Stories in Pictures

GILBERT S. GUILE
Ohio State University

A good seedbed is essential for improved sugarcane production in India. Photo—Bibby

Vocational agriculture teachers in Kansas receive in-service training on spraying equipment for weed and insect control during the summer months. Photo—C. C. Bevesh

Featuring—

TECHNICAL EDUCATION IN AGRICULTURE
TABLE OF CONTENTS

Editorials

Technical Education: Some Implications of a Definition
Challenges and Decisions in Post-Secondary Education
Your Roles in Technical Education in Agriculture
The Value of Intervise Education
Amen or Liability for Four-Year Colleges
Technical Education in Ornamental Horticulture
Technical Education for Farmers
Guidelines for Agricultural Education in Junior Colleges
Evaluation of Post-Secondary Programs in Agriculture
Post-High School Instruction in Agricultural Mechanics
Regional Seminars on Agricultural Education in Community Colleges and Area Schools
Agricultural Programs in Junior Colleges
Book Reviews
News of the Profession
A Project for Effective Teaching
Stories in Pictures

Guest Editorial...

Challenges and Decisions in Post-Secondary Education

Post-secondary education in agriculture is here and with it have come new challenges and decisions. A few of the challenges include the following: the general level of education in the various states, rising levels of education necessary for all agricultural employment, and the emphasis placed upon the qualifications of the individual in successful agricultural employment. In the last census data for Iowa, only 6.4 per cent of adults twenty-five years of age and over had four years of college or more; 51.2 per cent of adults twenty-five years of age had not graduated from high school; and 15.2 per cent had not finished the eighth grade. We may assume that a similar pattern exists in other states. This educational level exists at a time when the number of unskilled jobs in our country has decreased from sixty millions to less than six millions. The consolidation of farms and the increase of related agricultural industry are demanding new training, upgrading of existing programs, and expansion of training for new school graduates.

Large expenditures of capital are common for colleges and universities in all states. We consider this desirable for the intellectual growth of our nation. However, we must face the fact that only 10 to 15 per cent of our high school graduates are receiving college degrees in most states. The remaining 80 per cent or more provide special challenges for post-secondary educational institutions. Major industries must cease to stress the quality of the individuals as important to successful employment. The personal factors must often be rated, and ability to communicate, leadership ability, motivation, and enthusiasm. Much of our modern education with its classes and lecture courses is more of a "bucket filling" process with relatively little attention to the development of the person as an individual leader. This is a challenge to post-high school vocational education in agriculture. We are

(Continued on next page)
From the Editor . . .

Third, technical education is characterized as specialized education. Technical education in agriculture is specialized in the sense that it prepares technicians for specific occupations or for groups of occupations which involve common knowledge, methods, or research within the field of agriculture. Also, technical education is specialized in the sense that it prepares technicians that are unique to each substantive field of occupational education.

The fourth distinguishing feature is the general agreement that programs of technical education should be provided at the post-secondary level. The requirements for technical knowledge and the duties and responsibilities of technical jobs necessitate a complexity of subject matter and maturity of student that make post-high school institutions the most appropriate level for technical education programs.

As a result of these features of technical education that relate closely together and understanding and application of specific principles have explicit and important implications for program planning, teaching, and staffing. For example, it is not clear to identify tasks performed by technicians sufficient for determining content of a curriculum in which some principles are emphasized. If the curriculum is to embody the scientific principles applicable to the specialized area of instruction, isn't there a need for a careful analysis of the tasks performed by technicians to identify, clarify, and apply the scientific principles, or technology, that are appropriate.

In technical education emphasis is rightfully placed on the development of technical competence. Previously, performance specific tasks. But note that the ability for performance, though paramount, is associated with a clear understanding of the scientific principles involved. The "why" is as important as the "how." The requirement for a functional integration between theory and practice rates pertinent questions pertaining to sequence of subject matter, selection and organization of learning activities, and methods of teaching. An acquaintance with the psychology or learning reveals some approaches to teaching that are more conducive to application of principles and transfer of learning in contrast to teaching methods which emphasize learning of knowledge. One fundamental is clarity—whether the basic principle or generalization is more likely to be applied to a specific environment if that principle or generalization is learned in a context that relates specifically to the job, occupational area, product, or service with which the prospective technician will be dealing.

The very nature of teaching in technical education programs must be under the direction of persons who are both competent in technical knowledge and professionally prepared as teachers. Does the technician in business and industry who developed expertise through experience with little formal study of the basic science and technology involved necessarily possess the credentials desired for instructors in technical programs? Is it probable that the instructor of technical education is understood by the holder of a baccalaureate or higher degree in science or in agricultural education is distinctive; it stands on its own merits. And that is the way we should treat it—an important and distinct, and incidentally, the most rapidly developing phase of agricultural education.—JWR

Guest Editorial . . .

in an excellent position to meet this challenge with our smaller classes and individualized instruction. We must ask ourselves this question: are we writing the curricula and staffing our programs to meet this challenge? Are we designing the courses to meet the needs of the self-contained classroom versus related instruction in regular junior college classes. Both plans are being explored in states pioneering in post-high school education. Upon first thinking of the self-contained classroom, we acknowledged the method but from experience we have been delighted with our results. We observe many students classified for second years as poor in mathematics and English who make excellent records in this subjects when taught as related to their field of interest.

We continue to be plagued with unrelated instruction when students are placed into conventional junior college mathematics and English for related instruction. Some vocational programs are requiring the instructor to prove application of the related training to the specialized vocational field before being considered as part of the instruction staff. This is done before a council of the vocational field of training.

The above are only a few of the challenges and decisions we face as we move ahead. Time and experience will solve some of these problems. We must be prepared.

Your Role in—

TECHNICAL EDUCATION IN AGRICULTURE

HOWARD SIDNEY, Agricultural and Technical College
Cobleskill, New York

You have a role in technical education in agriculture! Every teacher of grades of vocational agriculture, every instructor in an agricultural technical institution, every student member in Colleges of Agriculture, administrators, guidance counselors, and admissions personnel—all have a role in technical education in agriculture.

AGRICULTURAL EDUCATION IN HIGH SCHOOLS

Larger and more comprehensive high schools will be built in the next five years throughout the country. These schools will consolidate the smaller rural schools and central schools in several areas. The half a million rural schools will offer vocational courses in addition to agriculture, and they will make possible a greater degree of specialization in agriculture courses in the upper grades.

Vocational agriculture in large comprehensive high schools will include basic agriculture science courses, science courses, and guidance for ninth and tenth grade students as preparation for specialized courses in the twelfth grade. Many of the scientists in our agricultural colleges are not necessarily doing work which is closely related to the business of farm production. The four-year agricultural college student spends a greater percentage of his time in studying theories, basic sciences, and general courses with less time in the laboratory making practical application of instruction. As a result, the graduates have fewer laboratory experiences and do not have the same competencies and skills that are needed to carry out the actual business of production, processing, or managing an agricultural business.

Howard Sidney is Chairman of the Agricultural Division, State University of New York, Agricultural and Technical College, Cobleskill, New York. Howard Sidney

AGRICULTURAL EDUCATION IN COLLEGES

The agricultural colleges in the United States have a remarkable record of progress in research, instruction, and teaching. The agricultural colleges are placing greater emphasis on the third and fourth years and graduate study. Many of the scientists in our agricultural colleges are not necessarily doing work which is closely related to the business of farm production. The four-year agricultural college student spends a greater percentage of his time in studying theories, basic sciences, and general courses with less time in the laboratory making practical application of instruction. As a result, the graduates have fewer laboratory experiences and do not have the same competencies and skills that are needed to carry out the actual business of production, processing, or managing an agricultural business.

Howard Sidney

The Cover Picture

Students in an electrical laboratory in one of the technical programs in agriculture at the Agricultural and Technical College, Cobleskill, New York. Photograph furnished by Howard Sidney.

February 1968

THE DEMAND FOR TECHNICIANS

When agricultural education is limited to high school instruction in agriculture, there is no educational opportunity for graduates from vocational agriculture in the high schools. The technical schools accommodate the study of agriculture in four-year colleges, a gap is created in the area of applied labora-

ory knowledge that can be filled by a technician. The gap in agricultural education between the high school vocational agriculture graduate and the four-year college graduate in agriculture has not attracted a great deal of attention until recent years. Previously, the technical level occupations in medicine were filled by technicians who were trained through many years of experience or by scientists who were doing the work of technicians. As these people retire we are suddenly faced with an acute shortage of young men graduating from technical programs in agriculture for farming and the occupations related to agriculture which require agricultural competency. We have agricultural educators in both the high schools and universities who are reluctant or unwilling to accept this challenge. Even if they do, they feel it is not of their concern, since it is another phase of agricultural education.

THE TECHNICAL EDUCATION MOVEMENT

A new movement sometimes appears to appear out of nowhere. Established programs and individuals. Technical curriculums in agriculture offer a very low level of opportunity for graduates from vocational agriculture in the high schools. The technical schools accommodate the study of agriculture in four-year colleges, a gap is created in the area of applied labora-

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not be continuing in the four-year colleges. One phase will be dependent upon the other since technical schools cannot hope to recruit able and interested students unless there is motivation, guidance, and agricultural instruction in the secondary schools. High school vocational agriculture cannot survive unless there is a realistic outlet for students to continue their education to fit into businesses which today require a high degree of competence, skill, and know-how in agriculture.

The four-year colleges hold the key to success of post-secondary technical schools due to the fact that post-secondary institutions must have capable faculty who understand technical education and who have the professional education and the experiential experiences needed for success in teaching. The four-year colleges must be the centers for teacher education because they have the facilities, faculty, and research capability as well as the program for guided practice teaching and other requirements of sound teacher education. Four-year colleges must provide inservice education to keep teachers, both the professional and the occupational, up-to-date. The greatest need at the present time is a supply of well-trained, well-prepared teachers who have the instructional capability and who have a genuine understanding of agriculture.

The graduate is prepared for a variety of employment opportunities in a particular area of agriculture but he still has the specialization necessary to apply the scientific principles that he has studied. The curriculum must include extensive laboratory experiences which provide for the application of principles learned.

The sequence of courses is of utmost importance. The student must have some technical courses the first semester, which serve to motivate the student and to acquaint him with laboratory techniques at the beginning of the training period. The sequence of courses allows the student to take technical courses on a much higher level in the second year, thus accomplishing more in the two-year period.

The technical curriculum requires that 30 to 50 percent of the courses be in general education. These courses in communications and social and physical sciences must be of an applied nature to make the technical courses more meaningful and valuable. A successful technical curriculum is dependent upon general education courses being a part of the technological program. General education courses should be selected carefully and should be studied concurrently with technical courses. Both the faculty in general and technical education should be involved in curriculum development.

**FACULTY**

Teaching technical courses is entirely different from teaching either high school or college vocational agriculture or professional degrees in agriculture. To some extent, technical education is a combination of the two. The instructor in a technical course must teach students how to prepare papers and do independent study using technical journals, texts, references, and other material found in a well-equipped library. He must also teach the students how to demonstrate skills and techniques in the laboratory and must be able to help students gain proficiency in performing these techniques and skills.

Faculty members must have a complete understanding of the objectives of technical education and must be able to understand the unique qualities which graduates in these fields develop. Teachers must be able to help students who have passed the examinations to be accepted in two-year colleges or have students from two-year colleges move on to continue their education.

**Technical Education in Agriculture**

High school technical instruction is being carried on in many areas. A high school teacher may need to teach agriculture courses in addition to teaching other classes. The high school technical teacher who has taken courses in the field can give valuable help to the student who is interested in agriculture. The teacher should help the student to understand the importance of technical education and the possibilities it offers.

**FURTHER DEVELOPMENT**

Technical education in agriculture is an exciting challenge. It is important to the agricultural industry. Technical education in agriculture is desperately needed to prepare farm operators and equipment operators for off-farm occupations related to agriculture and natural resources. Many of these occupations are in short supply and are not being filled by agriculture graduates. Technical education in agriculture must be expanded through technical programs.
Is Agriculture in Junior Colleges an

Asset or Liability for Four-Year Colleges?

G. A. SHERMAN
Mt. San Antonio College, Walnut, California

There are about one hundred two-year institutions offering programs of agriculture at the present time in the United States. Some fifty other institutions are offering courses in agriculture. The U. S. Office of Education estimates that 300 new junior colleges will be started during the five years immediately following the next ten years. The decisions these colleges make about the kinds of programs they will offer, including the decision on whether agriculture will be included in the offerings, will depend greatly upon the leadership and guidance provided by all of us in agricultural education. A very active interest in expanding agricultural programs in junior colleges was outlined in a study made by the Mt. San Antonio College staff on issues during the past two years to junior colleges and four-year colleges located throughout the nation.

Partners not Competitors

In some states four-year colleges tend to look at the new junior colleges with some distrust. Some colleges have been in a year or two, served with one teacher of agriculture trying to teach several subjects. Distress because enrollment at the new college is seen as a threat to enrollment at the four-year college.

This article is from a talk presented by Mr. Sherman to representatives of four-year colleges and universities during a conference on Undergraduate Teaching in the Plant and Soil Sciences held in Washington, D.C., in March, 1967. The conference was sponsored by the Commission on Education in Agriculture and Natural Resources of the National Academy of Sciences. G. A. Sherman is Dean, Agricultural Science and Home Economics, Mt. San Antonio College, Walnut, California.

Role of the Junior College

Basically, the junior college has three functions. One is to offer a transfer program to the four-year college. Some students who are qualified to go directly to the four-year college might elect to attend a junior college closer home.

The second function is remedial. Many students who are not qualified to enter a university will attend a junior college, and provided they maintain a "C" average, transfer to a four-year college. The remedial function should be of interest to four-year institutions for it is in the junior colleges that potential good students have an opportunity to prove themselves. University enrollments are growing so rapidly that many students who may be capable of graduating are turned down. Some persons feel that testing programs for entrance do not favor students interested in agriculture who have attended small, rural high schools. This group, plus those who are eligible for entrance but attend a junior college first, can make a considerable contribution in the programs of the upper divisions of the four-year colleges.

The third function is to provide vocational and technical education. This function is probably the most important. The aim of most junior college students is to complete two years of college and then go to work. This is a function not performed by most four-year institutions.

Role of Four-Year Colleges

What is the role of the four-year university in the development of agriculture in the junior college? It is an important role. It is a role of leadership.

Knowledge of Programs. The first step is for university people to acquaint themselves with the junior college programs. Many university staff members criticize the junior college programs even though they have never been on a junior college campus. Most junior college programs in the two-year programs in agriculture are graduates of the four-year institutions. If the teachers cannot perform their duties properly, it is because they were not adequately prepared in the four-year college program.

articulation. A liaison committee should be established between the two-year and four-year institutions. Such a committee has been organized by the University of California for several years. Membership includes personnel of the Bureau of Agricultural Education who represent high schools, the university, state college and junior college teachers, and administrators. This committee has been very valuable in articulation at all levels of agricultural education.

A student at Mt. San Antonio College checking seed for quality in the laboratory.
Technical Education in Ornamental Horticulture

ROBERT H. WHITE
Center for Vocational and Technical Education
The Ohio State University

The availability of adequate curricula has often been a major factor in a decision to implement technical programs of instruction in agricultural occupations. Functional curricula guides should facilitate the establishment of technical education programs. Any curriculum being considered must be judged to be credible by industry if the programs are to receive their support. Potential employers must have faith in the curricula being implemented if they are to employ students upon completion of the program. The number of technical ornamental horticulture programs is increasing, although by 1965 few "off-the-shelf" curriculum guides were available to educators responsible for these programs. Relative lack of agreement had often reached concerning curriculum content of technical ornamental horticulture programs. Apparently, there was even little agreement regarding the types of ornamental horticulture technicians employed by industry.

The Study

The purpose of the study described in this article was to identify the types of ornamental horticulture technicians and to develop curricula for ornamental horticulture technicians. The ornamental horticulture industry in Ohio was used as a basis for the study.

The procedures used in the study were designed to incorporate these major principles of curriculum construction: to benefit from experiences of established and ongoing programs in other states; to utilize the judgment of potential employers in successful horticulture businesses; and to establish acceptable procedures for curriculum preparation that result in curricula highly acceptable by school administration, potential employers, and vocational educators.

Types of Technicians

Six types of ornamental horticulture technicians were identified. A study of twenty-one post-secondary programs in eight institutions located in a half dozen states provided tentative identification of the six types. An analysis of the job titles or job descriptions of each of the employed ornamental horticulture technicians supported these types. Ornamental horticulture technicians were employed in the areas of:
- Arboriculture and park management
- Floriculture
- Greenhouses and nurseries
- Landscape
- Turf
- General ornamental horticulture

Procedure for Determining Curriculum Content

Each of the six types of ornamental horticulture technicians was considered separately in the development of the curriculum content. The first step was to establish a list of possible courses for each type of technician. In landscape, for example, examination of similar programs in selected institutions provided a comprehensive list of technical courses. The lists of courses for each of the types of technicians were merged into a comprehensive course list for each type of technician. Extensive care was necessary to prevent duplicate listing of courses with identical content but with different course titles. The same procedure was also used for nontechnical or general education courses such as psychology, communications, basic economics, and political science.

Each course in the list of technical subject matter courses, or topics as they were then called, was placed on a separate 3 x 5 card with a brief explanation of what was included in each topic. Each deck of cards was duplicated for the members of the jury ranking the topics. Twelve managers or owners of successful ornamental horticulture businesses were selected to represent the industry as a jury of experts. Three or more members of the jury of experts worked independently from identical sets of cards in ranking topics for each of the six technician types. The composite rank order thus obtained provided a list of courses to be included in the curriculum, ranging from the most to the least important topic. This made it possible to include the more important technical subjects as perceived by industry.

The analysis of rankings for each type of technician indicated considerable agreement for arboriculture and park management, floriculture, greenhouse and nursery, and turf. Kendall's Coefficient of Concordance (W) was used to determine the degree of agreement among the rankings.

Dr. Robert H. White is Retired Specialist, Center for Vocational and Technical Education, The Ohio State University. This article is based on his Ph.D. dissertation, "The Education of Ornamental Horticulture Technicians in Ohio," completed at The Ohio State University in 1967.

The AGRICULTURAL EDUCATION MAGAZINE

Program Features

Several characteristics of the proposed program had to be determined before the curricula could be prepared. The curricula are designed for twenty-one months of post-high school level instruction. Credit is allowed for four and one-half months of supervised work experience required during the program. Each curriculum provides approximately 100 quarter hours of credit with emphasis upon technical subjects. The programs are envisioned as terminal in nature with transfer of credit being a very minor consideration. The proposed curricula meet both the Ohio Board of Regents and the State Department of Education requirements for the Associate Degree.

Summary

Features in successful programs, the need for industry, pedagogical requirements, and state educational standards were all considered in the proposed curricula. The assumption was made that similar programs in other states had valid contributions to offer. Conditions in local industries served as criteria for jury members to determine the more important courses. State standards were considered as well as course sequence, seasonal appropriateness, and other educational requirements. The curricula that resulted reflect several realistic tempering agents.

178

Table 1

<table>
<thead>
<tr>
<th>Non-technical Courses</th>
<th>Related Technical</th>
</tr>
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<tbody>
<tr>
<td>Written Communication</td>
<td>Botany</td>
</tr>
<tr>
<td>Oral Communication (Speech)</td>
<td>Agricultural Mathematics</td>
</tr>
<tr>
<td>Records and Bookkeeping</td>
<td>Soils</td>
</tr>
<tr>
<td>Political Science</td>
<td>Personnel Management</td>
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</table>

Table 2

<table>
<thead>
<tr>
<th>Type of Technician</th>
<th>Unique Courses</th>
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</thead>
<tbody>
<tr>
<td>Arboriculture and Park Management</td>
<td>Mapping, Grading and Construction</td>
</tr>
<tr>
<td>Floriculture</td>
<td>The Floral Industry</td>
</tr>
<tr>
<td>Greenhouses and Nurseries</td>
<td>Horticultural Marketing</td>
</tr>
<tr>
<td>Landscape</td>
<td>Propagation by Cuttings</td>
</tr>
<tr>
<td>Turf</td>
<td>Nursery Management</td>
</tr>
<tr>
<td>General Ornamental Horticulture</td>
<td>Contracts and Specifications</td>
</tr>
</tbody>
</table>

Common and Unique Courses

Several courses emerged as being common to all six of the proposed curricula. Generally, the common courses are for the less technical topics as shown in Table 1. The more technical courses are usually present in only one or two of the curricula. Table 2 lists the types of technicians and examples of unique courses for each.

FFA Fellowships

Massey-Ferguson, Inc., is again providing three fellowships for persons who are interested in or who wish to prepare themselves for posts as state FFA executive secretaries and other adult leadership positions involving FFA responsibility.

The program will extend from June 15 of one year to June 15 of the following year. Each fellowship provides a stipend of $330.00 per month for twelve months. In addition, up to $750.00 per fellow is provided for travel expenses in the training program.

The program is conducted cooperatively by the National Office of the Future Farmers of America and the University of Maryland. Detailed information about the program may be obtained by writing to Dr. V. R. Carducci, Department of Agricultural and Extension Education, University of Maryland, College Park, Maryland 20742.
A Rapidly Changing Agriculture Means —

TECHNICAL EDUCATION FOR FARMERS

C. E. BUNDY, Teacher Education
Iowa State University

We have witnessed during the past few years unprecedented development in the commercial, industrial, and farm machinery industries. Farmers have discovered that they can get the greatest return on their capital and labor by investing in commercial, industrial, and farm machinery. As a result, many farmers are devoting a large part of their income to agricultural education investing funds and personnel in activities which will not get the greatest return.

A Changing Agriculture

Let us look at the changes that are taking place in agriculture and see what our direction should be in vocational agriculture.

It is anticipated that we will have in the vicinity of 245 million people to feed in the United States by 1980. This 28 per cent increase in population will mean about 50 million more people to feed. It is anticipated that the per capita consumption of butter, milk, and eggs will continue to decrease and that the consumption of beef and veal will increase. This will necessitate a 40 per cent increase in demand for beef. The consumption of pork is likely to decrease but we will need about 16 per cent more pork to feed the 1980 population. Nearly 50 per cent of the nation's food will be consumed in 1980 than at the present time. We will need approximately 20 per cent increase in the production of eggs and milk products by 1960.

It is estimated that the production of livestock feed will be increased 60 per cent by 1980. Exports of agricultural goods have doubled during the past ten years and it is estimated that we may be exporting 2 per cent more crops in 1980 than in 1960. Using these projections, we should expect an increase in crop output of 40 to 50 per cent by 1980.

Technical education is doubling each ten years. Many practices and machines become obsolete in less than five years. Technological developments will become more rapid and more dynamic during the next ten years.

Changes in Farming

These developments point to a continuation of the trend toward larger farms. Since 1949 we have lost nearly two million farms in this nation. About 85 per cent of these were small farms with less than $2,500 worth of products produced per year. There has been a dramatic increase in the number of family farms with annual sales over $10,000. The number of larger-than-family farms has decreased since 1949. These data have implications to agricultural education and especially in the area of young and adult farmer programs.

The average farm in the United States in 1959 was 205 acres. Today it is 530 acres. Farming is big business. In Iowa the average farm approaches 220 acres and is valued at approximately $150,000. An additional thirty to fifty thousand dollars is needed in working capital. With the increase in farm size there is an increase in the percentage of farm operators who hire farm workers 150 per cent for more each year. While some economize a disappearance of family operated farms and an increase in corporate farms with hired workers, the trend to date indicates that as farm businesses become larger, they are reorganized into family units.

Need for Adult Education

The need for young and adult farmer programs in agricultural education is magnified when we study the characteristics of our present farm operators. A 1963 study of a random sample of farm operators in Iowa indicated that only 1.2 per cent were college graduates, 5.6 per cent had from two to three years of college training. Only 2.2 per cent of the operators had received any instruction in agriculture while in college. Approximately 41 per cent of the operators had no formal education in agriculture. The average age of the operators was 63 years.

Two-thirds of the operators had no formal educational training. Nearly 20 per cent had attended vocational agriculture in high school, about 10 per cent had completed veteran's farm training, and another 10 per cent had vocational agriculture and college training. These data emphasize the need for educational programs in agriculture.

Indigent Staff and Finance

Public school administrators have been given greater responsibility in local communities for young and adult farmer education. The state may also be given greater responsibility. The state districts have been well organized. The state districts have been well organized. The state districts have been well organized.

Farms Who Enroll

It is not assumed that vocational agriculture will meet all of the agricultural education needs of farmers. Studies show that the innovators of new practices in many communities do not rely upon local resources for information. The innovators are directly involved in the College of Agriculture or the commercial researcher. Many of the early adopters obtain information from commercial sources rather than from local resources, or from educational services, or from vocational agriculture teachers. The early adopters and the early majority are moving, however, the individuals most likely to be active in young and adult farmer classes. These are the groups to which our programs should be directed. We should make use of the innovators and resource persons in conducting the educational programs. They are the primary representatives of the groups.

Other Agencies Providing Adult Education

Commercial concerns provide adult education also. They employ the best qualified persons from both vocational agriculture and agricultural extension. They have almost unlimited funds to devote to the preparation of educational materials and to the conducting of educational meetings. Commercial concerns are an active part in agricultural education. Vocational agriculture teachers need to cooperate and represent agriculturists in developing community programs. However, care must be taken to avoid implications of bias.

Changes in the Agricultural Extension Service in most states will make it possible for teachers of vocational agriculture in the state and the district extension service in local communities to work closely with the Agricultural Extension Service in the College of Agriculture or the commercial researcher. Many of the early adopters obtain information from commercial sources rather than from local resources.
Almost 4,000 students are enrolled in agriculture during 1967-68 in the thirty-five California junior colleges that provide vocational agriculture or forestry training. This represents a continuing increase in enrollment for this phase of agricultural education in California.

ADMISSION POLICY

One reason for this increase is the "open door" policy for admission of students. This policy provides unlimited educational opportunities for 100 per cent of the student population. Such a program provides thousands of students with educational opportunities that are denied students in other states of this nation. However, each enrolling student is required to take a placement test. The test results assist the counselor in placing the student in courses which are in keeping with his achievement capacity. Because of varied student capacities, many students will require five or six semesters to complete the two-year or four-semester Associate of Arts degree program. Junior college educational opportunities in California are not restricted by the outmoded junior college entrance examination. It is highly impractical to use the entrance examination in California junior colleges because of the threefold objectives of junior colleges: to provide general education, to provide college transfer programs, and to provide occupational training programs.

SELECTION OF STUDENTS

Since the entire student population has an educational need within at least one of these objectives, a primary responsibility of the junior college is to assist the student in selecting a program in which he may reasonably expect to succeed. This is in contrast to selection on the basis of a student's probable success in a traditional four-year degree program. Whenever we restrict junior college programs to the more academically talented, we are merely displaying a continued disdain for the studies which indicate that only 20 per cent of the student population is likely to earn a baccalaureate degree. Therefore, our responsibilities to the entire student population are obvious and require the provision of realistic programs for all students at all levels of achievement. Many such programs will need to be one year in length.

TYPE OF INSTITUTION

Another concept of public postsecondary education in California is that this education is conducted on a comprehensive junior college campus. This is in contrast with other areas in the country where designated postsecondary institutions provide only vocational training. It is also in contrast to those states in which the responsibility for vocational education is fulfilled by the state university. A stabilizing factor in the junior college program of California is that none of the junior colleges are or have been designated to achieve four-year status. The nine junior colleges campuses are in the responsibilities for conducting the four-year degree programs. It is significant to note that the eighty California junior colleges currently enroll more than one-half of all college students in the state.

A COMPLETE PROGRAM

The primary employment opportunities in agriculture are in the fields of landscape maintenance, agricultural inspection, agricultural sales and services, farm machinery, and forestry. Preliminary studies of the fields of farriery, food processing, and weights and measures inspection indicate that opportunities exist for students with junior college training in these areas of agriculture.

"Although certain courses in agricultural production are needed for off-farm occupations, a total curriculum in agricultural production will tend to train people for a limited number of job opportunities."

Although certain courses in agricultural production are needed for off-farm occupations, a total curriculum in agricultural production will tend to train people for a limited number of job opportunities. Therefore, the junior college vocational agriculture program should not be limited completely to production courses. Over one-half of the agricultural students in California junior colleges take training by the end of one year. Therefore, a constant emphasis is being placed upon one-year certificate programs. Such a program helps prepare the student for job entry. Many of these students later return to the junior college to acquire additional training for advancement on the job.

CURRICULUM CONTENT

Successful junior college programs in agriculture are those that first identify the required skills and then develop the curriculum to provide these skills. Occasionally subject matter is added to the program merely because someone likes to teach specific skills or because a course is required for the baccalaureate degree. A classic example is a course in seeds and feeding. This course seems to have been included in all agricultural curricula developed since the Morris Act. An agricultural education specialist who is a former feedlot operator was recently asked to describe the responsibilities of a young junior college graduate whom he had employed. His reply was: "First I have a Ph.D. who is responsible for the formulation of rations so this young man is told to take so many pounds of ingredients from designated bins and put them into a mixer for a specific number of hours. After mixing, he distributes the mixture to the various pens. If anything breaks down, I expect him to be capable of repairing it." In this case, mechanics training is far more important than training devoted to the balancing of rations. Therefore, realistic approaches must be taken in the identification of the occupational skills that need to be taught.

FACTORS FOR SUCCESS

The future success of vocational agriculture in California junior colleges will depend primarily upon these factors:

- The implementation of effective work experience education and intern programs.
- The reflection of industry needs by providing one-year certificate programs.
- The articulation of high school and junior college agriculture curricula.
- The introduction of new and improved teaching techniques.
- A philosophy that indicates concern for the educational needs of all the students who continue to contribute to success in agricultural education.

The technological advances in agriculture are constant reminders that dynamic leadership will be needed to develop and conduct effective programs designed to meet the needs of students studying agriculture in junior colleges.

Themes for Future Issues

- March: RESEARCH AND DEVELOPMENT
- April: THE IMAGE OF VOCATIONAL EDUCATION IN AGRICULTURE
- May: INSTRUCTIONAL MATERIALS
- June: EVALUATION
- July: AGRICULTURAL EDUCATION IN PROGRAMS INVOLVING OTHER VOCATIONAL SERVICES
- August: ADULT EDUCATION
- September: AGRICULTURAL EDUCATION FOR PERSONS WITH SPECIAL NEEDS
Evaluation of Post-Secondary Programs in Agriculture

EUGENE S. WOOD, Teacher Education
Southern Illinois University

The post-secondary programs in agriculture are part of the junior college curriculum in Illinois. The development of junior colleges was quite slow in Illinois before the General Assembly passed the Junior College Act of 1965. Before 1965, junior colleges usually were part of a common school system and were primarily single-purpose institutions furnishing the first two years of a baccalaureate program only. Under the 1965 Act, a Class I Public Junior College must have a comprehensive program and must furnish training for baccalaureate, vocational, and adult education. There are now thirty-three Class I Junior Colleges in the state which have been approved in the last two years. It appears that there eventually will be approximately forty junior college districts serving the entire state.

Technical Education Programs

The first post-secondary program in agriculture in Illinois was started in 1963 at Joliet Junior College as a curriculum in Agricultural Supplies. In 1965, four non-junior colleges developed agricultural programs: Clinton Community College, Agricultural Mechanics; Chicago City Woodrow Wilson Campus, Ornamental Horticulture; Danville Junior College, Ornamental Horticulture; and Western Valley College, Agricultural Supplies and Agricultural Mechanization. In 1966, Danville Junior College added Agricultural Mechanics and Agricultural Production. During the 1966-67 school year, Illinois had five schools offering agricultural programs with approximately thirty teachers and nearly 400 students. In the fall of 1967, seven additional schools in Illinois offered one or more agricultural programs, bringing the number of teachers to forty and the number of students to approximately 700.

Evaluation Essential

Realizing that evaluation is an essential part of any educational program, a research project was undertaken to analyze the influence of the post-high school programs on students and to determine how successful the students are when employed.

The first phase of the study was an attempt to determine the background, interests, and abilities of the students enrolled in the post-secondary programs. Information was collected from 230 students who were enrolled in 1965-66 and from 228 new students who enrolled in 1966-67.

In the second phase of the study an attempt was made to determine student competencies and attitudes at the end of the first year of on-job training. Ratings were obtained from students, employers, and college superiors.

The third phase of the evaluation project involved contacting the graduates and their employers six months after the students graduated. Only one school with one program had graduates in 1966. Thirty-eight graduates completed this program in June, 1966.

Students are instructed in Illinois on welding in the technical program at Danville Junior College, Illinois.

Outcomes

Some major findings of the study are as follows:

- To the degree that first semester grades indicate future academic success, it would appear that students in the junior college programs had slightly over one-half of the students who graduated from high school graduating class would successfully complete the technical education program.
- The majority of the students in these programs, other than in ornamental horticulture, are farm boys with vocational agriculture backgrounds.
- The parents and vocational agriculture teachers have the greatest influence on students entering technical programs except for those students enrolled in ornamental horticulture.

The employers indicated that 95 per cent of the student-employers would be acceptable as permanent employees.

The surveys showed that 87 per cent of the student-employers would be retained for regular employment.

Most of the students expressed an interest in and a desire for ownership and supervisory positions as their career objectives.

Students believed that, in comparison to other courses they have taken in high school, vocational agriculture is most helpful in technical programs and in future work.

Most of the students believed that they would be active in one or more extra-curricular activities and felt these activities were of value to them in the post-secondary program.

* Most of the students had work experience after the age of sixteen and in most cases it had been of major value to them.

* The majority of students indicated a preference for a two-year program although one third indicated an interest in a course of more than two years.

* Employers and college supervisors, in general, rated student-employee high in integrity, dependability, responsibility, cooperation, courtesy, and personal appearance. Generally the student-employees were rated average in initiative, judgment, and leadership.

* The employers showed a high degree of interest in continuing as a training station.

Graduates rated on-job training and course work in agriculture as having the greatest value to them.

Nearly three fourths of the twenty-six graduates contacted indicated that they would like additional training in the field in which they specialized.

Twenty-five of the twenty-six graduates said they would recommend the program to their best friend.

Some Concerns

The rapid growth of technical education in agriculture in junior colleges has not happened without some problems and concerns in the state. One of the major problems has been the shortage of well-qualified instructors. The major concern of the instructors is for high school teachers of agriculture.

Some of the programs have found success in matching a technician with a professional teacher. There is a need for programs in the state to prepare teachers for the junior college.

Another concern is a lack of variety of programs and the duplication of agricultural supply and mechanics programs. All programs are two years in length.

Dr. Eugene S. Wood is director of the research project, "Evaluation of Illinois Post-High School Educational Programs in Agriculture," which is funded by the Research Coordinating Unit, Illinois Board of Vocational Education and Rehabilitation, and Southern Illinois University. A complete report of the study is available from the School of Agriculture, Southern Illinois University, Carbondale, Illinois 62901.

Eugene S. Wood

Central States Seminar in Agricultural Education

Date: February 15-22, 1968

Place: Sherman House Hotel, Chicago, Illinois

Theme: Instructional Programs in Agricultural Education to Meet the Changing Needs of Agriculture

Program Chairman: Professor Clarence E. Bandy

Agricultural Education

Iowa State University

Ames, Iowa

February, 1964
POST-HIGH SCHOOL INSTRUCTION IN AGRICULTURAL MECHANICS

JAMES ZEPPLIN, Instructor
Marathon County Technical Institute
Wausau, Wisconsin

Post-high school instruction in agricultural mechanics offers rewarding opportunities for high school graduates of vocational agriculture. High school students in vocational agriculture are expected to receive some instruction in farm machinery and tractors, but the equipment and facilities available, the time available for instruction, and the age and maturity of students usually limit this instruction to the operation, care, and maintenance of equipment that can be accomplished in the home farm shop.

High school instruction in agricultural mechanics can ideally develop the mechanical aptitude of a student. It is not the objective of the high school program to prepare a person to go into an agricultural implement business as a competent mechanic. This is a responsibility of the post-high school program. The mechanically inclined student can capitalize on his high school instruction in agricultural mechanics by taking a two-year post-high school course in agricultural mechanics offered by technical institutes or junior colleges.

THE PROGRAM
A program of instruction in agricultural mechanics was established at the Marathon County Technical Institute in Wausau, Wisconsin. The school carefully planned a curriculum with the support of the Wisconsin Power Equipment Dealer's Association and with the aid of both state and local advisory committees. A pilot program was initiated under the Manpower Development and Training Act with the approval of the Wisconsin Board of Vocational, Technical and Adult Education. The program began in a rented structure since the justification for the purchase of a building could not be made until the program was established. After two years of successful operation the program was moved into a larger rented facility to provide more adequate space for new equipment and machinery. A new building is planned for occupancy in 1969.

FACILITIES AND EQUIPMENT
Adequate facilities and equipment are needed for effective instruction in agricultural mechanics. It has been well established that to train properly a mechanic it is necessary to provide adequate instruction and practice in a shop. To do so requires shop space for numerous pieces of machinery and tractors. The Marathon County Technical Institute now operates a shop of 72' X 96'. Enrollment is limited to thirty-six students. No more than two students are assigned to any one piece of machinery or tractor. Adjacent to the shop are two classrooms, each 24' X 24', a lounge and dressing room combination, and offices for the instructors.

In addition to the large amount of space required for this instruction, the shop must be well equipped. It is the philosophy of our school that it pays to buy good tools. This results in less breakage and longer life. Each two students are assigned a high quality set of hand tools. Specialized tools are checked out to the students as they are needed in their work.

THE CURRICULUM
The first year students receive instruction in machinery and spend two hours per day in the shop, one hour in lecture, and three hours in related instruction such as communications, welding, and the interpretation of manuals. The second year they receive their training on tractors spending three hours per day in the shop, one hour in related lectures, and two hours in related instruction such as selling and hydraulics.

It is important that students learn to use modern equipment for engine analysis and repair. The shop is equipped with some equipment not commonly found in the average implement dealership. However, dealers have expressed a desire to install such equipment if they can hire persons properly trained in its use. Such equipment as a distributor tester, vacuum tester, hydraulic and diesel testers, and dynamometers fall into this category. Though expensive, the agricultural mechanic of the day needs to know how to use all of this equipment.

INSTRUCTIONAL RESOURCES
In addition to equipment, much is required in the way of demonstration pieces and cutaways to provide effective instruction. Manufacturers have provided the school with diesel engines, mock-up hydraulic systems, and visual aids as well as scholarships to help needy students. Also, manufacturers' representatives aid the school by providing some of the lectures and demonstrations. These men are experts in their field and can lend real support to the shop and classroom instruction.

THE FUTURE
The farm equipment industry has been criticized for the low wages paid mechanics. However, a well-trained mechanic can receive very adequate compensation for his work. More and more dealers are paying mechanics on the basis of flat-rate tables. This table gives the number of hours of labor to be charged to the customer for a given repair job. When a mechanic can do a job in less than the prescribed time the difference is paid to the mechanic. In this method of payment a good mechanic can provide more income for himself and the dealer.

Young men should be encouraged to enter agricultural mechanics occupations if they have the interest and ability to do good work. In this line of work with the increase in mechanization and automation taking place in agriculture today, the future is bright for the agricultural mechanic.

REGIONAL SEMINARS ON AGRICULTURAL EDUCATION IN COMMUNITY COLLEGES AND AREA SCHOOLS

Title of Seminars: Teaching Agricultural Occupations in Community Colleges and Area Vocational Schools.

Purpose: To expedite the development of vocational and technical programs for agricultural occupations at the post-high school level in area vocational schools and community colleges.

Program: Problems to be discussed during the seminars include the need for technical programs in agriculture, curriculum development, facilities, staffing, student organizations, occupational experience, and the development of guidelines for the total instructional program.

Participants: Teachers of agriculture in high schools, community colleges, area schools, technical institutes, and junior colleges; administrators of community colleges and area schools; advisory committee members; board members; state supervisors; teacher educators; and leaders in business and industry.

Dates and Locations: Regional seminars have been held at Mankato, Minnesota; Perryburg, Ohio; and Muscatine, Iowa. Additional seminars are scheduled as follows:

January 31-February 2, 1968
Northwest Mississippi Junior College
Senatobia, Mississippi

February 14-16, 1968
Northeastern Junior College
Scottsbluff, Nebraska

March 6-8, 1968
Potomac State College
Keyser, West Virginia

March 20-22, 1968
Auburn Baldwin Agricultural College
Tifton, Georgia

April 11-13, 1968
Mesa Community College
Mesa, Arizona

April 24-26, 1968
Tennessee Valley Community College
Oakland, Oregon

May 8-10, 1968
East Texas State University
Commerce, Texas

May 22-24, 1968
Thompson School of Applied Science
Durham, New Hampshire

June 12-14, 1968
Central Carolina Technical Institute
Sanford, North Carolina

For Additional Information: Information about the seminars may be obtained from the head supervisor or teacher educator in each state. The seminar director, listed below, may also be contacted for additional information.

Mr. Howard Safford, Seminar Leader
Agricultural Technical Education
Agricultural and Technical College
Goldenskull, New York 12093

FEBRUARY, 1968
United States

Agricultural Programs in Junior Colleges

WILLIAM J. BECKER and WARREN G. NOLAND
Research Associates, The Ohio State University

More junior colleges are offering courses in agriculture than ever before. The quality of instruction in agriculture in junior colleges is improving. These are two of the major findings of a 1967 survey of junior colleges in the United States.

Types of Programs

Of the junior colleges offering agriculture in 1967, 43 per cent indicated that they offer college transfer programs in agriculture, 34 per cent offer technical programs, and 45 per cent offer vocational programs. Figure I shows the percentages of responding institutions offering various combinations of transfer, technical, and vocational programs. A number of junior colleges indicated that college transfer students and technical students are enrolled in the same courses or program. An analysis of the same population in 1963, Stepp argued that 51 per cent of the junior colleges were offering agricultural programs.

Figure I

Types of Agricultural Programs in Junior Colleges

- 37% offer Transfer, Technical, and Vocational Programs
- 24% offer Transfer and Technical Programs only
- 21% offer Transfer Programs only
- 8% offer Transfer and Vocational Programs only
- 8% offer Technical and Vocational Programs only
- 5% offer Technical Programs only

Figure II

Characteristics of the Faculty Teaching Agriculture

- 91% hold a Master's or Doctor's Degree
- 69% teach in only one subject matter area
- 75% are full-time staff members
- 47% have been on the staff three years or less
- 1% do not have a college degree

The study, from which this article is taken, is a random sample of 243 junior colleges in thirty-three states listed in American Junior Colleges (Sixth Edition, edited by Edward J. Glazier) as offering agriculture. A survey instrument was mailed to ninety-one junior colleges. Responses were received from seventy-nine institutions in twenty-nine states. Thirty-eight of the responding institutions located in twenty states have established agricultural programs.

Enrollment

The eighty-three responding institutions which offer agricultural programs indicated a total enrollment of 5,640 students in agriculture. Forty-two per cent of the enrollments are in transfer programs, thirty-nine per cent in technical programs, and nineteen per cent are in vocational programs. These percentages are comparable with the 1963 findings by Stepp who found 42 per cent enrolled in transfer programs, 40 per cent enrolled in technical programs, and 18 per cent enrolled in vocational programs.

While there has been little change during the past four years in the percentages of students enrolled in the various programs, there is a significant increase in the number of students enrolled in agriculture. In 1967, Stepp compared 2,994 agricultural students in 33 junior colleges for an average of 90 students per junior college. The writers found 5,640 students enrolled in agricultural programs in 38 junior colleges for an average of 150 students per junior college.

Faculty

The typical junior college faculty member teaching agriculture holds a master's degree, is a full-time staff member teaching in one subject matter area, and has been on the staff three years or less (See Figure II).

The importance of quality instruction is apparent by the fact that 68 per cent of the staff teach in one subject matter area; another 20 per cent teach in two areas. Only 12 per cent of the staff members teach in three or more subject matter areas. The staff members came from a wide variety of backgrounds including high school vocational agriculture teaching, farm and ranching, agricultural extension, agricultural business, and government service.

Problems

Several problems in conducting agricultural programs in junior colleges were identified. These are:

- Inability of students to handle the mathematics, science, and communication skills required to master the agricultural curriculum.
- Lack of student motivation.
- Diversity of backgrounds and experience which students possess as they enter the programs.
- Keeping the content of the curriculum relevant in a rapidly changing era.


This book is written as a reference for teachers of vocational agriculture and agricultural extension workers, and as a textbook for students in agriculturist courses in high schools and for students who desire to have an overview and perspective of the nature and scope of opportunities in the field of agriculture.

The eighteen chapters, including photographs, diagrams, and tables, will help the reader understand the agricultural programs including farm supplies, processing, distribution, consumerism, and employment. There are chapters dealing with marketing, whaling, rearing, business organization, and management, and economic tools for decision-making.

The book provides facts and principles which may help the educator to develop an understanding of the nature, scope, and functions of agriculture. To achieve these goals, the textbook should be used as a reference in related instruction for high school students who receive supervision in an agricultural experience.

Two individuals collaborated in the preparation of each of two chapters. The other ten chapters were each prepared by a different author. The authors were asked to work within a self-imposed three-week deadline. This complete freedom within the framework to use their own style, to express their own ideas, and to present their own interpretations. This freedom probably results in some lack of cohesion, but it has the advantage of providing the reader with some differences in points of view. In terms of the reader this may be its greatest contribution.

Chapter titles deal with the participation of teacher educators in agriculture, descriptions of programs, the job of the teacher of agriculture, the recruitment and selection of teachers, the teacher education curriculum, student personnel services, interdivision, graduation, and student, and so on.

O. Donald Mauder Michigan State University

February, 1967

The AGRICULTURAL EDUCATION MAGAZINE


Teacherteam in Agriculture was prepared as a part of the American Association of Teacher Educators in Agriculture. It will therefore be read with great interest by many readers of The Agricultural Education Magazine. In the planning stage, the editors' committee debated whether the book should describe present thinking in agricultural teacher education or should be a comprehensive history of the subject. It indicates that, so some extent, it has done all of these. For the most part it is oriented to the present and recent past.

The volume will fill a long-needed need for a basic text and reference for the education in agriculture. It will be used by supervising teachers and by graduate students in educational, agricultural, and other educators in developing countries who are seeking to establish teacher education programs.

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Barnett M. Clark Michigan State University
Dr. Knuti received B.S. and M.S. degrees from the University of Minnesota. He completed the Ed.D. degree at the University of Illinois.

He is a co-author of Profitable Soil Management. Dr. Knuti served as president of the American Association of Teacher Education in Agriculture in 1960. He served three years in the U.S. Army during World War II as an education and agriculture officer in the European Theatre.

Gene M. Love has been appointed Associate Professor and Acting Head of the Department of Agricultural Education at the University of Missouri. Prior to assuming his new position, Dr. Love was Associate Professor of Agricultural Education at The Pennsylvania State University where he had been a member of the staff in agricultural education since 1958. Dr. Love received B.S., M.S., and Ph.D. degrees from the Pennsylvania State University.

Leo L. Knuti retired in 1967 as head of the Department of Agricultural Education at Montana State University. Dr. Knuti had been at Montana State University for nineteen years. His professional career also includes ten years as State Supervisor of Agricultural Education with the Minnesota Department of Education.

Dr. Max L. Amberson was appointed Associate Professor and Acting Head of the Department of Agricultural Education at the University of Minnesota. Mr. Amberson received the B.S. degree from Montana State University in 1955 and a M.A. degree in agricultural education from the University of Minnesota in 1966. He has completed course work toward the Ph.D. in agricultural education at The Ohio State University.

Mr. Amberson taught agriculture at Whittaker High School, Montana, from 1950 to 1957. From 1957 to 1959, he was Assistant Director, Agricultural Development Department of the F. W. Peavy Company in Minneapolis. He served as Supervisor of Agricultural Education, Montana Department of Public Instruction from 1961 to 1966. Since September, 1966, he has served as Acting Director of Vocational Education in the Montana Department of Public Instruction.

J. Robert Warmbrod accepted a position as Professor of Agricultural Education, The Ohio State University, on January 1, 1968. Dr. Warmbrod has been a member of the Division of Agricultural Education, University of Illinois, since 1961.

A Project for Effective Teaching

J. A. BRUST

Vocational Agriculture Instructor
Germantown, Iowa

Want a new project to help your students feel they have accomplished something worthwhile?

Patience Plus Persistence

Proper motivation is the necessary beginning of every worthwhile undertaking. After viewing a number of the familiar metal FFA road signs rusting after a few years, our chapter decided we would build a large framed sign for each highway entrance to our town that included the FFA emblem as well as our chapter name.

We began with a 4' x 8' sheet of tempered Masonite cut into two equal-sized pieces, five 4' x 12' boards, and an abundance of patience. An overhead projector was used to project an FFA emblem to the 4' x 8' board which had been painted white. Tracing and painting the emblem by hand required considerable patience, but we eventually erected the signs proudly. They make an impressive introduction in our town.

In the meantime some of the students decided to build "home farm" signs to name and identify their individual farms. We drew plans for signs which would be distinctive and attractive. Once we had our plan, more students became interested. Progress was slow due to the fact that all work was done while students were "on leave" from study hall. However, as interest gained momentum we decided to make signs building a chapter project. This then question arose, "Why not allow all students to make farm signs?" As a result one of our current requirements is that every ninth grade student build a farm sign. Each student designs his sign.

Our goal was to build an inexpensive yet attractive sign. Our plan finally evolved itself into something simple, yet sturdy. The bill of materials is as follows:

- 4" x 8" 1/2
- 2" x 8" 4'
- 1" x 8" 10'
- 1" x 8" 10'
- 2" x 8" tempered Masonite
- 6-6" galvanized box nails
- 2-5" x 2" lag screws
- 1/4" x 1/2" carriage bolts
- 1" x 1/2" eye screws
- 2-3" wire nails

Glue and paint

The students spend a lot of time drawing the pictures and marking the letters on the boards that have a base coat of white paint. A great deal more time is spent in painting the pictures and letters.

Equals Pride

Is all the time and effort spent on this project worth the problems that are encountered? The answer is definitely "Yes." Each student spends considerable time and effort in making an attractive and distinctive sign, but most vital is the fact that each has something which is his own creation of which he can show pride. And when these signs go out on the road in front of their houses, their workmanship is at an all-time high.

One thing that impressed me was the observation that the students believed nothing could be done until a plan was developed. To think through a plan and work out the problems encountered was one of the biggest barriers. It was also the source of motivation that led to learning. That these students found out that they can do something for themselves was a real achievement. Pride by each student shows in all cases. It's their own work.

Many people both within and outside our community have made favorable comments about these signs. Many wondered where they could be purchased—attesting to their quality. A project such as this can be the grooming of that necessary element of effective teaching—pride.
Stories in Pictures

GILBERT S. GUILER
Ohio State University

Teams of New Hampshire students in a survey course taken by all Forestry Technology and Soil, Water and Conservation Technology majors. Photo by Anaya.

Students troubleshooting diesel engines in Agricultural Engineering class at the Agriculture and Technology College, Cobleskill, New York. Photo by Sidley.

Featuring—

RESEARCH AND DEVELOPMENT