

**AGRICULTURAL LABORATORY
EXERCISES AND
HOME PROJECTS ADAPTED
TO SECONDARY SCHOOLS**

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Agricultural laboratory exercises and home projects adapted to secondary schools by Henry J. Waters & Joseph D. Elliff

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HENRY J. WATERS & JOSEPH D. ELLIFF

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TO SECONDARY SCHOOLS

UNIV. OF
CALIFORNIA

BY

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INTRODUCTION

How we learn. Textbook teaching of agriculture, while very useful, is inadequate because it fails to develop the student's power to see things understandingly. It is through observing and doing that most of the knowledge of farming is acquired. The farm is a great laboratory. The operations in manuring the land, preparing the soil, selecting, testing, and planting the seed, protecting the plants against injury by weeds, insects, and disease, gathering and saving the harvest, feeding the products to live stock so as to bring the largest return in eggs, meat, milk, wool, and work are its exercises. The farmer learns principally by experience, the best though the costliest of teachers. The authors believe that it is possible, by expert teaching and close supervision of the student's work in the laboratory and field, to save a large part of this expense. The exercises are so planned as to teach the student how to make an experiment or an observation accurately and how to record and interpret the results correctly. This gives to the study of agriculture the disciplinary value of an exact science, besides teaching the fundamental lessons of how to farm successfully.

Selection of exercises. In choosing the exercises and projects to be included in the Manual, the authors have sought above everything else to select those which relate definitely to farming and which teach in their results the essentials of farm practice. They have endeavored to make the exercises and projects cover as completely as is possible the important, interesting, and practical farm problems of the country. The instructions to the student are definite. Each exercise and home project has been tried out, and when the directions are carefully followed, results that are decisive will follow.

Use of exercises and projects. The number of exercises to be completed in a year will depend upon the needs of the local community and the time given to the course. The vocational school giving one half of each day to the course in agriculture should be able to complete all the laboratory exercises and in addition provide the required six months' supervised project work. In schools giving less time the teacher should select those exercises of greatest importance to the local community.

Method. It is a great waste of time and effort to require each student to do all of the work of each exercise. In many cases the work of manipulation of apparatus and material can best be done by the teacher or by a group of students. In the table of contents this is indicated by a letter in parenthesis: (t) meaning that the work of manipulation may be done by the teacher, (g) by a group of students, (i) by the individual student.

Coöperation with the best farmers. The closest coöperation between the teacher of agriculture and the best farmers of the neighborhood is necessary to insure the teaching of sound agriculture and also as a means of facilitating the adoption of the teachings of the classroom and laboratory into the farm practices of the community. Sound teaching and close coöperation will be much helped if the teacher will choose an advisory committee consisting of the most progressive farmers of the neighborhood and will use this committee in working out a plan of correlating the school work with the local farm work. These and other leading farmers should be invited to talk to the class on the methods of farming which they have found most feasible and practicable.

Every member of the class in agriculture should be set to work on some problem on the home farm. Use should be made of the best dairy and beef cattle, the best horses, hogs, sheep, and poultry, in the community in the stock-judging work.

The school ground and its use. Many of the students of agriculture in high schools are without farm experience and are taking the work as a part of their preparation for teaching in the rural schools. Many of the students are girls. Even though the girls were reared on the farm they have not, as a rule, given attention to the details of farm operations. To both of these classes some actual field work will

be of great value. Every school which has a plot of land available, or which can secure the use of as much as a few vacant city lots and can command the needed funds, should arrange to grow a number of the crops that are of principal local importance. It is true that the operations of preparing the land, planting the seed, and cultivating and harvesting the crops will be commonplace to those students in the class who have had farm experience, but the work may be so planned as to demonstrate principles of great importance. In such case the lessons will be of much interest and value to farm boys as well as to those who have had no farm experience.

Project work in agriculture. Although great stress is laid on concrete class and laboratory instruction in field, shop, and classroom, this is not sufficient. In order that a boy may really fix his knowledge of poultry husbandry, it is necessary for him to engage in the poultry business. In order that he may bring together all of his knowledge of agronomy, it is necessary for him to grow a crop in accordance with what he has learned about crop production. It is the verification and application of the knowledge gained in classroom and laboratory that is the real measure of the value of instruction in any subject. In agriculture the supervised project gives full opportunity to apply the knowledge gained and at the same time to acquire actual farm experience. Project work in secondary-school agriculture is that part of the work of the course performed at home or on the school farm, and is a fixed requirement for each pupil in all schools receiving Federal aid under the Smith-Hughes Act.

Common essentials of project work.¹ The common essentials of all project work are:

1. The project must be selected by the student with the advice and consent of the teacher and parent. The parent must sign a written statement to the effect that he will (1) provide all the equipment necessary for the project, (2) allow the student sufficient time to do the work, (3) allow the student the net proceeds of the project.
2. The project must cover a more or less extended period of time, enough to do the work well.
3. It must be part of the instruction in agriculture as taught in the school of which the pupil is a member.
4. It must be a problem *worth while* and more or less new to the pupil.
5. Some competent person, preferably the teacher of agriculture, must supervise the work.
6. Detailed records of time, method, cost, and income must be kept.
7. The amount of school credit for any project should be determined on the basis of hours necessary to do the work well. If school time is used, two hours on the farm should count as one hour in the school.
8. A full report of the work in writing must be submitted to the teacher and kept as a permanent record in the school.

Kinds of projects. Projects may be classified as crop projects, animal-husbandry projects, farm-management projects, etc. They may also be classified as productive projects, demonstration projects, improvement projects, etc., as determined by the aim or purpose. A further classification into individual and group projects is possible. Growing a five-acre plot of corn on the home farm is an individual project. Growing a large vegetable garden on the school farm is a group project.

Acknowledgment is made by the authors to Dr. Otis W. Caldwell of Teachers College, Columbia University, for valuable assistance in determining the plan and scope of the work, and to Charles L. Qear, of the Kansas State Agricultural College, for invaluable help in the detailed preparation of the exercises and projects and in the methods of illustrating them. Credit is given Professor J. O. Morgan, of the Texas Agricultural and Mechanical College, for preparing the exercises on cotton; and to Dean E. C. Johnson, of the Kansas State Agricultural College, for the exercises on plant diseases; to Professor George A. Dean, of the Kansas State Agricultural College, for the exercises on insects and bees; and to Professor Fred H. Merrill for the exercises on orcharding.

HENRY JACKSON WATERS
JOSEPH DOLIVER ELLIFF

¹ Adapted from *Bulletin 364*, United States Department of Agriculture.

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