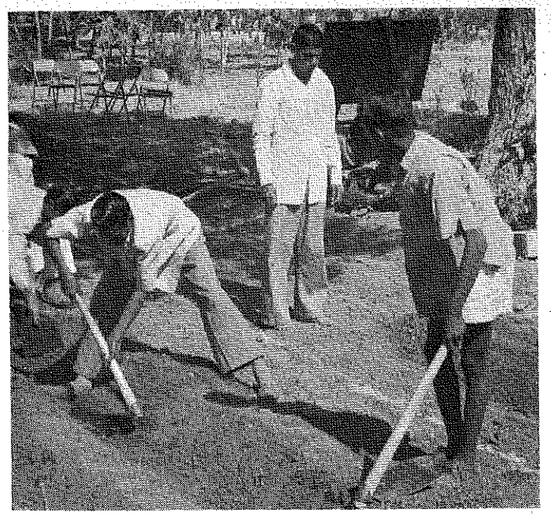
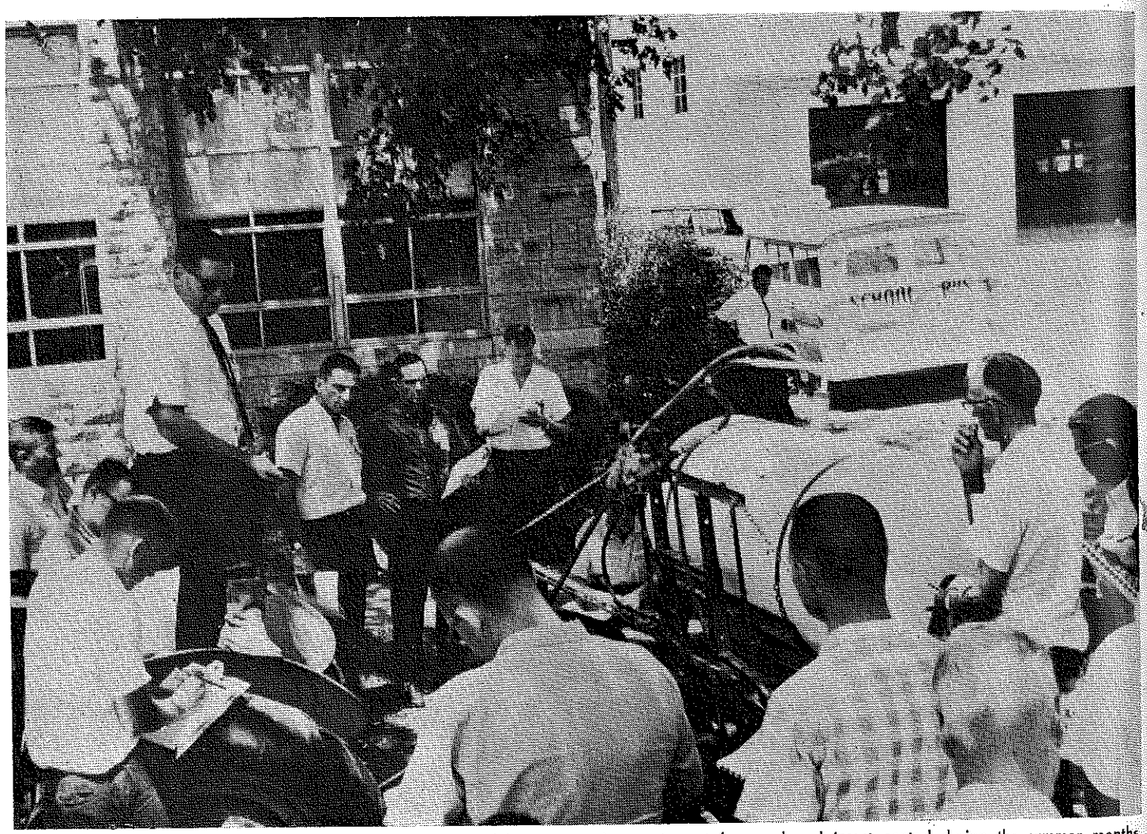


A good seedbed is essential for improved sugarcane production in India. Photo—Bristol

Stories in Pictures

GILBERT S. GUILER

Ohio State University

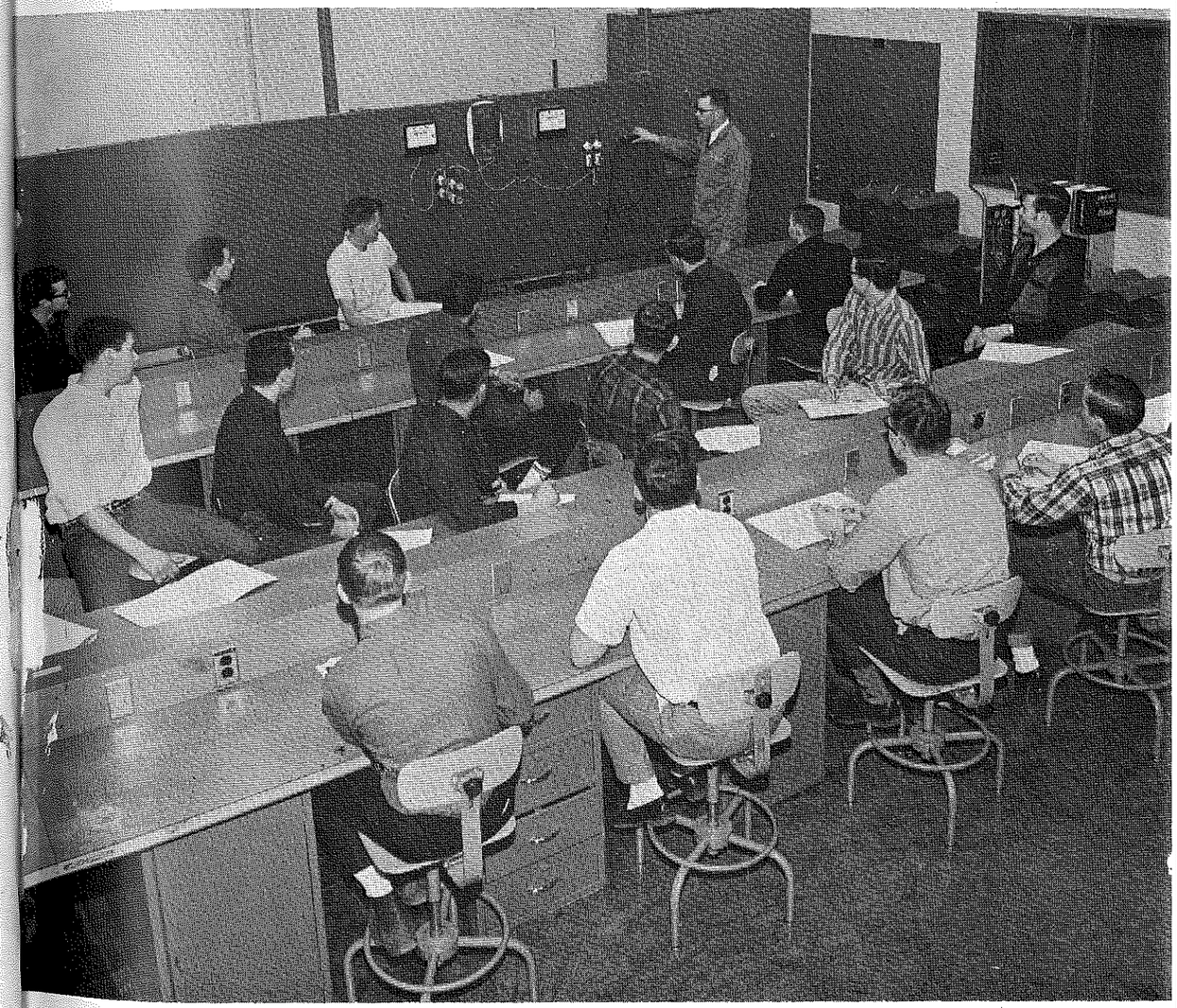


Vocational agriculture teachers in Kansas receive in-service training on spraying equipment for weed and insect control during the summer months. Photo—C. C. Eustace

AGRICULTURAL EDUCATION

Agricultural Education

Volume 40 February, 1968 Number 8



Featuring—

TECHNICAL EDUCATION IN AGRICULTURE

THE
AGricultural EDucation
MAGAZINE

Vol. 40 February, 1968 No. 8

The professional journal of Agricultural Education. A monthly publication managed by an Editorial Board. Publication office at The Lawhead Press, Inc., 900 East State St., Athens, Ohio 45701.

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Subscription price, $3 per year. Foreign subscriptions $3.25. Student subscriptions in groups one address, $1 for October-May. Single copies .50 cents. In submitting subscriptions designate new or renewal and address including zip code. Send all subscriptions to T. L. Faulkner, Business Manager, AGRICULTURAL EDUCATION MAGAZINE, State Department of Education, Montgomery, Alabama, 36104.
Articles and pictures should be sent to the Editor or to the appropriate Special Editor.
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EDPRESS

Editorials

From the Editor . . .

Technical Education: Some Implications of a Definition

J. Robert Warmbrod

What is technical education in agriculture? What are its distinguishing characteristics and features? The answers to these questions determine to a great extent the manner in which programs of technical education will be, or should be, developed and operated. The method used to describe and define a concept such as technical education includes some rather important implications for the implementation of the concept.

A perusal of definitions and descriptions of technical education, technician, technology, and the like reveals at least four distinct features of that phase of agricultural education characterized as technical education. First, it is essential that technical education be concerned with theoretical knowledge and scientific principles. Frequent reference is made in the literature to the fact that the success of the technician is dependent upon technical information and the understanding of the laws of science and technology.

The second distinguishing characteristic of technical education is, for all practical purposes, part and parcel of the first. Not only does technical education involve an understanding of scientific principles, but of equal importance, it emphasizes the practical application of scientific knowledge in solving problems and performing specific tasks. So technical instruction in agriculture accentuates the understanding of the laws of science but does so in a context which enhances the application of scientific principles in solving problems of design, production, distribution, and service in the field of agriculture. The interdependent relationship between understanding and application of scientific principles has important implications for program development and operation. Particularly relevant are the implications of this relationship to curriculum development and organization and to approaches to teaching that are appropriate for technical programs.

(Continued on next page)

Guest Editorial . . .

Challenges and Decisions in Post-Secondary Education

C.W. Dalbey

Post-secondary education in agriculture is here and with it has 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 qualities 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; 53.0 per cent of Iowa adults over twenty-five years of age had not graduated from high school; and 13.8 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 million to less than six million. 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 high 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 facts 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 a special challenge for post-high school vocational education. Major industries never cease to stress the qualities of the individual as important to successful employment. The personal factors most often listed are character, ability to communicate, leadership ability, motivation, and enthusiasm. Much of our modern education with its large 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

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Mr. C. W. Dalbey is Chief of Agricultural Education, Vocational Education Branch, Iowa Department of Public Instruction, Des Moines.

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 there are scientific principles 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 alluded to earlier, those features of technical education that relate closely understanding and application of scientific principles have explicit and important implications for program planning, teaching, and staffing. For example, is job analysis to identify tasks performed by technicians sufficient for determining content of a curriculum in which scientific 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 and clarify the scientific principles, or technology, that is appropriate?

In technical education emphasis is rightfully placed on the practical application of theoretical knowledge in performing specific tasks. But note that the ability to perform, though paramount, is associated with a clear understanding of the scientific principles involved—the "why" is as important as the "how." So the requirement for a functional interconnection between theory and practice raises pertinent questions pertaining to sequence of subject matter, selection and organization of learning activities, and methods of teaching. An acquaintance with the psychology of 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 acquisition of knowledge. One fundamental is clear—a basic principle or generalization is more likely to be applied to a specific situation 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 implication for staffing is that 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 expertness 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 intricacies of technical education are understood by the holder of a baccalaureate or higher degree in some phase of agriculture who has no special preparation as an instructor of technical education? The preparation of teachers for technical programs is one of the most important issues facing the profession today.

The foregoing are some of the more important implications for program development and operation which result from the definition of technical education. Technical education in agriculture is distinguishable from instruction in agriculture provided in high schools. Technical education in agriculture is not synonymous with instruction in agriculture in colleges and universities. Technical education in agriculture 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.—JRW

Guest Editorial . . .

in an excellent position to meet this challenge with our smaller classes and more individualized instruction. We must ask ourselves this question: are we writing the curriculums and staffing our programs to meet this challenge?

Among the decisions we must consider is the issue 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 abhorred the method but from experience we have been delighted with our results. We observe many students classified from secondary records as poor in mathematics and English who make excellent records in these 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 vocational agriculture, every instructor in an agricultural technical institution, every faculty 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 few years throughout the country. These schools will consolidate the smaller rural schools and central schools we now have. The large comprehensive rural schools will offer vocational courses in addition to agriculture, and they will make possible a greater degrece of specialization in agriculture courses in the upper grades. Vocational agriculture in large comprehensive high schools will include basic agricultural science courses, career studies, and guidance for ninth and tenth grade students as preparation for specialized courses in the eleventh and twelfth grades. This will require agricultural teachers who are specialists in farm mechanics, horticulture, farm management, and other agriculture occupations prevalent in the geographical area served by the school.

Instruction in off-farm occupations and natural resources should be a significant part of the high school program of vocational agriculture. But training for farming and farm management should not be pushed aside. Farm businesses will continue to need young men with more training and education than they can possibly acquire in high school. Farm operators need a high level of competency in agricultural management and at the same time must be technically competent in the application of the agricultural sciences. There is no question that agriculture is going to require many people with an education beyond that which they can acquire in high school.

The Cover Picture

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

AGRICULTURAL EDUCATION IN COLLEGES

The agricultural colleges in the United States have a remarkable record in research, experimentation, 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 today in studying theories, basic sciences, and basic 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 competencies and skills needed to carry out the actual business of production, processing, or managing an agricultural business.

THE DEMAND FOR TECHNICIANS

When agricultural education is limited to high school instruction in agriculture and to the study of agriculture in four-year colleges, a gap is created in the area of applied laboratory 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 agriculture 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 competencies.

Howard Sidney

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

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 threaten the security of established programs and individuals. Technical curriculums in agriculture offer a very useful and realistic opportunity for graduates from vocational agriculture in the high schools. The technical schools accommodate high school graduates who lack the desire or should

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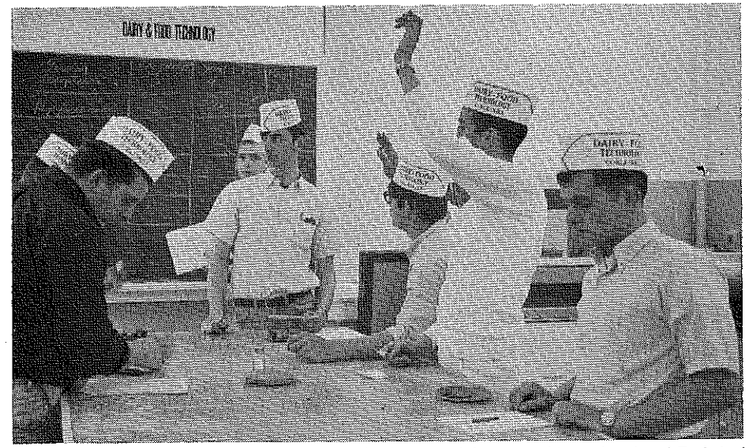

Students working on a project in the dairy and food science laboratory. (Agricultural and Technical College, Cobleskill, New York).

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 competency, 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 occupational experience 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 in technical programs up-to-date. The greatest need at the present time is a supply of well-trained teachers with both the professional and occupational skills necessary to teach in a technical school. These teachers must also have a real understanding and appreciation of technical education and the desire to be part of this phase of agricultural education.

There is no question about the need for technical education in agriculture. Nor is there a question about the close relationship that must exist among high school instruction in agriculture, technical education in agriculture at the post-secondary level, and professional education in agriculture in four-year colleges and universities.

THE TECHNICAL EDUCATION CURRICULUM

Technical curriculums should not be established or maintained only to satisfy the interests of pressure groups or faculty members who have vested interests in certain phases of education. The curriculums must be based on the needs of the industry in the geographical area the institution serves. This requires careful planning and study both in establishing new curriculums and in evaluating existing curriculums.

Curriculum development must include an advisory committee made up of members who are actively engaged in industry, business, and professional organizations. Advisory council members are in a position to know the needs of the agricultural occupations being studied. The advisory committee should be carefully used for advice and counsel. Actual planning of the curriculum and course content is the responsibility of the professional teacher.

Technical instruction in agriculture must be directed toward specialized occupational objectives. The curriculum includes a body of related knowledge and skills which the student must master in becoming a successful technician. The graduate is prepared for a variety of employment opportunities in a particular segment 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 studied.

The sequence of courses is of utmost importance. The student must have some technical courses the first semester. This is necessary to motivate the student and to acquaint him with laboratory techniques at the beginning of the training period. This 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.

Some technical curriculums require that 30 to 50 per cent 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 related to the technology being studied. General education courses should be selected carefully and should be studied concurrently with the 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 vocational agriculture or professional degree courses in a university. 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 materials found in a well-equipped library. He is also required 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 keep in mind the unique qualities which graduates of technical programs should possess. Teachers cannot move from

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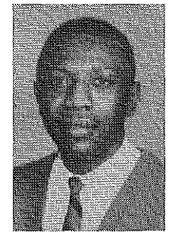
The Value of Inservice Education

JOE KING, JR., Teacher of Agriculture
Five Points, Alabama



Joe King, Jr.

Very few educational groups have the opportunity afforded teachers of vocational agriculture of meeting each year to appraise their program, to exchange ideas, and to plan for improvement of instruction. Area and state conferences have been responsible for much of the progress we have made since the first vocational education act was passed by the U.S. Congress in 1917. In recent years the conviction has grown among educators and supervisors that inservice education is needed to help teachers of agriculture increase their knowledge and skills.

An inservice education program to accomplish these purposes is the program introduced by the vocational teachers in my county. The program involves specialists from several disciplines. General sessions are conducted by faculty members, supervisors, and members of other departments. Teachers decide what topics they want to discuss, what demonstrations they want to see, and what speakers they want to hear.

An Example

The area of farm mechanics can be used to illustrate a comprehensive program of inservice education for teachers. It is evident that many teachers need to be retrained in the operation and maintenance of modern farm machinery. Several states have training programs underway which include workshops and short courses on farm mechanics for teachers. Inservice education activities for teachers in the area of farm mechanics would include the following:

- Visits to schools where good farm mechanics instruction is conducted.
- Off-campus courses in farm mechanics for which college credit is given.
- Area or district clinics in farm mechanics for groups of teachers to improve and increase their farm mechanics skills and abilities.
- Laboratory courses in special areas of farm mechanics at a college for advanced credit during the summer.
- Demonstrations in special areas of farm mechanics during workshops and courses.
- Use of specialists from commercial companies to teach new techniques and procedures.
- Individual study by teachers about farm mechanics in bulletins, books, magazines, and commercial literature.

Involve Others

The program of inservice education should not be limited to those persons having teaching duties in the classroom. Head teachers, principals, supervisors, counselors, and others who give technical advice and guidance to classroom teachers should also be involved in inservice education. It is very important that school administrators not be overlooked. Administrators are interested in being told about materials and ideas brought back from professional meetings.

The Future

We should feel encouraged about the future of vocational agriculture. We are fortunate in having many capable men as teachers and supervisors who have given long years of service in agricultural education. This has given the vocational agriculture program in the public schools and colleges continuity and stability that is highly desirable. Teaching, if regarded as a profession, requires special knowledge acquired only through serious study and maintained and enlarged by inservice education.

Technical Education in Agriculture *(Continued from page 174)*

high school teaching to the technical level without further training. Young graduates of four-year colleges often lack business experience which can provide an appreciation for the balance needed between theory and practice. An over emphasis on skills without a knowledge of basic principles will result in failure of technical programs. At the opposite end of the continuum, independent study and research expected of advanced students in four-year colleges will not bring desired results.

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 owners and operators and to prepare persons for off-farm occupations related to agriculture and natural resources. Many of these occupations require competencies in agriculture that must be acquired through technical programs.

No single type of institution has a monopoly on technical education. Programs should be established according to local needs and desires in community colleges, technical institutions, area vocational and technical schools, and in four-year colleges.

The development of technical education in agriculture is proceeding rapidly in the United States. All of us in agricultural education are affected by this movement. We must be aware of its implications and accept our appropriate roles.

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 500 new junior colleges will be started in the United States in 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 found by the Mt. San Antonio College staff on visits 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 scorn and distrust. Scorn because here is a young school with one teacher of agriculture trying to teach several subjects. Distrust because enrollment at the new school is seen as a threat to enrollment at the four-year college.

Some of the concern for one teacher teaching several subjects is warranted. Such conditions do exist. The same conditions may have existed when the four-year colleges were beginning. Specialization in teaching can come only with increased enrollment. As for competition for students, one would have to examine high school records to see how many of the junior college students would have been eligible to attend a university. In most junior colleges, the majority would not have been eligible.

A closer look at the new junior colleges will reveal them more as an asset to the four-year colleges than a liability. The two-year institutions are a source of new students rather than competitors. The majority of the two-year institutions are looking for guidance and direction concerning the types of agricultural programs to offer. The four-year colleges can be of service by helping identify areas of need for training programs.

There is a common misconception that junior colleges grow until they become four-year colleges. Although this has happened in some cases, most junior colleges are established to fill a specific need in our educational system and will remain as two-year institutions.

G.A. Sherman

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 a university may choose to attend a junior college nearer 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 institution. The remedial function should be of interest to four-year institutions for it is in the junior colleges that potentially 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 sizable contribution to enrollment in 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 study and then go to work. This is a function not performed by most four-year colleges. In 1962, there were 70,000 high school graduates who had taken vocational agriculture. About 50 per cent of these students went directly into farming or other occupations. Between 18 and 53 per cent indicated that they planned to continue their education with the percentage varying from one state to another.

(Continued on next page)

Programs in Junior Colleges

A variety of agricultural programs are offered in two-year institutions. This wide variety of offerings is probably desirable because most programs are job oriented and related to local communities. A general upgrading of programs is taking place with programs becoming more technical.

Many of the programs in the plant and soil sciences include courses in soils, pest control or entomology, farm mechanics or agricultural engineering, marketing, agronomy, forage crops, and farm management. Additional courses in crop botany, plant diseases, irrigation and water management, weeds and weed control, soil management, and seed production are suggested for two-year technical programs. Although these courses are not planned as transfer courses, some would be acceptable for lower division credit at four-year colleges. The acceptance of the courses should depend on the quality of instruction in the junior colleges and on the nature of laboratory and other equipment.

Role of Four-Year Colleges

What is the role of the four-year university in the development of agriculture in the junior colleges? 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 teachers 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 institutions.

Articulation. A liaison committee should be established between the two-year and four-year institutions. Such a committee has been in operation in 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.

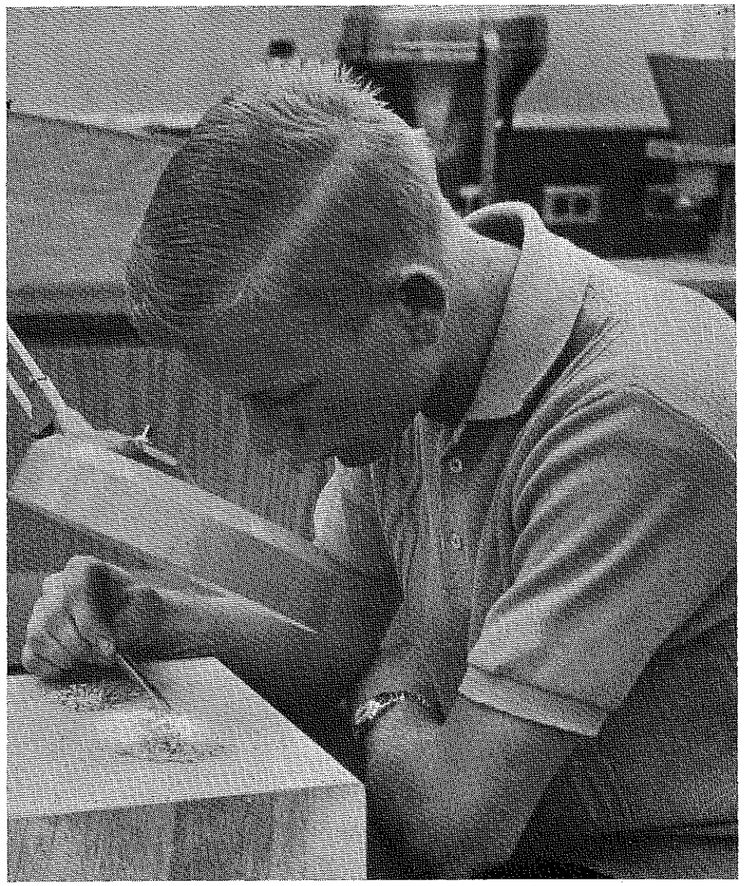
Promotion of programs. The universities can provide leadership by seeing that some of the new junior colleges develop agricultural programs. Not all new junior colleges will or should have programs in agriculture, but those located in important farming areas should offer some type of program. The assistance of four-year colleges in planning and staffing junior colleges will do much to insure the success of the two-year programs. Such assistance will eventually benefit the four-year institutions also.

Teacher Education. The demand for teachers in new programs will be great during the next ten years. Here the four-year institutions can assume their most important role—the preparation of teachers. Previously junior college teachers of agriculture have come from the ranks of high school vocational agriculture teachers. There is a feeling, among some at least, that this may not be the most desirable source of teachers. It is up to the four-year colleges to find what kind of teachers are needed and how best to prepare them.

The Challenge

The number of junior colleges will increase. If many of these new institutions develop good agricultural programs, they will be an asset to the total system of agricultural education. Liaison between two-year and four-year institutions is desirable to establish articulation agreements.

The demand for teachers in junior colleges will increase. These teachers will need to be prepared by four-year institutions. There is a need for both preservice and inservice education for these teachers. Many of these teachers will have to be able to teach more than one subject.



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 curriculum guides has often been a major factor in a decision to implement technical programs of instruction in agricultural occupations. Functional curriculum guides should facilitate the establishment of technical education programs. Any curriculum being considered must be judged to be credible by industry if the program is to receive their support. Potential employers must have faith in the curriculum being implemented if they are to employ students upon completion of the program.

The number of technical ornamental horticulture programs is increasing, although by 1966 few "off-the-shelf" curriculum guides were available to educators responsible for these programs. Relatively little agreement had been 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 curriculums 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 three 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 curriculums 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 over 250 employed ornamental horticulture technicians supported these types. Ornamental horticulture technicians were employed in the areas of:

- Arboriculture and park management
- Floriculture
- Greenhouse and nursery
- 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 from other programs for each of the types of technician were merged into a comprehensive course list for each type of technician. Extreme 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 extensive 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.

Robert H. White

Dr. Robert H. White is Retrieval 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.*

Table 1
Courses Common to Six Ornamental Horticulture Technician Curriculums

Nontechnical Courses	Related Technical
Written Communication	
Oral Communication (Speech)	Botany
Records and Bookkeeping	Agricultural Mathematics
Political Science	Soils
Psychology	Personnel Management

Table 2
Six Types of Ornamental Horticulture Technicians and Examples of Courses Unique to Each Type

Type of Technician	Unique Courses
Arboriculture and Park Management	Mapping, Grading and Construction
Floriculture	The Floral Industry Horticultural Marketing
Greenhouse and Nursery	Propagation by Cuttings Nursery Management
Landscape	Contracts and Specifications Landscape Construction
Turf	Golf Course Design
General Ornamental Horticulture	None

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.

Common and Unique Courses

Several courses emerged as being common to all six of the proposed curriculums. 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 curriculums. Table 2 lists the types of technicians and examples of unique courses for each.

Program Features

Several characteristics of the proposed programs had to be determined before the curriculums could be prepared. The curriculums 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 108 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 curriculums meet both the Ohio Board of Regents and the State Department of Education requirements for the Associate Degree.

Summary

Features in successful programs, the needs of industry, pedagogical requirements, and state educational standards were all considered in the proposed curriculums. 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 curriculums that resulted reflect several realistic tempering agents.

FFA Fellowships

Massey-Ferguson, Inc., is again providing three fellowships for persons now engaged 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 $333.00 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. Cardozier, 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

C.E. Bundy

We have witnessed during the past few years unprecedented development in the commercial fertilizer, feed, and farm machinery industries. Farmers have discovered that they can net the greatest return on their capital and labor by investing in commercial fertilizer, enlarged feeding programs, and modern farm machinery. Private as well as business investments are made in terms of yield and security. Are we in agricultural education investing funds and personnel in activities which will net 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 fifty 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 more poultry will be consumed in 1980 than at the present time. We will need approximately a 20 per cent increase in the production of eggs and milk products by 1980.

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 75 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.

Technology in agriculture 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-year period. We have watched the yield of corn move from approximately 35 to 82 bushels per acre. It will not be long until we will average more than 100 bushels of corn per acre and perhaps more than 50 bushels of soybeans per acre. New plows are being developed that will function efficiently at speeds of six to nine miles per hour. Implement companies are building machines which combine tilling and planting. Six and eight row planters are common, and great improvement has been made in power units.

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 88 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 288 acres. Today it is 359 acres. Farming is big business. In Iowa the average farm approaches 230 acres and is valued at approximately $120,000. 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 days or more each year. While some economists predict 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. A high percentage of the large corporate farming operations have failed.

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 1965 study of a random sample of farm operators in Iowa indicated that only 1.2 per cent were college graduates and 5.6 per cent had from one to three years of college. Only 2.2 per cent of the operators had received any instruction in agriculture while in college. Approximately 41 per cent of the operators were high school graduates. Thirty-eight per cent had no more than an eighth grade education. The average age of the operators was 46.3 years.

Two-thirds of the operators had no formal education in agriculture. Nearly 20 per cent had studied vocational agriculture in high school, about 10 per cent had completed veteran's on-farm training, and less than 1 per cent had vocational agriculture and college training. These data emphasize the need for educational programs in agriculture for those who are presently operating farms and for those who are preparing to operate farms or become hired farm workers.

Fifty million more people in the United States by 1980 — This will necessitate a 40 per cent increase in beef . . . 16 per cent more pork . . . 50 per cent more poultry . . . 20 per cent more eggs and milk . . . 40 per cent increase in crop production.

Need for Instruction in Farm Management

The increases in size of farm businesses, capital and labor resources needed, and competence in agricultural technology point to an increased emphasis in post-high school farmer education in farm management, farm record keeping, and record analysis. A study has recently been completed of the farm business record and analysis systems of Iowa farm operators. We were shocked to discover that 93 per cent of the operators were not associated with any record keeping groups and that only 50 per cent of the operators used a printed farm record book. More shocking was their response to the question as to whether they could have used assistance in keeping and analyzing records. Two-thirds of the farmers indicated they could not have used assistance. Not only did they not use records in making management decisions, they also apparently were unaware of the value of records in the management of the farm business. Nearly 85 percent of the operators had no informal instruction in farm management, record keeping, or record analysis.

Inadequate Staff and Finance

Public school administrators have not, in general, been willing to staff and finance programs in adult education. Individual teachers and state staff members must inform administrators and members of school boards concerning the need for expanded programs in young and adult farmer education. As instructors gain experience and demonstrate their abilities to plan and conduct educational programs, they are in great demand by agricultural business and industry. The trend toward multiple-teacher departments with one or more instructors assigned major responsibility for young and adult farmer programs exists in many states. We will not meet the educational needs of farm operators and hired workers unless we greatly increase the number of teachers of agriculture. Additional personnel must be provided either as fully qualified teachers of vocational agriculture or through the use of special instructors in the community who have demonstrated their abilities as potential teachers.

Teacher Education

In 1962, persons preparing to teach in only a few states were required to enroll in special methods courses in young and adult farmer education. It is evident that we have not placed as much emphasis upon the young and adult farmer phases of the total vocational agriculture program as is necessary.

In addition to special methods courses, we also need to give prospective teachers an opportunity to experience the teaching of adult and young farmer classes during student teaching. Persons preparing to be teachers may also be given pre-employment experience in working with adults by organizing adult classes near the university in communities which do not now have vocational agriculture programs.

Farmers 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. They go directly to the College of Agriculture or to the commercial researcher. Many of the early adopters obtain information from commercial sources rather than from either the agricultural extension service or from vocational agriculture teachers. The early adopters and the early majority groups are, 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 as resource persons in conducting programs. The late majority and the laggard groups will not usually be participants in our young and adult farmer programs.

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 organizations will continue to play an active part in agricultural education. Vocational agriculture teachers need to work with commercial representatives 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 to assume greater responsibility in local communities for young and adult farmer education. The establishment of district extension offices staffed with specialists can greatly improve the resources available to vocational agriculture instructors. It is important that cooperative working agreements be developed between the two educational agencies which will result in an improved instructional program for farm operators and workers.

California

Guidelines for Agricultural Education in Junior Colleges

RALPH E. MATTHEWS, Supervision
California Department of Education

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 tuition-free 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 several 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 classes 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 examinations. 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 only one year in length.

TYPE OF INSTITUTION

Another concept of public post-secondary 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 post-secondary 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.

Ralph E. Matthews

Ralph E. Matthews is Consultant in Agricultural Education, Bureau of Junior College Vocational-Technical Education, California Department of Education, Sacramento.

A stabilizing factor in the junior college program of California is that none of the junior colleges are destined to become four-year colleges. The nine university and eighteen state college campuses share in the responsibilities for conducting the four-year degree programs. It is significant to note that the eighty California junior colleges presently 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 the students with junior college training in these areas of agriculture.

"Objectives of junior colleges: to provide general education, to provide transfer programs, and to provide occupational training programs."

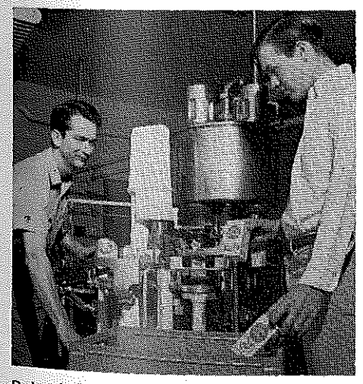
"Although certain courses in agricultural production are needed for off-farm occupations, a total curriculum in agricultural production will tend to train people for a limited number of job opportunities."

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 leave 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 those 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 feeds and feeding. This course seems to have been included in all agricultural curriculums developed since the Morrill Act. A southern California 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 minutes. 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.



Dairy Industry students at Pierce Junior College, California, receive occupational experience on the campus.

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's needs by providing one-year certificate programs.

Dr. Robert E. Kennedy, President of the California State Polytechnic College, San Luis Obispo, observes an ornamental horticulture student water a plant in his office. Students enrolled in the ornamental horticulture program maintain plants in offices of the college. The college also operates a commercial nursery and flower shop in which students obtain occupational experience.

- The articulation of high school and junior college agriculture curriculums.
- The introduction of new and improved teaching techniques.

A philosophy that indicates concern for the educational needs of all the students will 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

Illinois

Evaluation of Post-Secondary Programs in Agriculture

EUGENE S. WOOD, Teacher Education
Southern Illinois University

The post-secondary programs in agriculture are a 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 1964 at Joliet Junior College as a curriculum in Agricultural Supplies. In 1965, four more junior colleges developed agricultural programs: Canton Community College, Agricultural Mechanization; Chicago City Woodrow Wilson Campus, Ornamental Horticulture; Danville Junior College, Ornamental Horticulture; and Wabash 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.

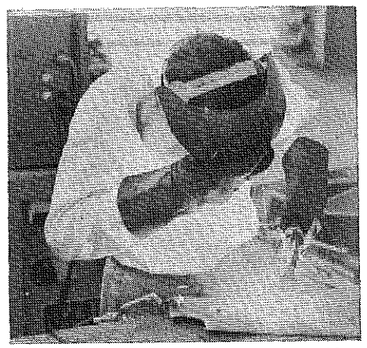
Evaluation Essential

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 238 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 supervisors.

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.

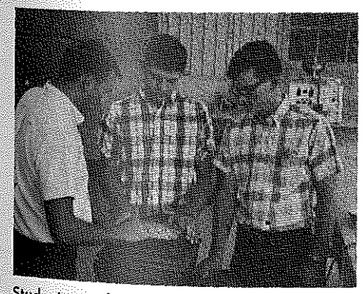


Students are instructed in helium arc welding in the technical program in argicultural mechanics at Danville Junior College, Illinois.

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 lower one-half of their high school graduating class will successfully complete the technical education programs.
- 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.
- Most of the students expressed an interest in and a desire for ownership and supervisory positions as their career objective.
- 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.
- The majority of the students had been active in one or more extra-class 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 felt 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-employees 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.
- The employers indicated that 95 per cent of the student-employees would be acceptable as permanent employees.
- The students believed that 38 per cent of the two-year program should be devoted to on-job training.
- The students felt that the pay rate for on-job training as too low.
- Several students remained after graduation as permanent employees at their on-job training stations.
- It appears that twenty-year-old students graduating from two-year programs at a time of high military draft, high employment, and greater emphasis on education may make several occupational changes after graduation.
- 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.



Students grade seed corn during their period of on-job occupational experience in a hybrid seed corn company. (Joliet Junior College, Illinois).

Graduates rated on-job training as having the greatest value. Employers rated student-employees high in dependability, responsibility, cooperation, and personal appearance.

Eugene S. Wood

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.

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 majority of the instructors are former high school teachers of agriculture. Some of the programs have found successful the matching a technician with a professional teacher. There is a need for programs in the state to prepare teachers for the junior colleges.

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.

Central States Seminar in Agricultural Education

Date: February 19-22, 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. Bundy
Agricultural Education
Iowa State University
Ames, Iowa

Wisconsin

POST-HIGH SCHOOL INSTRUCTION IN AGRICULTURAL MECHANICS

JAMES ZEPPLIN, Instructor
Marathon County Technical Institute
Wausau, Wisconsin

James Zepplin

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 discover 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 in 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

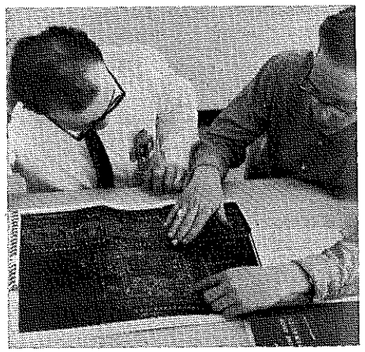
Adequate facilities and equipment are needed for effective instruction in agricultural mechanics. It has been well established that to train properly a mechanic it is necessary to provide adequate instruction and practice in a shop. To do so requires shop space for numerous pieces of machinery and tractors. The Marathon County Technical Institute now operates in 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 is 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 on 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 lecture, 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, valve refacer, hydraulic and diesel testers, and dynamometers



Locating and interpreting information about tractors and machinery is one of the most important aspects of a mechanic's work. A course in blueprint reading aids the student in developing this skill.

Students are taught basic welding during the first semester so they can use this skill when repairing farm equipment.

fall into this category. Though expensive, the agricultural mechanic of today 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 cut-aways 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 a part of the profit is paid to the mechanic. By 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 their interest and ability is along 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; Perrysburg, 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 Sterling, Colorado
March 6-8, 1968	Potomac State College Keyser, West Virginia
March 20-22, 1968	Abraham Baldwin Agricultural College Tifton, Georgia
April 11-13, 1968	Mesa Community College Mesa, Arizona
April 24-26, 1968	Treasure Valley Community College Ontario, 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 Sidney, Seminar Leader
Agricultural Technical Programs
Agricultural and Technical College
Cobleskill, New York 12043

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 with higher enrollments 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.

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 Edmund J. Gleazer, Jr.) as institutions offering programs in 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.

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 27 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. In an earlier study of the same population in 1963, Snepp[1] found that 31 per cent of the junior colleges were offering agricultural programs.

Figure I
Types of Agricultural Programs Offered by 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.
- 2% offer Technical Programs only.

[1]Neil Owen Snepp, "Agricultural Offerings in Community Colleges in the United States" (Ph.D. dissertation, The Ohio State University, 1963).

Enrollment

The thirty-eight responding institutions which offer agricultural programs indicated a total enrollment of 5,640 students in agriculture. Forty-two per cent of the enrollees are in transfer programs, 39 per cent in technical programs, and 19 per cent are enrolled in various vocational programs. These percentages are comparable with the 1963 findings by Snepp[1] who found 42 per cent enrolled in transfer programs, 40 per cent enrolled in technical programs, and 18 per cent enrolled in vocational and special adult 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 per institution. In 1963, Snepp[1] found that there were 2,954 agricultural students in 33 junior colleges for an average of 90 students per institution. The writers found 5,640 students enrolled in agricultural programs in 38 junior colleges for an average of 148 agricultural student per institution.

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 Figue 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, farming and ranching, agricultural extension, agricultural business and industry, and government service.

Problems

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

★ The inability of students to handle the mathematics, science, and communication skills required to master the agricultural curriculum.

★ A lack of student motivation.

★ The diversity of backgrounds and experience which the students possess as they enter the programs.

★ The desire of students who are better qualified for technician training to move into the transfer program.

★ Keeping the content of the curriculum relevant in a rapidly changing era.

Figure II
Characteristics of the Faculty Teaching Agriculture

- 84% hold a Master's or Doctor's Degree.
- 68% teach in only one subject matter area.
- 72% are full-time staff members.
- 47% have been on the staff three years or less.
- 1% do not have a college degree

★ Obtaining sufficient work stations for satisfactory work experience.

★ Maintaining a balance between technical and transfer programs within the institution.

★ Securing qualified staff members for the various agricultural programs offered.

★ A lack of finances for program improvement and expansion.

★ Recruiting and holding quality students.

Trends and Implications

The fact that junior colleges are offering more programs in agriculture has implications not only for junior colleges but also for students, parents, teachers of vocational agriculture, Colleges of Agriculture, Departments of Agricultural Education, and the entire agricultural complex. As increasing numbers of high school graduates enter agricultural education at the junior college level, there will need to be improved articulation of objectives between high school and junior college programs. Likewise, as more agricultural students transfer from junior colleges to four-year colleges of agriculture, closer working relationships will need to be established.

Associate degree programs in junior colleges will become an increasing source of personnel for agricultural business and industry. The junior college will need to be continually concerned with how best to prepare these individuals. Agricultural business and industry will need to learn how to utilize effectively these graduates.

Departments of Agricultural Education should actively recruit junior college graduates in agriculture as a potential source of teachers of agriculture. Departments of Agricultural Education must give serious consideration to the preparation of teachers for post-secondary programs.

Vocational agricultural teachers in secondary schools should acquaint students and parents with the educational opportunities in agriculture in the junior colleges. Teachers of agriculture should become aware of the opportunities for teaching at the junior college level. The potential of junior colleges for providing agricultural training is tremendous. Junior colleges provide a hope and a challenge for providing the post-secondary education so urgently needed in agriculture.

BOOK REVIEWS

EXPLORING AGRIBUSINESS by Ewell P. Roy. Danville, Ill.: Interstate printers and Publishers, 1967. 295 pp. $6.25.

This book is written as a reference for teachers of vocational agriculture and agricultural extension workers and as a textbook for students in agribusiness curriculums in post-high school institutions. In addition, the book has value for advanced students in high school and for counselors to help them acquire an overview and perspective of the nature and scope of opportunities in the field of agribusiness.

The eighteen chapters, including photographs, figures, and tables, provide the reader an overview of agribusiness including farm supplies, processing, distribution, consumers, and employment. There are chapters dealing with marketing, wholesaling, retailing, business organization and finance, business management, and economic tools for decision-making.

The book provides facts and principles which may be used to develop understandings about the nature, scope, and functions of agribusiness. Teachers will find this book useful as a reference in related instruction for high school students who receive supervised occupational experience in an agricultural business.

Each chapter is followed by a list of topics for discussion and a list of selected references. The topics for discussion generally focus on content which has been presented in the chapter and in some cases suggest activities which help students study the local community.

The author identifies many types of employment in the agribusiness field. It is significant that the employment is identified by type, by level, and by job titles without reference to the extent to which agricultural technology is essential to success in the positions.

Dr. Ewell Paul Roy is professor in the Department of Agricultural Economics and Agribusiness, Louisiana State University, Baton Rouge.

O. Donald Meaders
Michigan State University

TEACHER EDUCATION IN AGRICULTURE edited by V. R. Cardozier. Danville, Ill.: Interstate Printers and Publishers, 1967. 376 pp. $4.00.

Teacher Education in Agriculture was prepared as a project of the American Association of Teacher Educators in Agriculture. It will therefore be read with a great deal of interest by many readers of *The Agricultural Education Magazine.* In the planning stage, the editorial committee debated whether the book should describe present thinking in agricultural teacher education, whether it should be historical, or whether it should present a picture of the future in agricultural teacher education. The editor 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 recognized need for a basic text and reference on teacher education in agriculture. It will be used by supervising teachers and by graduate students in vocational education as well as by educators in developing countries who are seeking to establish teacher education programs in agriculture.

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 broad framework, but they were given complete freedom within the framework to use their own style, to express their own ideas, and to present their own interpretations. While this freedom probably results in some lack of cohesiveness, it has the advantage of providing the reader with some differences in points of view. In terms of the future, this may be its greatest contribution.

Chapter titles deal with the development of teacher education 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, inservice education, graduate study, and evaluation.

Raymond M. Clark
Michigan State University

News of the Profession

George F. Ekstrom

George F. Ekstrom, Chairman, Department of Agricultural Education, University of Missouri, retired September 1, 1967 after forty-seven consecutive years of service to vocational agriculture. Dr. Ekstrom has advised 31 doctoral candidates and 179 Masters degree candidates during his twenty-one years at the University of Missouri.

Dr. Ekstrom is co-author of *Adult Education in Vocational Agriculture.* He served as Editor of *The Agricultural Education Magazine* from 1946 to 1949. Other major responsibilities have included Chairman of the AVA Research Committee, Agricultural Section; President and Secretary of Teacher Educators Section, AVA; National President of Alpha Tau Alpha; AVA Committee on Research and Publications; and Business Manager, *The Agricultural Education Magazine.*

Dr. Ekstrom began his teaching career in vocational agriculture in 1920 at Lamont, Iowa. He later taught at Jessup, Iowa before becoming State Supervisor of Agricultural Education in Iowa in 1927. Dr. Ekstrom was one of those present in Kansas City in 1928 when the FFA was organized. In 1938, he moved to the University of Minnesota as Assistant Professor of Agricultural Education. Since 1946, he has been a member of the faculty of the College of Education at the University of Missouri.

Leo L. Knuti

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 seventeen years. His professional service also includes ten years as State Supervisor of Agricultural Education with the Minnesota Department of Education.

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 or Teacher Educators 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

Gene M. Love has been appointed Chairman 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.

Dr. Love taught agriculture in high schools in West Chester and Mt. Joy, Pennsylvania. From 1956 to 1958 he was a member of the staff at Stanford University and served as a consultant to the President of Central Luzon State University in the Philippines.

He has served as a special editor of *The Agricultural Education Magazine.* He was editor of the *Teacher Education Series* published by the Department of Agricultural Education at The Pennsylvania State University. From 1964 to 1967, Dr. Love was a member of the Research Committee of the Agricultural Education Division of the American Vocational Association. He served as chairman of the committee in 1966-67. At The Pennsylvania State University he was director of the U. S. Office of Education funded project on the "Development and Evaluation of Instructional Units in Ornamental Nursery, Floriculture, and Turf Occupations for High School Students and Adults".

Max L. Amberson

Max L. Amberson has been appointed Associate Professor and Acting Head of the Department of Agricultural Education, Montana State University. 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 Whitehall High School, Montana, from 1955 to 1957. From 1957 to 1961 he was Assistant Director, Agricultural Development Department of the F. H. Peavey Company in Minneapolis. He served as Supervisor of Agricultural Education, Montana Department of Public Instruction, from 1961 to 1966. Since September, 1966, he 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 staff of the Division of Agricultural Education, University of Illinois, since 1961.

A Project for Effective Teaching

J. A. BRUST
Vocational Agriculture Instructor
Garnavillo, Iowa

J. A. Brust

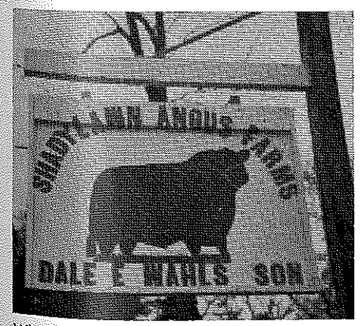
Want a new project to help your students feel they have accomplished something worthwhile?

Patience Plus Persistence

Proper motivation is the necessary beginning of every worthwhile undertaking. After seeing 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 4″ x 12′ posts, and an abundance of patience. An overhead projector was used to project an FFA emblem to the 4′ x 4′ board which had been painted white. Tracing and painting the emblem by hand required considerable persistence, but we eventually erected the signs proudly. They make an impressive introduction to 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 sign building a chapter project. Then this question arose, "Why not allow all students to make farm signs?" As a result one of my current requirements is that every ninth grade student build a farm sign. Each student designs his sign.



When giving directions to their homes, students always say, "You can't miss our place—it's the one with the big farm sign and our name is on it."

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

1—4″ x 4″ x 12′
1—2″ x 4″ x 4′
1—1″ x 4″ x 8′
1—1″ x 2″ x 10′
1—2′ x 3′ tempered Masonite
6—6d galvanized box nails
1—5/16 x 4″ carriage bolt
2—5/16 x 2″ lag screws
2—¼″ x 1½″ carriage bolts
2—½″ eye screws
10—2″ wire nails
Glue and paint

The students spend a lot of time drawing the pictures and making 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.

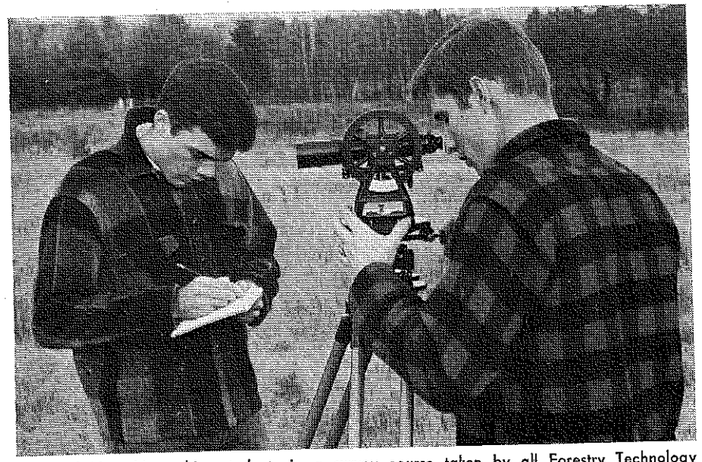
Equals Pride

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 since these signs go out on the road in front of their homes 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 to 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 from 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 beginning of that necessary element of effective teaching—pride.

As one boy put it after he had finished painting his sign, "I'm in love with my heifer."

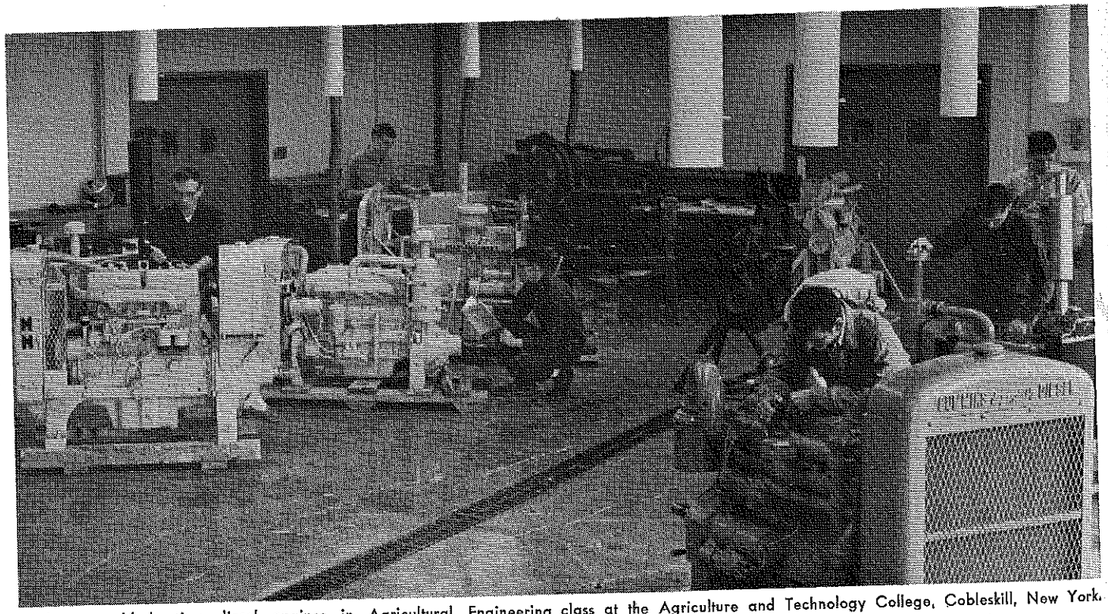


Team of New Hampshire students in a survey course taken by all Forestry Technology and Soil, Water and Construction Technology majors. Photo by Annis.

Stories in Pictures

GILBERT S. GUILER

Ohio State University

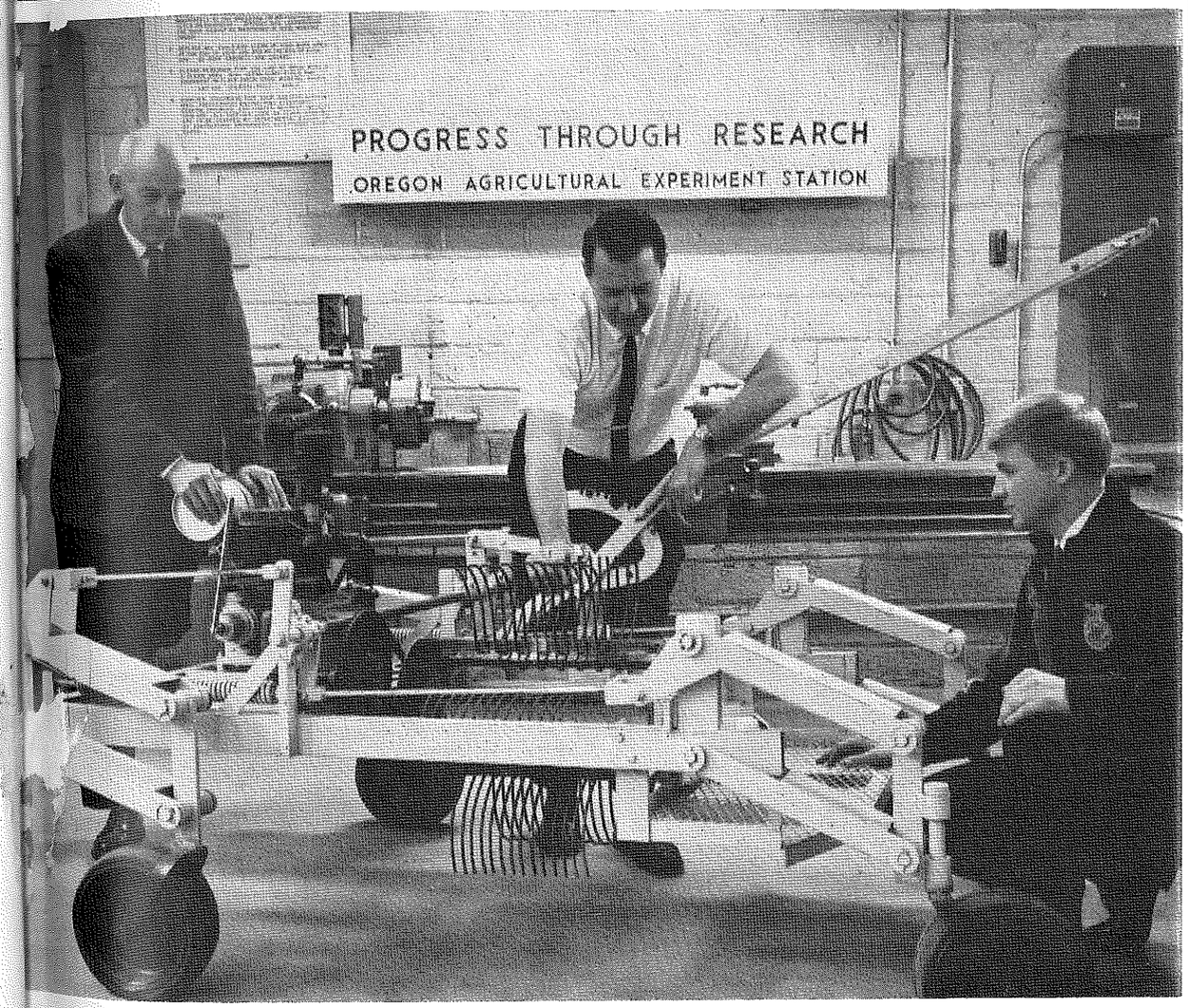


Students troubleshooting diesel engines in Agricultural Engineering class at the Agriculture and Technology College, Cobleskill, New York. Photo by Sidney

AGRICULTURAL EDUCATION

Volume 40 March, 1968 Number 9

Agricultural Education



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