in learning. Dewey has said " We learn to do by doing" .

Pupils should have a part in determining factors and problems to be studied. Stewart and Getman say that ¹ job analysis is not a teaching method but a guide to the teacher in what to teach. This has been tried by the author as a method. Although a minute analysis of every job in class 1. " Teaching Agricultural Education"-Stewart and Getman-- page 151.

with the help of the pupils would be carrying this idea to excess, some participation will act as desirable motivation. In every case the teacher will have prepared an analysis in advance.

It would be possible for the teacher to collect and assemble all the essential facts regarding the job and place them in the hands of the pupils, but it would be a serious mistake. Pupils must learn to search out information needed, to analyze it and to make decisions. To train boys in this habit is of much greater importance than to hand out the best information to them with out any effort on their part. The teacher should supplement their information with such data as it is either impossible or is not economically obtained by them. The admonition to go and look a thing up is not always a wise one. Some pupils will always lean on the teacher or on fellow pupils for information they do not themselves possess and to these such advice should be directed.

A thorough understanding of terminology used in the lesson is of fundamental importance. If the number of new terms is too great for each pupil to look up, a division of this task may be made and results pooled or exchanged. It is well for the lesson outline to call attention to key words and important new terminology.

Pupils should have a part in setting up of essential facts in the final discussion or "round-up" of the job studied. Every pupil should have a part in this. Some may

need to be encouraged while others must be held in check in order to give the backward ones a chance.

Ample provision should be made for individual laboratory and shop work. The purpose of shop work is to obtain knowledge and skill. As teachers of vocational agriculture we can hardly hope to produce a finished product in the form of a skilled workman but, where a degree of skill is important, sufficient repetition should be made to develop a degree of skill and an attitude of pride on the part of the pupil in his product. Competition will usually provide desirable motivation. If it is true that " the activities of the individual are indices of whatever learning is taking place"¹, then we must study the pupil's activities to determine his degree of participation.

14. Are the lessons so planned that the pupils will develop habits of study or research?

Chapman and Count say " Habit is the modification of behavior-executive, emotional and intellectual, consequent upon experience..... A habit in this wide psychological sense is nothing more than a disposition left by a previous experience"². Since experience constitutes the basis of habit, it is vital that we guide with the right kind of experience. Habits formed today are the foundation for new and

1. " Teaching Agricultural Vocations" -Stewart and Getman-
page 153.

2. " Principles of Education"-Chapman and Counts-pages 72-3

higher forms of habits.

The mere reading of a lesson does not insure mastery of the text. The pupil must develop the attitude of analyzing and evaluating the statements. Many pupils need to unlearn some set ideas they have acquired, and a mental attitude of suspended judgement is necessary in order that final decisions may be made on the basis of judgement unbiased by previous experience. This emphasizes the point of providing the right kind of experiences for the pupil. In determining the objective for a given unit of work it is important that the teacher keep in mind the effects the results will have on subsequent units. A pupil should be able to refer back to previous experiences in the solution of present problems. The responsibility for this is on the teacher.

Modern farm papers are a good source of information for farmers. Pupils should have systematic help in forming the habit of reading farm magazines.

Popular and semi-technical bulletins published by the United States Department of Agriculture and by the Extension Service and Experiment Stations contain valuable information for farmers. Our pupils need help in the study of these, particularly those with tabulations of various kinds. Practice in the interpreting of data of this nature must be supervised by the teacher. Once the pupil understands the significance of this type of literature, little encouragement will be needed to have him continue such studies, and

an invaluable habit will have been formed.

15. What provision has been made to determine whether pupils have realized the objectives and the standards of efficiency set up for the job and for individual pupils ?

Crandall and Cravens¹ suggest two criteria for testing teaching results " (a) Are students able to read, understand and profit by the semi-technical bulletins published by the Colleges of Agriculture ? (b) Are the students able to compute economic rations for other classes of livestock on the farm and in supervised farm practice?" To these one should add, do they actually put the acquired knowledge and skills into practice in their projects and other farm enterprises ? This is, no doubt, the final " proof of the pudding".
But how can we determine what educational objectives have been attained ?

Charts for checking the progress of each pupil are a valuable aid to the teacher and pupil alike. To some pupils such a device is a motivator. In the case of shop work this serves as a means to bring to the attention of the pupils those skills required for the doing of a particular job.

1. South Carolina Agricultural College, Division of Agricultural Education Bulletin No. 4 - " The Uses of the Farm Survey in the Teaching of Agriculture."

Home practice is more difficult of measurement. True, we can see evidence of some of the learning as it effects noticeable change in the boy's project activity, or the other farm activities he engages in. If a boy needs for his project, or the farm is in need of a new poultry house and he adopts or persuades his father to adopt the plans advised in school rather than some other plans under consideration, then we might say that our teaching is resulting in desirable outcomes. But, if the reverse is true, there must be something wrong. A boy may learn how to balance a ration and be able to compute the most economical ration for certain animals; but if he feeds his project animals just as he did before when they need the change there is something lacking in the educational process.

As teachers we should enable the boy to learn the best practices and he in turn should put these into effect when the opportunity offers itself. The jobs that can be put into practice by the pupils should be given preference for "we learn to do by doing", and immediacy of application will insure a stronger bond between the new situation and the response. The seasonal sequence of teaching the various new jobs as they occur in the occupation helps to accomplish this end.

Some educators, particularly supervisors, consider the financial side of the results as the best criterion to measure project success. This is an important measure of success

but so many factors than the boy himself are responsible for the result. After all, we educate not only the head for knowledge and the hand for skill, but also the heart for understanding. Proper attitudes, in the final analysis, are the best measure of teaching success.

PART II.

LESSON PLANS

and an Exhibit of Course Outlines.

Section A. Exhibit of Course Planning:

In determining content of courses and time allotment for the several enterprises and jobs, the following sources of information are available as valuable guides :

1. Surveys of the local community by the teacher.
2. Project reports of previous years.
3. Farm Management Surveys at the State College.
4. Agricultural Program for Benton County - Extension Service of State College.
5. United States Census of Agriculture: 1925 for Oregon, United States Department of Commerce.
6. Soil Surveys, State College.
7. Agricultural Situation--Bureau of Economics, United States Department of Agriculture.
8. Market Reports and Crops Reports-- Bureau of Economics, United States Department of Agriculture.
9. Agricultural Outlook, Bureau of Economics, U.S.D.A.
10. County Agent.
11. Advisory Board for Vocational Agriculture.
12. Local Bankers.
13. Local buyers of farm produce.
14. Successful local farmers.

PLANNING A COURSE IN LIVESTOCK ENTERPRISE.

Diversified farming is the safest type of farming and the tendency is in that direction. But even in diversified farming we find some specialization in that one or two of the enterprises are major and the others are minor or contributory .

In the Willamette Valley the usual major animal enterprises in order of importance are dairying, poultry and sheep.

Some crops on diversified stock farms are raised for cash sale but they are raised mostly for feeding.

For the individual pupil, his home farm, if typical, should be used as the basis for his work in agriculture while in high school. This differentiation of study can largely be taken care of by allotting an adequate amount of school time for project study and directing each pupil in additional home practice work.

The following tabulation was made from data taken from the United States Census of Agriculture : 1925 for Oregon, Statistics from Benton County. In some cases it was necessary to make estimation but these can not be far from correct.

Livestock and Products--1924-25.

Kind	Total number	Total value	Receipts .
Horses	3,392	\$ 209,727	Work
Dairy-cattle	9,000 (est.)	\$400,000 (est.)	\$298,000

Kind	Total number	-43- Total value	Receipts.
Sheep	25,679	\$ 245,336	\$69,807-wool
Goats	7,706	23,000	12,009 (mohair)
Swine	4,046	37,041	-----
Chickens	98,514	96,633	205,918 (eggs).

Note: The total value of chickens is very much less than that of sheep but the receipts are considerably greater for chicken eggs than for the wool only. By adding the sale of lambs to the returns for sheep the total would be doubled but even then gross returns realized from poultry are greater on the basis of value of animal units only. However, such other factors as labor cost, value of equipment needed and feed costs must be considered before an adequate comparison can be made.

This is but a beginning in the determination of content and time allotment. It is not the purpose of this thesis to answer this important part of the teacher's work. An application of the principles developed in Part I will enable one to outline the courses. Local conditions must be given serious consideration as they must play the leading roles in the building of a vocational program.

AGRICULTURE I.

A STUDY OF LIVESTOCK ENTERPRISES ON THE FARM.

THE DAIRY ENTERPRISE

Month	Jobs	Days Each.
Oct.	1. Importance of dairying and how to select cows.	1
	2. Selecting good cows	1
	3. Calving problems	1
Nov.	4. Providing Feeds	1
	5. Milk testing (demonstration).	1
	6. Feeding cows-rations and principles of feeding	3
Dec.	7. Separating milk	1
	8. Testing milk for butter fat (practice)	1
	9. Testing milk for sediment	1
	10. Producing clean milk	2
Feb.	11. Raising calves	2
	12. Buying cows	2
	13. Comparative costs (11 and 12)	1
Mar.	14. Values of manures	1
	15. Manure management	2
	16. Advantages in livestock farming	2
Apr.	17. Dairy costs and incomes	3
	18. Proper size of dairy unit	2
May	19. Marketing products (Cooperative)	2
	20. Healthy cows for high quality product	2

Total Ninety minutes a day for 32 days.

THE SHEEP ENTERPRISE--GOATS INCLUDED.

Month	Jobs	Days Each
Sept.	1. Importance of sheep and how to select breeding stock.	1
	2. Selecting breeding rams and ewes	1
	<u>3.</u> Flushing ewes and breeding	1
Dec.	<u>4.</u> Shelter and feed for ewes	1
Jan.	5. Lambing	2
	<u>6.</u> Sheep costs and incomes	1
Feb.	<u>7.</u> Importance of Angora goats	1
Mar.	8. Providing summer pasture	1
	9. Culling the ewe flock	1
	<u>10.</u> Docking and castrating lambs	1
Apr.	11. Shearing sheep	1
	<u>12.</u> Grading and marketing wool	1
May	13. Feeding lambs	1
	14. Marketing lambs	1
<hr/>		
Total	---- Ninety minutes per day for	15 days.

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THE POULTRY ENTERPRISE

Month	Job	Days Each
Sept.	1. Housing Pullets	1
	<u>2.</u> Feeding pullets.	1
Oct.	3. Factors for success in poultry	1
	4. Providing winter feed	1
	5. Feeding for egg production	1
	<u>6.</u> Poultry costs and incomes	1
Nov.	7. Poultry houses and appliances	1
	8. Yard sanitation	1
	<u>9.</u> Diseases and pest control	1
Dec.	10. Making and managing breeding pens	1
	<u>11.</u> Selection and care of hatching eggs	1
Jan.	12. Incubation	1
	13. Egg grading	1
	<u>14.</u> Marketing eggs	1
Feb.	15. Getting ready for baby chicks	1
	16. Buying baby chicks	1
	17. Feeding chicks	1
	18. Care and management of chicks	1
	<u>19.</u> Baby chick troubles	1
Apr.	20. Selling the cockerels	1
	<u>21.</u> Culling the laying flock	2
May	22. Pullet summer management	2
<hr/>		
Total	Ninety minutes a day for	25 days.

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FARM HORSES.

Month	Job	Days Each
Oct.	1. Selection of a good horse	1
	2. Feeding preparatory to heavy field work	1
	3. Preparing the horse and harness for field <u>work</u>	1
Dec.	4. Feeding and care of idle horses	1
	5. Costs of horse labor and how to gain more efficiency	1
	6. Selecting brood mares	1
	7. Raising colts	1
Total	Ninety minutes a day for	7 days.

THE SWINE ENTERPRISE.

Month	Job	Days Each
Oct.	1. Relative importance in county and how to select breeding stock	1
	<u>2.</u> Selecting breeding stock and breeding	1
Jan.	3. Preparation for farrowing	1
	4. Farrowing	1
	5. Care of pigs and sow after farrowing	1
	6. Fattening	1
	<u>7.</u> Marketing and profits from swine	1
Mar.	8. Weaning pigs	1
	<u>9. Pasture and grain for economical production</u>	1
Total	Ninety minutes a day for	9 days.

FARM SHOP WORK

Month	Job	Days Each
Nov.	1. Plan reading	1
	<u>2.</u> Drawing practice	2
Dec.	3. Study of cream separator	2
	<u>4.</u> Study of milking machines	1
Jan.	5. Leather work	3
	6. Soldering	3
	<u>7.</u> Rope work	2
Feb.	8. Lumber grades and prices	1
	9. Proper use and care of tools	1
	<u>10.</u> Sharpening tools	3
Mar.	11. Sketching livestock appliances	2
	12. Construction and repair of livestock _____ appliances	5
Apr.	13. Concrete work	2
	14. Small building construction	3
	15. Planning a farm shop at home	4.
<hr/>		
Total	Ninety minutes a day for	35 days.

HOME FARM SURVEYS

Month	Job	Days Each
Sept.	1. Visits to home farms	6.
Oct.	2. Visits to home farms	5
Nov.	3. Study and tabulation of data collected	5

Total Ninety minutes a day for 16 days.

Note: A visit by the class and the teacher to every farm represented will give an excellent basis for mutual understanding of problems.

The following is a suggestive form for a survey:

Name of farmer _____

Owner or renter _____ Tenure _____

Total acres _____ Tillable _____

Under plow _____ Permanent pasture _____

Soil types _____

Productivity _____

Crops grown _____ Acreage Each _____ Use _____

LIVESTOCK:

Kinds	Number	Age	Breeding and Breeds.
-------	--------	-----	----------------------

Remarks: (to be used for notes on such items as number and condition of buildings, amount and condition of equipment, and other impressions individually received by pupil).

HOME PROJECTS AND FARM PRACTICES

Month	Job	Days Each.
Sept.	<u>1.</u> Preliminary discussion	1
Oct.	2. Project selection	2
	<u>3.</u> Project budgets	2
Nov.	4. Project study and planning	2
	5. Project records	2
	<u>6.</u> Discussion	1
Dec.	7. Project reports	2
	<u>8.</u> Project study	2
Jan.	9. Project study	1
	<u>10.</u> Project reports	1
Feb.	11. Study of feeding of project animals	3
	<u>12.</u> Report of feeding study	1
Mar.	13. Visit to two projects (sanitation, etc.)	1
	14. Study of sanitation of project animals	3
	<u>15.</u> Report on sanitation	1
Apr.	<u>16.</u> Class visitation to each project	6
May	17. Project planning for summer	1
	18. Report of plans	3

Total Ninety minutes a day for 35 days.

Note: A total of six days has been set aside for term examinations, holidays, etc., making a grand total of 180 days.

SCHEDULE FOR OCTOBER.

Note: This is a sample monthly schedule-

Date and Day	Job and Number	Method.
2-----Thursday	Swine-----1	Discuss and study
3-----Friday	Surveys----2	Field trip
6-----Monday	Surveys----2	Field trip
7-----Tuesday	" "	" "
8-----Wednesday	" "	" "
9-----Thursday	" "	" "
10-----Friday	" "	" "
13-----Monday	Projects---2	Discussion
14-----Tuesday	" "	Supervised study
15-----Wednesday	Projects----3	Discussion
16-----Thursday	" "	Supervised study
17-----Friday	Horses-----1	Field trip
20-----Monday	" 2	Study and discuss.
21-----Tuesday	" 3	Field trip
22-----Wednesday	Dairying---1	Study and discuss.
23-----Thursday	" 2	Field trip
24-----Friday	" 3	Supervised study
27-----Monday	Poultry---3	Study and discuss
28-----Tuesday	" 4	Field trip
29-----Wednesday	" 5	Study and discuss
30-----Thursday	" 6	Study and discuss
31-----Friday	" 6	Discussion and test

Note: Job numbers are taken from individual enterprise job sheets.

A UNIT OF WORK FROM COURSE IN AGRICULTURE III.

PLANNING A SMALL IRRIGATION PROJECT.

Objective: To install a small irrigation project on the H. H. Gibson farm.

General explanation: A small brook, fed partially by overflow from the Corvallis City Reservoir located on Baldy Mountain, flows from north to southeast through the 35 acre farm belonging to Mr. Gibson. It flows through a large culvert under the Corvallis-Newport Highway; the highway cutting through the farm from east to west. Land on both sides of the highway may be watered by erecting a dam near the upper (north) side of the farm.

The accomplishment of this project is divided into 12 jobs. Two or more of these jobs will be worked at the same time, in order to make the most advantageous use of the available equipment and the pupil's time.

LIST OF JOBS.

Days Each

- | | |
|--|---|
| 1. To learn to set up and to operate the transit and rod and to give signals. | 1 |
| 2. To learn to record readings and calculate differences in elevations. | 1 |
| 3. Make preliminary surveys to locate the dam site. | 1 |
| 4. To make a survey to find the highest contour line for a gravity ditch system. | 1 |
| 5. Draw sketch map and calculate areas of land. | 1 |
| 6. To calculate the amount of water needed. | 1 |

7. To calculate the amount of water available.	1 day.
8. To make a study of the soil types and determine possible crops to grow with irrigation. (1 day to make a trip to an irrigation system.)	2
9. To figure possible costs and profits.	1
10. Devising ways and means for getting the water across the highway.	1
11. Building a dam.	5
12. Putting in main ditches, -for gravity system.	3
<hr/>	
Total Ninety minutes a day for	19 days.

SECTION B.

TYPE LESSON PLANS.

JOB I.

To learn to set up and operate the Transit and Rod, and to give signals. (From unit on Irrigation.)

Objective: To have each pupil in the class get sufficient skill to be able to operate in the field.

Materials: Transit and Rod, note book and pencil.

Procedure: Step.1. Teacher demonstrates setting up tripod and attaching instrument. Questions and explanations. Step 2. Demonstration continued by leveling instrument with adjusting screws. Questions and explanations. Step 3. Each pupil given his turn at setting up. Step 4. Demonstration of the use of the rod and movable target. Step 5. Instruction on how to hold the rod and how to read elevation. Step.6 .

Instructions,- pupils taking notes-on signals to be used.

Step. 7. Practice by each boy in sighting and giving signals.

Step 8. Practice by each boy in acting as rod man.

Essential skills and facts to be mastered for efficient work in surveying : 1. To set up the level and operate the transit. 2. To give proper signals to the rod man. 3. To properly set, hold and manipulate the rod. 4. To understand signals given by the instrument man. 5. To take down and properly encase the instrument. 6. To understand and be able to use the necessary terminology.

JOB III.

MAKING SURVEYS.

Objectives : 1. To locate a dam site and determine the height of the dam. 2. To find out if the neighbor's land will be flooded seriously. 3. To learn how high water would need to be lifted to irrigate the west field.

Materials needed : Transit and tripod, rod, hatchet, steel tape, a dozen clean stakes, field notebook and pencil.

Procedure: Step 1. The class will decide on a point at which the instrument may be set for sighting in every direction necessary to accomplish the objectives. The teacher has previously selected the approximate spot and will assist the pupils in their decision. The dam site must be tentatively located. The point selected is about 100 feet south of the north line fence and 75 feet west of the brook. From here sights can be directed in every direction if necessary.

Step 2. The transit is set up and leveled.

Step 3. The rod is carried to the County road, north of the farm, and moved about until the lowest spot is located. The reading is recorded as Foresight(F. S.)

Step 4. The rod is next carried to the location tentatively selected as the dam site, and moved about until a spot has been found on the east bank of the brook which seems to satisfy the stipulation. The target is moved up 2" in order to get the top of the dam below the road level. Drive a solid stake just level with the ground, set the rod on it for a final check. Drive another stake on the west bank, but it will not be driven level with the ground as it will require a little filling in at this point.(A second stake may have been driven in beside the one on the east bank to make it easier located.) Record these readings as the Back-sight. (B.S.)

Step 5. Carry the rod into Mr. Hansen's pasture across the County Road and take four or five readings at various points that will enable an estimate of the area that will be flooded when the stakes at each point and record these numbers and the elevations as foresights.

Step 6. Carry the rod to the highest point in the West field and drive a stake (they should be numbered in order) , set the rod on it , get the reading and record it as foresight.

Note : The stake at the dam site may be considered a bench mark or hub and subsequent readings can be taken from this as a known starting point. This will be used for locating

the main ditches around the upper borders of the fields to be watered by gravity. A new setting will be required for that job, which will be the work tomorrow.

UNIT OF STUDY.

SURVEYS OF HOME FARMS OF CLASS MEMBERS.

Objective: To visit every pupil's home farm for the purpose of having a mutual understanding of the home problems and conditions.

Reason for the study: 1. To motivate the pupils with contemporary situations. 2. To acquire information that will be helpful in subsequent study and discussion. 3. To get data that will be helpful in further determination of course content, and time allotment. 4. To help in the selection of projects and other farm practices. 5. To locate places for later field trips for study of certain jobs.

Job I. Deciding on the type of information wanted and making a form. Time--one period.

Procedure.

Step I. "The aim of the next job you will see on the board." (This has previously been put there by the teacher.)
"Write 'Surveys' on the tab of one of your divider cards and take a piece of note paper which you will head 'Surveys of Home Farms' and under it write your objective as you see it on the board."

Step II. " Why do you suppose it has been decided to make these visits? " After a few pupils replies are jotted down on the board the teacher will write reasons 2,3,4 and 5 for studying on the board to be copied by the pupils.

Step III. " What will we need to observe on the visits to be of use in our work for the year ?" Pupils suggestions will be jotted down on the board, to which the teacher will add if necessary.

Step IV. " Now, let us decide which of these points are most important and which ones we may want to eliminate". " Eliminate" is an example of a word that may be unfamiliar to some of the pupils and therefore may need defining by a pupil who knows the meaning or by the teacher if some pupil cannot adequately define it. By discussion and eliminations additions will be made and the necessary points for a survey form will be left on the board.

Step V. " In order that we may all use the same system let us make a form for this survey. We will have copies made on the multigraph. These we will take on our trip with us. To help us get the idea of how to make such forms, let us turn to page 7 in this bulletin." Here teacher passes out bulletin containing such forms and after a few minutes time given for looking through the forms, proceeds to set up a form on the board, giving the pupils as much participation in deciding the issues as advisable. A discussion of each item is made to clear up any questions as to the meaning and the answers to be obtained.

Step 6. " It will not be necessary for each of you to copy this form as we will have multigraph copies made. But, remember, we will visit each of your home farms and you can help a great deal by having yourself and your father well posted on the information we have decided to get. We want your Dad to help us with this if he has the time. Whose place will we visit tomorrow? Several pupils will no doubt offer an invitation. " All right, tomorrow we will start with Bill's farm, providing Mr. Jones will be at home. Is that all right, Bill? Very well, now put your note books away. Class is dismissed."

Notes: 1. The survey form mentioned in this lesson may be found on page 49. 2. The job of making preliminary home farm surveys comes at the beginning of the school year, as may be noted on page 49. 3. An analytical discussion of animal enterprises on the farms in this community has preceded this lesson, this lesson being taken from the course in livestock.

JOB II

MAKING A SURVEY OF A PUPIL'S FARM HOME.

Method- Field Trip.

Time- 1 to 2 Periods.

Objective: To get general data that will be useful in course content and lesson plans, (a) particularly with reference to the particular pupil's individual study and home practice program, and (b) to give each boy a chance to see

every other boy's farm environment.

Note: It is understood, of course, that the teacher has visited the farm previous to the visit by the class.

Procedure:

Step 1. Each boy is handed a copy of the survey form previously worked out by the class (to be found on page 49) and multigraphed. This form is clipped on a heavy card for greater ease and efficiency in handling.

Step 2. On arrival at the farm a conference is held with the farmer and pupils given an opportunity to ask questions. Each pupil will mark his own form.

Step 3. An inspection of buildings, livestock, and fields will be made so far as possible in the time available and the pleasure of the farmer permits.

Step 4. Each boy will file the survey form in the proper section of his note book.

Step 5. A thorough discussion of the trip. Note: Time probably will not permit a discussion of the first trip on the same day, but a thorough discussion is essential. This should be done during the first part of the period on the following day. Another survey, if not too distant, may be undertaken during the balance of the period. Each farm must of course be visited before final tabulations can be made, though such tabulation is of lesser value than the data of each farm as a unit in itself.

It will be well to mention that this preliminary survey will in no way take the place of the individual job survey-analysis.

Following is a survey form with the data obtained:

Name of farmer: " Bill" Morse.

Owner or renter: Full owner. Tenure: 10 years.

Total acres 119 Tillable 110

Under plow 85 Permanent pasture 30

Soil types clay, salty loam, rolling, good drainage

Productivity fair to good.

Crops grown	Acreage	Use.
Prune orchard	10	Cash crops
Clover hay	20	Home feed
Corn	9	Silage and hogs
Oats	26	Home feed
Wheat	20	Home feed and sale.

Livestock:

Kinds	Number	A ges	Breeding and Breeds.
Cows	7	2-5	Pure Jerseys
Heifers	4	1-2	" "
Calves	3	under 1	" "
Horses	5	5-12	Grade Percheron
Swine	16	hogs	Pure O.I.C
Sows	3	3	" "
Boar	1	2	" "

Kinds	Number	Ages	Breeding and Breeds.
Turkeys	100	Young	Bronze
Chickens	100	1-2	White Leghorns

Remarks: Fair house, new O.M.C. type chicken house not finished, old barn with a medium fair dairy section, good hog house, old silo, fair fences. Machinery fairly adequate and in fair shape.

Notes :How can this data be used in teaching ?

1. An application of Warren's productive work units to this farm show that the total of 526 M.W.U. are needed or 263 per man employed, not such a bad average; but for the 300 H.W.U. there are five horses on the place, an average of only 60 per horse. This can be made a lesson for the boys, and serve as an example of the use of such a survey as this.

2. The crop acres and animal units will come into constant play in the subsequent teaching and learning. The entire class now know what Bill has to work with.

JOB - FARROWING PROBLEMS - 4 DAYS .

Objective: To raise large litters of strong pigs.

Why study this job ? (Nearly all farmers in this community raise some pigs. (2) Frequently some pigs die at birth. (3) Small litters are too common. (4) Five boys in the class have hog projects.

First Day-

Instructions to pupils: Step number 1- First read the objectives and the reasons for studying the job.(above) Step 2. Read carefully the list of factors and problems. Be sure you know the meaning of words underscored. Mastery of first fourteen factors is required.

Factors and Problems

References.

1. How should sow be fed from five days before until farrowing ?
2. Should sow that is about to farrow be kept with other hogs ?
3. What is the purpose of farrowing rails and how are they constructed?
4. How large should the farrowing pen be?
5. How should the pen be prepared for farrowing ?
6. What kind of bedding may be used ? How much ?
7. What is the period of gestation for

" Ohio Individual Farrowing House" (pictures)

Farmer's Bulletin number 438

" Hog Houses" pictures.

Farmers Bulletin

a sow; for a gilt; the average ?

8. What kind of help should be given a sow at farrowing?

9. How should pigs be treated immediately after being born ?

10. What are some common farrowing troubles ?

11. How should a sow be fed for the first four or five days after farrowing ?

12. Why must a sow receive heavier feeding when suckling pigs ?

13. What is a good ration for a sow suckling pigs? What is tankage?

14. How many pigs should a sow farrow in 24 months if she is to be a profitable investment ?

"The A Shaped Hog House" - Tenn. pictures.

Ore. Sta. Circ.

56"Cost of Producing Pork" .

pp. 5-6

O.S .C. Hog Barns

Henry and Morrison

" Feeds and Feeding"

pp.357-8

Day " Productive

Swine Husbandry "

pp. 232-4, 227

Farmers Bulletin

1437 " Swine Pro-

duction " pp. 9-11

Ore. Sta. Bul. 196

" Finishing Pigs for

Market" p.11 tank-

age.

Additional Assignment for Grade above D

15. What variation is found among breeds as to number of pigs in a litter?

Farmers Bul.1437

" Swine Production"

16. Should a sow be expected to have two litters a year? How many years may a good sow be kept for a brood sow ?

Types and Breeds

of Farm Animals.-

Plumb.

17. What is prolificacy ? Ore. Sta. Bu. Cir.
18. At what age may a gilt be bred? 56 - Cost of pre-
19. What factors determine the time of producing pork ."
year that a sow may be bred ? When Market reports.
then will the pigs be marketed. ? " Productive
20. When should a sow be bred? Swine Husbandry"-
21. Does the conformation and size Day, pp. 34-5, 37-38
the sow have an effect on the Farmers Bulletin
pigs ? No. 1167.
22. To what extent does the boar in-
fluence the quality of pigs and
what quality boar should be used ?

Step 3. A visit will be made to the college hog barns to get as much first hand information as possible from observation and a conference with Mr. Yates, herdsman, at the college. It will be necessary to take notes as no comparison will be made after returning to the classroom for study.

Second Day: Step 1. This day will be given to the study of the references given. Make notes to answer each problem in the outline, using the same numbers. Refer also to your notes taken at the college hog barns.

Third Day: Step 1. A discussion of problems on which pupils have questions will be given about thirty minutes of time. Also, experiences of pupils who have hog projects.
Step 2. A list of essential facts to fit each problem in the outline will be formulated by the class and the teacher.

Fourth Day: An objective test will be given. Every student is expected to make a mastery test of the first 14 problems.

ESSENTIAL FACTORS.

1. A sow should be fed a rather light grain feed with pasture or legumes as hay for a week prior to farrowing. Twelve hours before she should have only water. If green feed is scarce a little oilmeal is advisable.
2. She should be placed in a separate farrowing pen about a week before time.
3. Farrowing rails give the pigs a chance to get out of the sows way when she lies down. An eight inch plank placed edge-wise on the wall about eight inches above the floor makes a good rail.
4. The farrowing pen should be about six by six feet or a little larger.
5. The pen should be carefully cleaned and disinfected with creoline preparation.
6. Straw cut short but not too chaffy makes good bedding. Only a small amount should be used.
7. The gestation period for sows is 120 to 115 days; for gilt 108- 112. The average is 112 days.
8. If the sow is handled some before farrowing she will not be nervous if given help at farrowing. Often no help is needed. In the case of farrowing young sow it may be necessary to pull out the pigs but this should be done only when the sow is straining.

9. A new born pig should have the phlegm removed from the nose. Then it should be put in a warm place. If chilled it should be immersed up to the head in warm water, and be put to the teat for suckling.

10. Common farrowing troubles: pigs born dead, pigs being chilled, inflammation of the udder.

11. From 12 to 24 hours after farrowing the sow should have only warm water; then from 3 to 5 days on light feed which should be increased to full feed in from $\frac{1}{2}$ to two weeks, depending on the amount of milk needed.

12. A sow suckling pigs should be fed more grain and less roughage because she has to supply food for herself and the litter.

13. A sow suckling pigs should be fed less roughage and more grain high in protein. Tankage, a commercial name for a feed made from meat scraps and other offal of the slaughter house, is a good protein supplement.

14. To be profitable a sow should farrow at least 16 pigs every 24 months or on an average of five and one-third for each of three litters.

Additional factors:

15. Berkshires, Duros Jerseys and Chesterwhites are all more prolific than Poland Chinas.

16. A two year old sow may farrow two litters a year but pigs must be weaned at eight weeks of age. Three litters in two

is a better practice. A good sow may be kept as long as she farrows a good litter, to eight years or older.

17. A gilt may be bred at eight months of age but it is better to wait until 10 months.

18. Several factors determine time of year that a sow should be bred in Oregon, two most important are available cheap feed, and season of the year when prices are best.

19. For the best prices sows should be bred in March or April and again in September or October. Nearly four months gestation period and seven months to grow out their pigs will put them on the market in February or March or in August or September.

20. A sow should be carefully selected for conformation and quality, should come from a prolific strain, because "like begets like". The sow is responsible for the number of pigs in the litter. A small second or third litter after a large first one is due to improper feeding just prior to or during gestation period.

21. The boar influences the litter about 50 % and should be selected as carefully as the sow. Only pure bred boars should be used.

OBJECTIVE TEST IN FARROWING.

Please see the numbers found in A in the parenthesis under B to complete the sentences in A.

A.- A sow should be placed in (1) a B.-() Straining:
week prior to farrowing. Care must be () Nose
taken not to use too (2) bedding. Pigs () Teat
should be pulled only when the sow is (3) () Twelve
and then only when she needs help. A () Water
new born pig may need to be rubbed dry () Grain
and to have the (4) removed from his (5). () Oilmeal
For his first (7) he may need to be () Separate pen.
placed to (6). For (8) to (9) hours be- () Roughage
fore farrowing the sow should be fed only () Farrowing
(10). A sow suckling pigs needs more (11) () Feeding
and less (12) than before (13). In case () Rent
no green feed or hay is available a () Much
little (14) may be put in the sows feed () Phlegm
before farrowing. Each pig claims his () Twenty-four
own place at the table and the weaker
pig becomes the (15).

Place the number from B in parenthesis under A for the best match possible:

- | A | B |
|---------------------------------|-----------------|
| () Eight inches from the wall. | 1. Creoline |
| () A good protein supplement. | 2. Barley |
| () Roughage feed for hogs. | 3. Alfalfa hay. |

- | | |
|----------------------------------|-------------------|
| () Used for disinfecting. | 4. Tankage |
| () Prevents smothering of pigs. | 5. Farrowing rail |
| | 6. Trough |

Place the number of correct answer in parenthesis in front of statement :

- () The height of a farrowing rail should be from the floor in inches (1) 6; (2) 18; (3) 8; (4) 12.
- () The average gestation period is (1) 4 months; (2) 112 days; (3) 150 days; (4) 100 days.
- () To be profitable a sow should farrow yearly (1) 6 pigs; (2) 8 pigs; (3) 5 pigs; (4) 7 pigs.

Place a plus or minus sign before each statement :

1. During the week prior to farrowing a sow should be fed a heavy ration.
2. If succulent feed is lacking, a little oilmeal should be added to ration before farrowing.
3. Only water should be fed 12 hours before farrowing.
4. A twelve inch plank placed 6 inches above the floor makes a good farrowing rail.
5. A farrowing pen should be 6'x6' or larger.
6. The pen should be cleaned and disinfected before the sow is placed in it.
7. Short straw makes good bedding.

8. Gilts usually carry their pigs longer than sows.
9. A sow should never be handled before farrowing.
10. If a sow has been properly fed before farrowing she will seldom have trouble at farrowing.
11. A chilled pig should be entirely immersed in hot water.
12. Inflammation of the udder may be caused by cold, dirty pens and must be treated properly, and promptly.
13. Pigs being born dead is due to light feeding just before farrowing.
14. A sow should be given a full ration just before farrowing.
15. A sow with a large litter will need heavier feeding than one with a small litter.
16. Tankage is a milling by-product.
17. Three litters every two years is a good average.

For a grade above D:-

1. Berkshires are among the most prolific breeds.
2. Two other prolific breeds are _____ and _____
3. A good prolific sow should be kept (years) (1) 2; (2) 15; (3) 6;
4. Only gilts of good conformation should be kept for breeding purposes.
5. A gilt should be bred at (months) (1) 3; (2) 6; (3) 15.
6. Factors that determine the time of year that sows should be bred in Oregon are _____

7. In order to get top prices for pork sows should be bred either in the months of _____.
8. This will put their pigs on the market in the months of _____ and _____.
9. Only a _____ boar should be used for a sire has _____% influence on the litter.
10. The number of pigs in the litter depends entirely on _____.
11. _____ is largely to blame for small litter at second farrowing following a fair number the first time.
12. Explain "like begets like."

SHEEP.

MANAGEMENT, CARE, AND FEEDING OF EWE FROM TIME PRIOR TO BREEDING UNTIL AFTER LAMBING TIME.

Note: This unit was studied at lambing time and required six days.

A. Situation to be dealt with:

1. Sheep farming is an important enterprise in community.
2. Two boys in the class have sheep project.
3. Considerable difference in practices is found in community.
4. Due to poor practice small lamb yields are obtained and ewes are frequently unable to suckle their lambs.

B. Objective:-

1. To produce high percentage of lamb yields.

C. Note: The following pre-test was given several days prior to the study of this unit; really embodying both review and the pre-test idea.

1. What is meant by "flushing" ewes?
2. How long does a ewe carry a lamb?
3. What is gestation period?
4. During which months should lambs be born?
5. How early in the fall should a ram be turned in with the ewe flock?
6. Is it necessary to feed grain or hay to sheep all winter?
7. Under what conditions is winter feeding absolutely necessary?
8. What kinds of hay are best for sheep?
9. Should oats be fed whole or ground?
10. How much grain is usually fed per head?
11. How much hay would you feed?
12. What is the use of lambing pens?
13. Is it advisable to use them?
14. What is meant by parturition?
15. In what position should a lamb come at birth?
16. What kind of help may be given a ewe when giving birth to a lamb?

17. Why do ewes sometimes lack milk ?
18. How can you avoid keeping such ewes another year ?
19. How can a ewe be made to claim a lamb as her own ?
20. How many lambs should a flock of 100 ewes produce in a year ?

D. Procedure:

First day.

Step I. Presentation:

" The aim of producing a high per centage of lambs is so postively dependent upon the previous management of the ewes that it is desirable to review several jobs that precede the particular job to be studied now. We will review Jobs I, II and III from the outline that will be put into your hands, or you may turn back to your former notes on these jobs."

Step II. " Before proceeding with the review study let us figure out the problems that will need to be solved in the new jobs to be studied now. Then we can put this in with the old jobs and have them all together in one outline. We will begin with the management at lambing time (Job IV). Let us list on the board the problems in the job. You boys who have had more experience with sheep can help us out on this."

Jobs IV, V, and VI are thus analyzed by the class and teacher.

Step III. " Now you may go ahead with the review study for the balance of the period; we have only thirty minutes."

Second day:

Step 1. " Multigraph copies of the problems we worked out yesterday on Jobs IV, V, and VI are ready for you. Study two of the references, at least, given for each job. You may use the back of the outline for your study notes, using the same numbering system as that used in the outline. This will enable you to use your notes to a better advantage, in the discussion the last part of the period. Your notes do not need to be complete sentences. Are there any questions on how to proceed? We do not have a copy of each reference for each of you, so pass the book or bulletin back as soon as you have finished with it. You do not all have to start on the same job, nor is it necessary to keep your notes in the same order that they are in in the outline, but be careful to follow the same numbering system."

Step 2. Supervised study for about forty-five minutes.

OUTLINE OF JOBS .

Job.I. Fall Management of the Breeding Flock.

Factors and Problems

Sources of Information.

1. What kind of pasture may be provided for the flushing of ewes ?
Study at least two references.
2. How may the ram be put into condition ?
Craig-"Sheep Farming" pp. 165; 167-70; 170-3.
3. What time should the breeding commence ?
Coffey -"Productive Sheep Husbandry" -pp. 225-8; 230-3.

Factors and Problems:

4. How long prior to breeding should ewes be flushed ?
5. When should the ram be taken from the ewe flock ?
6. What effect does flushing have on the lamb yield ?
7. Why should ewes be tagged ? What is meant by tagging ? By dock ?
8. How young may ewes be bred ?
9. How many ewes to a ram ?

Sources of Information:

Potter-" Western Livestock Management " . pp. 179-81
Pupils' Projects.

JOB II. WINTER CARE AND FEEDING OF FLOCK.

1. What kind of pasture can be provided for winter ? Craig-pp. 177-80
Ore. Exp. Sta. Cir. no. 62
2. When should hay be fed? Coffey 236-8
3. How much hay will probably be needed? Potter-pp. 82-3
Pupils' projects.
4. What kinds of grain may be used ?
5. How should grain be fed ?
6. How much grain per day per head should be fed ?

JOB III. SHELTER, EQUIPMENT AND EXERCISE FOR EWE.

1. What kind of shelter needs to be provided ? Kleinheinz " Sheep Management" -pp. 37-41.
2. How much space is needed for hay ? Coffey- pp. 240-1.

Factors and Problems

Sources of Information

3. What is a good arrangement for feeding ?
4. What kind of hay and grain racks are advisable?
5. How many ewes get exercise ?
6. Why is exercise necessary ?

Pupils' projects.

JOB IV. MANAGEMENT AT LAMBING.

1. Where should ewes be kept during lambing season ?
2. How often and when should shepherd look after the flock ?
3. What time of day are most of the lambs dropped ?
4. What is the normal presentation of a lamb ?
5. How much help should a ewe be given at lambing ?
6. What attention should be given a new born lamb ?
7. When should lambing pens be used ?
8. How important is it for lamb to get the colostrum milk ? What is colostrum ?
9. How can a ewe be made to own a lamb ?

Craig-pp. 183-5, 189-95; 196.

Kleinheinz-pp. 45-53

Potter- pp. 184-6.

Pupils' projects.

Factors and Problems

Sources of Information

10. How should a ewe short on milk be fed ?

11. Why should ewes udders be tagged? What is meant by tagging ?

JOB V. FEEDING EWES WITH SUCKLING LAMBS TO WEANING.

1. What grain and hay feeding should be done ? Craig-pp. 198-9
2. What kind of pasture should be provided ? Coffey pp. 267-9, 270-4
3. Is it wise to feed silage and roots ? Kleinheinz- pp. 65-9 83-4
4. Should creeps be provided for lambs for feeding ? What are creeps ? Pupils' projects.
5. What kind of feed should lambs get ?
6. How much feed should lambs be fed ?
7. At what age should lambs be weaned and how ? JO

JOB VI. EFFECT OF LAMB YIELD ON PROFITS.

1. What is the lowest yield one should be satisfied with ? Oregon Bulletin
2. What is meant by 120 % yield ? " Cost of Raising
3. What is a fair feed bill per ewe ? Sheep on Irrigated
4. How much higher is the feed bill Land" .-pp.10-14

Factors and Problems

Sources of Information

- for a mother with twins than with one? Ore. Bul. 219, " Cost
5. What is the average cost of a lamb of Producing Kutton
from birth to market ? and Wool in Eastern
6. What is the total cost of a ewe and Oregon Ranges." pp.
her lamb for a full year ? 12-13.
7. What is an average income from one Pupils' projects.
ewe with but a single lamb ?
8. With twin lambs ?
9. How do profits from the two compare?

For grades above a D the schedule is as follows:

- A---- all ten questions.
B-----any seven questions.
C-----Any four questions.

JOB VII. ADDITIONAL ASSIGNMENTS.

Step III. A discussion of the problems in Job IV. takes about twenty minutes.

Step IV. Announcement of next day's work. " Tomorrow we will visit the farm of Hector Brothers to make a study of their sheep layout and practices. We will use the Job Outline that we have as the guide for our study. Mr. Hector is interested, not only in sheep but in boys, and will be able to give us considerable help and information. In return for his help, how should we conduct ourselves while we are on his farm?" Answers: quiet around the sheep, pay attention when he is talking, ask only sensible questions and tell him

we appreciate his help. " That is fine. It would be a good idea for each of you to jot down in your field note book the particular questions you want to ask. Let us do that. That list of questions will also help you in the home assignment you will be given."

Step V. " Your home assignment is for each of you to get all the information you can for the problems we have studied, either from your home farm or from a neighbor if you do not have sheep at home.

Those of you who have sheep for your home project will of course do all these jobs. Some others of you have sheep at home. You will be given grade points for all farm practice with sheep if you will include this in your farm practice schedule. You will then be given supervision."

Third Day--

Trip to farm of Hector Brothers to study their layout and practices, in order to get data to satisfy analysis under " B" .

Fourth Day--

Step 1. Tabulate all data from home or neighbors' farms and the Hector Brothers'.

Step 2. Finish study and assignments.

Fifth Day--

Step 1. Round table discussion of assignments and tabulated data.

Step 2. Set up (teacher and class) essential facts for the unit. This is for minimum assignment only.

ESSENTIAL FACTS.

Objectives: In order to produce a high lamb yield it will be necessary to know the following facts:

1. Broken mouthed ewes must be culled out.
2. Old ewes that produced no ewes or lacked milk must be culled out. (Those that did not produce the previous season.)
3. Flushing is a necessary practice.
4. The ram must have all the qualities desired in the lambs.
5. The docks of ewes must be tagged when breeding season begins.
6. The ram should be turned in with the ewes late in August or early in September and taken out again before December 1.
7. There should not be more than fifty ewes per ram.
8. Some winter feeding of hay and possibly grain is advisable and is absolutely necessary during stormy weather.
9. Shelter that will keep the animals dry and will prevent drafts is necessary.
10. Equipment should be so arranged that crowding will be avoided as crowding may cause much abortion.
11. Provision must be made for plenty of exercise for the ewes but they must not be run at any time.
12. Good water and salt must be available at all times.

13. The shepherd must expect to be on the job day and night during the lambing season. Short season depends upon fall management.
14. Lambing pens should be provided for ewes with weak lambs, ewes not claiming lambs, young ewes and ewes with twins.
15. Assistance in parturition should be given only when wrong presentation is evident.
16. A new born lamb should have the phlegm cleaned out of the mouth and nose.
17. A still born lamb may be revived by a sudden jolt of breathing into its mouth.
18. The lamb may need assistance in getting it's first drink as it is absolutely necessary that it get the colostrum milk.
19. When a lamb is two days old it can usually be turned into a good pasture with it's mother.
20. Creeps should be provided for the lambs when they are old enough to nibble at feed. Legume hay and meal should be provided.
21. Unless lambs are sold early (May) they should be weaned. Distant removal from the flock of ewes is best.
22. A 100 % lamb crop is the least that a man should be satisfied with.
23. Costs can be reduced by having more ewes producing twins, by providing good pasture at all times, by supplementing pasture with good hay and grain when grass is short or weather is severe and by raising all feed at home.

24. Items of expense are feed, about 50%, of the total; labor about 13 %; replenishment of flock about 20%; miscellaneous expenses about 17 %, of the total,

25. Items of income are: lambs-about 65%; wool about 30 %; cull ewes, about 5 % of the total.

Sixth day--final test-

True and False.

Place a plus sign before the true statements and a minus sign before the false.

1. The ram represents one half of the lamb flock.
2. Wet snow does not hurt sheep.
3. It is not necessary to have water around for sheep.
4. Salt should be provided at all times.
5. The ram should be taken away from the flock not later than October 1.
6. The still-born lamb may be revived by blowing in its mouth and thumping on its chest.
7. When a lamb is four days old it may be docked.
8. A lamb should be born hind feet first.
9. Assistance in parturition only when wrong presentation is evident.
10. Early lambs are sold in March and April and should weigh 80 pounds.
11. Ewe lambs kept for breeding should be weaned early in July.

12. Weaned ewe lambs should be put in a pasture adjoining the flock.
13. A 100 % lamb yield is not too high a goal to set.
14. Feed is the smallest item of cost in sheep raising.
15. A ewe should produce a gross income of ten dollars and more.

Test number 2.

Place the number corresponding to the word in the right hand column into the parenthesis in which it fits.

- Getting the ewes into good condition is called (). Culling out of () ewes and selecting those that produced () the previous year is a good practice. Winter feeding is absolutely necessary in (). Crowding ewes with lamb may cause (). () is necessary to keep sheep in good health in winter. A good shepherd will watch his flock day and night during () season. This season may be shortened by proper () management. Lambing pens are needed for ewes with (), ewes that lack (), weak (), and () lambs that need to be adopted. The lamb must have the () milk. This is the () milk that
1. Abortion.
 2. Colostrum
 3. Stormy weather
 4. Grain
 5. Twins
 6. Fall
 7. Exercise
 8. Milk
 9. Flushing
 10. Breeding
 11. Orphan
 12. Brokenmouthed
 13. Lambing
 14. Lambs
 15. First
 16. Hay.

is drawn. Costs can be reduced by having more ewes producing (), supplementing poor pasture with () and ().

Multiple Choice.

Place in the parenthesis the number of the correct choice.

- () The ram should be turned in with the flock in (1) June; (2) July; (3) October; (4) August; (5) December.
- () The best hay for sheep is (1) cheat; (2) grain; (3) legume.
- () The best amount of grain per ewe is (1) two pounds; (2) $\frac{1}{2}$ pound; (3) 4 pounds; (4) one gallon.
- () Lambing pens at Hectors were (1) 6'x6'; (2) 3'x 8'; (3) 4'x 4'; (4) 3'x 5'.
- () June marketed lambs should weigh (1) 50 lbs; (2) 70 lbs.; (3) 100 lbs.

Matching Test.

Place number in B in parenthesis under A.

- | A | B |
|--|----------------------------------|
| (<input type="checkbox"/>) Tagging docks. | 1. Drafts. |
| (<input type="checkbox"/>) One ram. | 2. Feeding lambs. |
| (<input type="checkbox"/>) Wool. | 3. Income items. |
| (<input type="checkbox"/>) Creeps. | 4. Not over fifty ewes. |
| (<input type="checkbox"/>) Feed. | 5. A job during breeding season. |
| (<input type="checkbox"/>) Lambs | 6. Items of expense. |
| (<input type="checkbox"/>) Shelter | |
| (<input type="checkbox"/>) Interest on investment. | |

For additional assignment:

1. Galton's law of heredity is:
2. Ova are:
3. Effect of flushing on production of twins is:
4. Production of twin lambs is an () characteristic.
5. Twin lamb mother should be marked (when?):
6. Abortion is caused by:

Abortion is:

7. Those boys having sheep for projects write a paper on how you plan to make use of this sheep study in working out your own project, any changes you will make, etc.
8. Those not having sheep for project but sheep on home place make a written comparison of your home practices and those set up in the list of essential facts, stating ways in which you hope to make a change at home if changes are needed.

Note: The teacher will need to check on the ultimate results by supervising the boys' home work.

JOB - Project Study and Planning.

Objective: To have every member of the class learn how to proceed with his individual project study and planning.

Reasons for Undertaking this Job.

1. Every boy has a home project.
2. The boys' projects are the real basis of our year's work in agriculture.
3. Considerable special time has been set aside for individual project study and planning.
4. The pupils need training and guidance in forming proper study procedure and habits of study.

Procedure:

Step 1. Presentation. Teacher explains the reasons for this study about as above with perhaps some more detailed elaboration. The following discussion will then be reproduced from memory with as much accuracy as possible. Figures have been taken from Albert's project book.

"Step 2. " Now, who has a project job that gives him some difficulty?"

Pupil Albert-" I would like to know what I should select for my project; I have a notion to get about half a dozen ewes."

Teacher-" You boys know that Albert came into the class several weeks late, in fact, his folks just came to Benton County from Iowa. I wonder how many of you know where Iowa is? Conditions are somewhat different there than here in

Oregon. How many of you have been there ? You fellows who have been here ought to be able to give Albert some pointers and be glad to do it."

Albert-" I went to Mr. Reynolds as you suggested, and he will sell me five old ewes for \$35.00 each, or five ewe lambs for \$17.50 each."

Pupil (B)- " What kind of sheep are they?"

Pupil-" They are pure bred registered Hampshires."

Teacher- " Mr. Reynolds makes a business of shipping rams to Eastern Oregon and will buy yours if you raise any."

Pupil-" Yes, he will buy the rams or trade me ewes for them"

Teacher-" Suppose you buy those young ewes, will they have lambs next spring?"

Pupil-" He says they ought to have, but he can not guarantee it. The old ewes would be more apt to have lambs".

Pupil-" It would be a good idea to figure out how many lambs he would get in either case."

Pupil-A p " Mr. Reynolds says that I ought to get 100 % crop from the ewes but maybe only half that from the young ones."

Teacher-" What does that mean, Earl ?"

Pupil- " An average on one lamb from each ewe."

Teacher- " Yes. Do you have enough cash to pay for them?"

Pupil-" No, I have only \$50 and he will take the balance any time within six months. He doesn't even demand a note, though he will keep the registration papers until I pay the balance."

Pupil-" Do you figure they are worth that much; you could buy grades for a lot less."

Pupil- " Dad bought some grades that cost him \$12.00 each and they are a scrubby lot too; some are 'gunners', while the old ones are all under five years of age and I can take my pick."

Teacher-" That might give us some chance for work in selection."

Pupils-" Sure, let's pick them out for Albert."

Teacher- " If Mr. Reynolds won't object we shall do that. But we had better figure first if it will pay Albert to buy these ewes; whether to buy the old ones or the lambs; or whether to invest in sheep at all ."

Pupil-" Sheep seem to be a good investment."

Teacher-" Yes, they have been the last few years. How do you suppose we could find out about possible future developments?"

Pupil-" Maybe a bulletin would tell."

Teacher -" We have a pamphlet put out by the United States Department of Agriculture and by the State College called the 'Agricultural Outlook for 1929.' that will give some ideas on the question. The College also has two bulletins on Sheep Costs and Profits, Station Circular 62 based on irrigated farms, and Station Bulletin 219 based on Eastern Oregon ranges. These are not quite our conditions but total costs and total returns or income are about the same. Also,

we have a Farmers Bulletin, 840, on "Farm Sheep Raising for Beginners" . We have enough copies of all put together for each two boys to use the one together."

Step 3. Bulletins are distributed. Teacher- "Now, let us study these for about half an hour to see whether we can help Albert to figure on his budget proposition. Our pages 6 and 12 in the Oregon Bulletins, budgets given will be found there. In the farmers Bulletin study especially from the bottom of page 4 to the middle of page 8. Ask me for help in your study if you need it. I will write these bulletins and pages on the board in order that you may get the information for your note books. Those of you who have sheep projects will need to make careful note of this study in your books."

Step 4. Supervised study. The teacher is ready to give help, but does not bother the pupils who are diligently studying and do not request help. Such as do seem not to know how to proceed are questioned about details of assignment, items are explained to them in such a way as to motivate their study. It is sometimes a mistake to give too much time on an assignment of this kind as it may form a habit of dilly dallying.

Step 5. Making a project budget. "What items of cost will we consider? Let us set them on the right hand on the board. Jim, will you do the writing please?" Pupil- "What

will I write?"

Teacher- " The other boys will give the items. Head the list with Costs in capital letters like this (demonstrates). All right, give him the items and costs of each. Which bulletin had we better follow ?"

Pupil-" The one for irrigated farms would be best, I believe"

Teacher-" I think you are right. Let us procede."

Pupil-" The budget says 'ewe flock maintained by buying yearlings' and the other 'by holding over lambs' so which will we use ?"

Teacher-" What do you think about it , Darrel?"

Pupil-" Well, he is going to buy them so I should say the first one."

Teacher- " Who thinks Darrel is right ? Yes, I too, agree. We will have to hurry to get our budget done."

Pupil- " Feed and pasture \$ 500, but that is for 100 ewes. Shall we divide each of those figures by 20 ? That would make it about right for five ewes ?

Teacher- " For our purpose that will be all right though costs are relatively higher for smaller flocks."

Pupil-" How do you figure that ?"

Pupil-leafing the bulletin- " This bulletin says that a flock of twenty to thirty can be handled better and more economically than a very small flock. It takes as long to change a small flock from one field to another as it does a

big flock."

Teacher-" That is right, but because we have not the other figures available just now, let us go ahead with these."

Pupil-" Labor, $3\frac{1}{2}$ hours at 40¢ an hour, isn't that too much to charge ?"

Teacher- " Would 25¢ be better? Suppose we say 5 hours at 25¢, how much will that total for five sheep, Donald ?"

Pupil-figures-" S ix and a quarter."

Pupil-" Interest at 8 per cent of \$ 850; where do they get the \$ 850?"

Teacher-"Who can tell? On page nine it gives the average value of ewes at \$ 8.48 each; multiply this by 100 will give you the \$850."

Pupil-" Thirty yearling ewes to replenish the flock - \$ 233. 20."

Teacher-" What does that item mean? Read the first foot note to the class. Do you all understand that? The cost of producing a yearling ewe is given on page eight."

Pupil- " Total expense is \$ 1062.20 for 100 ewes or \$10.62 each."

Teacher-" What are the income items and amounts ?"

Pupil-" 100 lambs, 80 pounds each at 10¢ is \$ 800
700 pounds wool at \$ 4 is-----\$56

Total income would be \$ 1136.00 or \$11. 36 each."

Pupil- " That means a profit of only 74¢ a head."

Teacher- " What does your bulletin say about chance for extra profit ?"

Pupil- " Making good selection of breeding flock, flushing the ewes at breeding time and more care at lambing."

Pupil- " A small flock can be pastured for less, I think."

Teacher-" That is true, to some extent. Growing his own feed will reduce that item some and you remember that that is half the cost." Now, how many of you have the idea of studying the job in your own project?"

Pupil-" What kind of notes should we make on our project study?"

Step 6. " I will give you a form you may use. Take a clean sheet of paper from your note book, head the first page in the blank above the first line:

Job - Buying Sheep.

Factors and Problems

1. Will it pay me to buy sheep for my project?
2. What age ewes should I buy?
3. Etc.

Sources of Information.

- " Costs and Profits of Sheep on Irrigated Farms" - Ore. Sta. Bul. 62--etc.

" These are sample problems."

List all the factors and problems you think will make a difference in your final decision, and all the good sources of information you can find. Ask me for approval of your references. Successful farmers are a good source of inform-

ation, but it is a good idea to check one man's opinion with the opinion of others" .

Now, turn your sheets and head the top as I show you."

I. Notes on my Study.

II. How I Plan to do the Job.

I. Take down enough notes to form a good basis for your decision in planning the job. When you have gotten all the notes you need put down numeral II and write your plan according to the decision you have formed as a result of your study.

Step 7. " Now each of you may tackle one of your job problems. Ask me for help when you need it. The job that is most pressing now or will be soon, or the one giving you most difficulty, should be studied first. Each one of you will make a project budget."

" Albert, you had better make your own budget, based on the help we have given you. When you have finished it the class will no doubt be interested in seeing the results, and also hear the decision you will have made about what to buy."

Following is the budget that Albert finally adopted, with the help of the teacher:

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Costs.

5 ewe lambs at \$17.50-----	\$ 87.50.
Feed and pasture - - - - -	50.00
Labor-30 hours at 25 ¢ - to include shearing-	7.50
Wool marketing - - - - -	1.00
Taxes - - - - -	.85
Salt - - - - -	.30
Housing - - - - -	1.00
Misc.-dip-etc. - - - - -	.75
Interest on the \$ 87.50 at 8 per cent	7.60
Possible loss of one ewe - - - - -	<u>- 17.50</u>
Total Costs - - - - -	\$ 173.40

Income.

Wool - - - - -	\$ 14.00.
3 lambs at \$ 17. 50 - - - - -	52.50
Value of ewes - 4 at \$ 35.00 -----	<u>- 140.00</u>
Total credits -- -- -- --	\$ 206.50

Possible net gain of \$ 33.10 or \$ 6. 62 per head.

MAKING THE FARM HOLE

A DESIRABLE PLACE TO LIVE.

Unit of Work from Agriculture III.

List of Jobs to be Studied:

1. Installing a water system.
2. Installing a lighting system.
3. Painting the house and other buildings.
4. Installing plumbing.
5. Putting up attractive fences and gateways.
6. Landscaping the house yard.
7. Remodelling the interior.

Introduction:

1. The preparatory step for this unit consists of contrasting for the pupils in a rather picturesque way a real home on a good farm with an unkempt shack that serves merely as a place to sleep and eat.

In order to give the setting, a few high lights are here mentioned. 1. One is inspired to work harder, accomplish more and earn more when a definite and worthwhile goal has been set, e.g. a good home. 2. A wholesome and beautiful surrounding has a desirable influence on the worker, in that it makes him more contented and therefore more efficient. 3. Making money on the farm is only a part of the farming business, spending wisely is equally as important. A thousand dollars difference in the price of two cars may

give father a feeling of prosperity when he drives it out on Sunday, but that extra thousand expended on the house would give mother hourly comfort for the other three hundred odd days in the year. That thousand, invested in providing comfort or furnishing or entertainment features in the home might be the means of keeping the young people at home, at least some evenings, while the extra thousand invested in the car makes the latter even a greater temptation for not staying at home. Being out late at night reduces working efficiency very considerably. It should not be difficult to see the implication here attempted. 4. Labor is a big item in making improvements on the farm. The man who knows how to do these jobs can increase his annual labor efficiency considerably by using his slack season and bad weather time for making improvements, on the farm and home. Such materially increase the value of his property as well as making the farm a more desirable place for him and his family to live.

Time and space do not here permit a detailed lesson planning for each of the numerous jobs involved in this unit of work.

II. Objectives : (1) To have each boy in the class undertake some improvement feature on his home farm and carry it through to a satisfactory conclusion.

2. To each figure actual costs in materials and labor required for each job to be undertaken.

3. To study costs of various jobs that cannot be done.

III. Methods to be used: 1. Supervised study. 2. Field trip to study good layouts, and bad. that have good possibilities. The homes of class members will be used as far as it is advisable. 3. Actual work of painting, planting, making lawn, wiring, plumbing, installing hydraulic ram and reservoir for home water supply, etc. will be undertaken both as individual and as class projects during school hours. 4. Supervised home improvement jobs outside of school hours are a part of the unit of work. 5. Slides or moving pictures will be used. 6. Surveys of farms where modern improvements are installed, to learn costs and the value to the folks on these farms. 7. Round-ups for discussion and study.

PART III.

EVALUATIONS.

In Part III of this thesis an attempt is made to evaluate the lesson plans presented in Part II in the light of the principles stated and discussed in Part I of the thesis.

An evaluation chart has been worked out covering the entire subject of the thesis. This is supplemented by explanatory remarks.

A special evaluation table and discussion on the unit "Farrowing Problems" is included for the reason that criticisms given by other teachers were used as the basis for evaluation.

EVALUATION

PRINCIPLES

(In abbreviated form; see pages 8-9 for the full text of principles)

1. Has lesson plan been analysed to determine if content will function effectively in the occupations of the pupils?
2. Is teaching carried on in a typical environment?
3. Is teaching based on the actual farm job as in the community?
4. Are objectives based on job and pupil requirements and limitations?
5. Have study materials been selected to satisfy the problems?
6. Has unnecessary duplication of work been avoided?
7. Have individual differences been sufficiently recognized?
8. Is emphasis given to forming proper attitudes toward farm life?
9. Is adequate emphasis given to basic general principles of education?
10. Has the best teaching method been used for the lesson?
11. Has the pupil procedure been definitely indicated?
12. Is a motivating approach and procedure used?
13. Is provision made for adequate pupil participation?
14. Will the pupils develop habits of study and research?
15. What provision is made to test out whether pupils have realized the standards and objectives set up?

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CHART

LESSON UNITS

	P. 53	P. 54	P. 55	P. 56	P. 58	P. 62	P. 71	P. 86	P. 95					
	Importance	Application	Importance	Application	Importance	Application	Importance	Application	Importance	Application				
1.	1-10	9	1-15	5	1-10	10	1-10	9	1-10	10	1-10	9	1-10	9
2.	1-5	4	1-10	10	1-5	5	1-15	15	1-10	7	1-10	10	1-10	9
3.	1-5	2	1-10	10	1-5	4	1-15	15	1-15	8	1-15	14	1-15	15
4.	1-10	9	1-10	9	1-10	9	1-10	9	1-10	5	1-10	9	1-15	15
5.	1-5	2	1-5	2	1-5	4	1-5	4	1-10	9	1-10	10	1-10	9
6.	-	-	1-5	4	1-5	4	1-5	5	1-5	3	1-5	4	1-5	5
7.	1-5	4	1-5	4	1-5	4	1-5	4	1-15	10	1-15	14	1-15	14
8.	-	-	1-5	4	1-5	4	1-10	8	1-5	3	1-5	4	1-10	8
9.	-	-	-	-	-	-	-	-	-	-	-	-	1-5	3
10.	1-10	10	1-10	10	1-10	10	1-15	15	1-10	7	1-10	10	1-15	14
11.	1-10	9	1-15	13	1-10	9	1-10	9	1-10	5	1-10	9	1-15	14
12.	1-10	9	1-10	9	1-10	9	1-10	9	1-10	7	1-10	9	1-15	13
13.	1-10	10	1-10	8	1-5	4	1-10	10	1-10	9	1-10	10	1-15	12
14.	-	-	1-5	4	1-5	4	1-10	9	1-15	12	1-15	14	1-15	14
15.	1-10	5	1-10	0	1-5	0	1-10	9	1-15	10	1-15	15	1-15	13

EVALUATION CHART.

On the chart an attempt is made to evaluate the several lesson plans in the light of the fifteen principles set up in Part I, pages 8 and 9. The lesson titles could not be given due to lack of space and are therefore indicated at the head of each column by the page number on which they are found. The column headed "Importance" should be interpreted "Relative Importance of Their Principle in this Lesson Plan." A rather arbitrary rating has been employed. The column headed "Application of this Principle to the Lesson Plan" must be interpreted "Relative Application of this Principle to the Lesson Plan". The rating given in each case is, of course, based on the importance of the principle as it applies to that particular lesson.

It will be noticed that some of the spaces in the evaluation table are left blank, this being especially noticeable in the case of the principle applying to those basic requirements of universal education, not usually considered a definite part of the agricultural courses. In many instances in vocational classes, incidental application of the principle may be made and, it is safe to say, vocational teachers should do so more often than they do. Such teachers are selected with more care, are therefore higher grade teachers and have more influence with the pupils than do

the average class room teachers. The agricultural teacher works with the pupil at his home as well as in the class room, actually having larger contacts with each pupil than other teachers do. Home conditions are better known to the agriculture teacher than to any other member of the school system. He has rather intimate acquaintance with the parents. All of this emphasizes and increases the agriculture teacher's responsibility in regard to the attitudes pupils develop, not only toward farm life but toward life as a whole. The farmer should have equal rights with other citizens but have also equal responsibilities. The formation of desirable habits and the development of proper attitudes are after all the most important increments of teaching.

A detailed discussion of each principle would require too much time and space and would perhaps not add to the value of this study. However, it seems advisable to point out a few that would seem to have a greater relative importance in influencing the final ends desired in vocational agriculture than others.

Principle 2, "is teaching carried on in a typical environment", is brought out in lesson units on pages 54, 58 and 71.

Principle 3, "is teaching based on actual farm job", is basic in vocational education. Its application is well

illustrated in the lesson units on page 54, 58, 71, 86, and 95.

Principle 7, " have individual differences been sufficiently recognized", has, in vocational education, no particular reference to the pupil's practical program, his project and other farm activities. This point is given recognition in the lesson units on pages 56, 58, 86, and 95.

Principle 11, " has the pupil's procedure been definitely indicated" is perhaps best illustrated by contrasting the lesson units on sheep management, page 71, with that on farrowing, page 62.

Principle 13, " pupil participation", is illustrated in lesson units on pages 58, 71, and 86.

Principle 14, " will the pupil develop habits of study and research" is shown in lesson units on pages 58, 62, and 86.

Principle 15, " What provision has been made to test out whether pupils have realized the standards and objectives set up" , is demonstrated by the lesson units on pages 58, 71, 86, and 95. The final answer will be found in the actual activity of the boy in his project and other farm practices.

Our ultimate aim is to produce change where change is desirable, to develop the habits of weighing values and making wise decisions. As a result of these we will have better farming, better living and better citizenship.

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EVALUATION TABLE.

"Farrowing Problems"	Answers Tabulated.			
	Yes	No	Qual- ified	Tot. No.
1. Is the lesson applicable to the needs and conditions of the community?	7			7
2. Has sufficient provision been made for taking care of individual differences in pupils?	5	2		7
3. Are the jobs based on the unit of work occurring in the occupation?	6		1	7
4. Are the purposes and objectives based on the requirements of the jobs and the needs and limitations of the pupils?	5		2	7
5. Is the provision made for a motivating approach? (a) To create interest? (b) To present a problem or difficulty? (c) Do questions take into account pupil's probable knowledge?	4		3	7
6. Is adequate provision made for solving the problems satisfactorily?	7			7
7. Does the lesson unit provide for maximum pupil participation?	6		1	7
9. Has the pupil's procedure for studying the lesson been indicated with sufficient definiteness?	6		1	7
10. Has adequate provision been made for summarizing the essential facts and for testing the pupils on the attainment of the objective set up for the lesson unit?	5	1	1	7
Totals	57	3	10	70

EXPLANATION OF QUESTIONNAIRE
ON " Farrowing Problems" .

The questionnaire form given on page 104 was submitted to about a dozen teachers of vocational agriculture in Oregon high schools, to a state supervisor and to two teacher trainers. Six of the teachers and one teacher trainer were kind enough to send replies that could be tabulated.

The unit of study accompanying the questionnaire is the one on " Farrowing Problems, pages 62-71. Two of the teachers were able to give the plan a trial in their own classes. Their replies just about average in with those of the others who did not use but merely studied the plan.

The request for an answer of " yes" or " no" and a brief statement brought the result that is tabulated on page 104.

Qualifying statements were as follows: on question-

2. " It is too rigid" .
3. " The job 'Farrowing Problems' is not a clear cut job---; as a matter of fact two or three jobs are incorporated.--"
4. " The lack of clarity in '3' renders a clear statement of the purposes and objectives difficult" . " Rather limited".
5. " It is difficult to judge the provision made for a motivating approach. If this is the first job in the swine enterprise to be studied by the class, then the approach would be lacking in what Allen calls the preparatory step. If,

however, this lesson had been preceded immediately by others that objections would not be valid." " Not unless it is done verbally first." " Possibly not as full as it might be (5-c).

7. " Not as much as I use."

8. " Questionable. I think you are doing too much for the student in the way of giving him all the references; I like to have him find most of it."

9. " Pupil's procedure is entirely too limited when examined in the light of this lesson plan alone. There is no instruction in regard to use of references, note book, and the like."

10. " I see no provision for summarization or for testing the pupils. Ample material for such is presented but a method for doing it is not in evidence."

The qualifying statements have been quoted almost in their entirety because they are quite to the point, coinciding rather closely with the writer's opinions. The criticism on number ten does not seem quite just and, since it comes from but one man, the writer is inclined to think that he overlooked the objective test, pages 68-71, when the unit plan was mailed out.

Criticisms obtained, but not in form for tabulation included such statements as " I feel that if this system were carried out throughout the year, that the boys would get tired of it, but as fine for learning the facts. This

type plan is good for group learning. " A motivating approach is lacking. It does not seem to take into consideration the individual home situations of the pupils. As the boys are able to suggest changes they should make on their own how far or project by comparing with these the list of essential facts? "

It is of course assumed that a single type of plan will not be followed the whole year through.

It is the writer's opinion that the last quotation just about hits the nail on the head, so to speak, as far as vital criticisms of this lesson unit is concerned. A contrast on the point in question, - the actual functioning of the classroom study in bringing about changes in the pupils' activity in the typical farm environment, may be formed by comparison of the unit under consideration with the unit on sheep, pages 71-85. In that unit considerable emphasis is placed on carry over to the farm the immediate and ultimate effects on the activities of the boys in the actual farm environment, and situations.

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