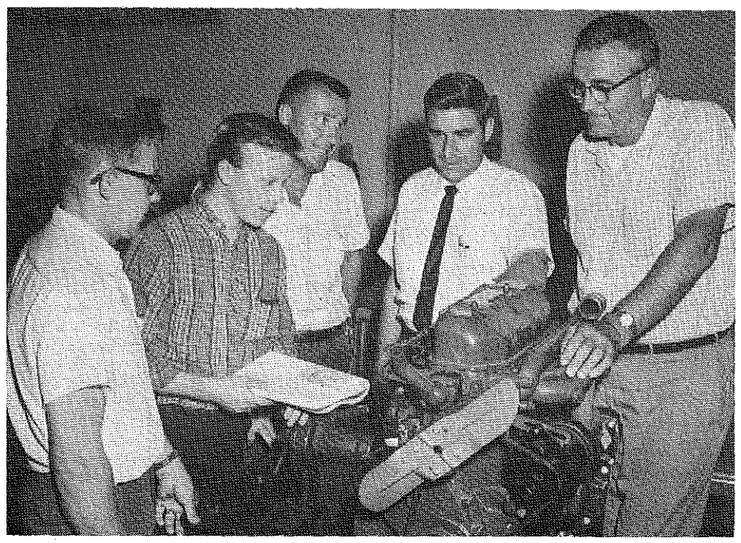
Teachers of agricultural occupations who supervise student teachers and administrators from cooperating schools attend a cooperating teachers' conference at Illinois State University. (Photo by Kenneth James, Illinois State University at Normal)

Stories in Pictures

ROBERT W. WALKER
University of Illinois

Richard Weldon, Teacher of Agriculture, Eaton, Colorado, efficiently organizes materials for agricultural mechanics. Project plans, clean-up duties, and announcements are tacked on these hinged panels. (Photo by Paul J. Foster)



Vocational Agriculture teachers from Indiana and Cambria counties (Pennsylvania) attend a two-day diesel clinic conducted by personnel from the Tractor and Implement Division of Ford Motor Company. (Photo by Willis Bechtel, Indiana Evening Gazette)

AGRICULTURAL EDUCATION

olume 42 September, 1969 Number 3

Agricultural Education

Featuring —

INSTRUCTIONAL PROGRAMS IN AGRICULTURAL MECHANICS

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TABLE OF CONTENTS

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EDPRESS

Editorials

From the Editor . . .

Projects: Use and Abuse


J. Robert Warmbrod

The project has been used widely but abused frequently as a teaching device in agricultural mechanics. High school teachers of agriculture wisely realize the value of projects as a means of meaningful, student-centered activity which is essential for effective teaching and learning. Projects which are closely related to and outgrowths of the instructional program provide opportunities for the development of understandings and skills through what students perceive to be useful activities and real situations. An often overlooked contribution of the project as a teaching device, when accompanied by proper instruction and supervision, is that it allows students to see and evaluate the results of their efforts. When properly used, projects motivate students and help them identify and define problems requiring further study.

But too frequently projects in agricultural mechanics merely result in student activity that is mistakenly equated with desirable learning. In too many cases projects in agricultural mechanics are used more as a guise for keeping students busy than as a device for effective teaching and learning. Aren't the type, number, and complexity of agricultural mechanics projects determined in a number of cases primarily by what projects students have the means or inclination to provide? The nature and extent of project and laboratory work should be determined primarily by the objectives and nature of the instructional program rather than by what students can be persuaded to provide for shop work.

How effective as a teaching device is the project in agricultural mechanics when it is accompanied by little if any instruction and supervision? When students' projects are not accompanied by appropriate instruction and supervision, the activity is described more appropriately as shop work than project or laboratory work. Projects, almost by definition, emphasize the development of skills. Yet all too often the development of concomitant understandings is overlooked or, in some cases, ignored. If we are not care-

(Continued on next page)

Guest Editorial . . .

Where Can We Find . . . ?


Curtis R. Weston

Do you know of someone in your state with a master's degree who can produce when it comes to overhauling a diesel tractor, who has had four or five years of successful teaching experience and some practical experience working in industry? The pay scale is $14,000 to $16,000 depending upon experience and educational level.

Too often those of us who are involved with teacher education in agricultural mechanics receive this type of inquiry. The usual reply is, "Sorry, but I cannot recommend a teacher to fill your vacancy." Many times the inquiring party will indicate a desire to have a person with a doctorate to fill such a position. We can find all too many who meet the educational requirements of the master's degree or the doctorate, but none who are qualified to teach the practical aspects of actual engine or machinery overhaul.

Where do these inquiries come from? They come from universities, colleges, junior colleges, technical schools, area vocational schools, and high schools. Surprisingly enough, we have never received such an inquiry from industry for this type of trained person. It is not because industry does not provide this type of training, but that they place different values upon educational background than we do in educational institutions. I will make no attempt to justify the institutional position or industry's position as to the merits of the systems by which they secure teachers.

Training programs are in operation to train for almost any type of position in this country except for the teacher who has the professional background and the background of practical work experience. When are we going to realize that it may be just as important for a person to know how to run a valve grinding machine as it is to be able to figure Chi-square or know how to use the t test. I contend that a person who investigates and then evaluates an engine analysis machine test has as much "on the ball" as a person who writes a research proposal. His training should be

(Continued on next page)

Curtis R. Weston is Associate Professor of Agricultural Education and Agricultural Engineering at the University of Missouri, Columbia.

From the Editor . . .

ful, we find ourselves inappropriately separating theory and practice in agricultural mechanics instruction. We teach the former in the classroom then go to the laboratory for the latter, frequently neglecting to relate the two. Shouldn't we use the practical (project) as a means of developing and clarifying the concepts and understandings (theory) we expect students to grasp? When project activity in agricultural mechanics is determined primarily by what students make available, a very probable result is a narrow curriculum for many students. It is not too difficult to argue that the subject matter of agricultural mechanics most appropriate for an up-to-date high school curriculum emphasizes power, machinery, electricity, and related areas for which it is difficult if not impossible for students to provide projects.

How do we revive the project as an effective teaching device in modern instructional programs in agricultural mechanics? Perhaps the place to begin is to delete from our vocabulary terms like farm shop and agricultural shop as labels of facilities for laboratory instruction in agricultural mechanics. If we describe these facilities as agricultural mechanics laboratories, there is a chance we will be more inclined to use the facilities for meaningful project activity. But regardless of the terms used to describe laboratory facilities, it is essential that schools assume full responsibility for providing adequate laboratory facilities and appropriate laboratory and project experiences that are part and parcel of the instructional program. Project activity and laboratory instruction in agricultural mechanics should in no way be limited by students' inability or lack of desire to provide projects of the appropriate type, variety, and complexity.

Project activity in agricultural mechanics must begin with a well planned, up-to-date curriculum. Today and in the future these curriculums will emphasize areas of instruction in agricultural mechanics for which it is impossible for students to provide well-suited projects. And of great importance is the requirement that project activity become, both in concept and practice, laboratory instruction contributing directly and effectively to the teaching-learning process. When used properly, projects in agricultural mechanics are a means of effective teaching, not an end sought. —JRW

THE COVER PICTURE

Mike Donnely, vocational agriculture student at Vergennes, Vermont, receives instruction on the operation of a crawler tractor used in forestry and conservation work. The instruction is being provided by William Scott, vocational agriculture teacher, during a supervisory visit to Mike's summer employment station, Yandow Sales and Service, Ferrisburg, Vermont. (Photo by G. R. Fuller, University of Vermont)

Guest Editorial . . .

recognized as equivalent to other professional training.

Agricultural education departments and agricultural engineering departments must realize that both have some responsibility for training the type of teacher desired or we will soon lose control of the teacher education in agricultural mechanics. Many teachers now teaching agricultural mechanics have only industrial backgrounds and little or no formal education beyond high school. These men are desperately attending extension classes, enrolling in correspondence courses, and going to summer school trying to improve professionally.

I believe the time has come for us to follow the examples we have used in student teaching and place our teachers of mechanics in industry for extended periods of time for which they would receive credit, possibly at the master's level, for this internship-type training. To become adequately prepared in this manner may require as much time and effort as is required for meeting the requirements of a doctoral program. And it should be just as rewarding as though the student has pursued and achieved a higher degree in an educational institution.

Still, the real problem that must be resolved in our thinking is, "when is a person well-educated?"

Themes for Future Issues

October	***Instructional Programs in Ornamental Horticulture***
November	***Instructional Programs in Agricultural Supplies***
December	***Instructional Programs in Agricultural Resources***
January	***Teacher Education and Supervision***
February	***Instructional Programs in Agricultural Products (Processing)***
March	***Instructional Programs in Forestry***
April	***Instructional Programs in Agricultural Production***
May	***General and Practical Arts Education in Agriculture***

HAZARDOUS OCCUPATION ORDER | EXEMPTION APPROVED FOR AGRICULTURE STUDENTS

NEIL O. SNEPP, Michigan State University
and
JOHN W. LACEY, U.S. Office of Education

When the Secretary of Labor's agricultural hazardous-occupations order became effective in January 1968, it kept many youth from jobs which they had previously performed and caused concern to a number of farm operators who had traditionally hired youth. Approximately 254,000 vocational agricultural students are in the 14 to 16 years age group to which the agricultural hazardous-occupations order applies.

Exemptions Approved

These problems were brought to the attention of the U. S. Office of Education during the summer of 1968. Problems resulting from the hazardous-occupations order were discussed at national, regional, and state meetings during the fall and early winter of 1968. Since the original order provided for requesting special exemptions, it was decided that the Division of Vocational and Technical Education, U. S. Office of Education, would request an exemption from certain parts of the agricultural hazardous occupations order. The exemption proposed would permit vocational agriculture teachers to sign exemption certificates for 14- and 15-year old vocational agricultural students who meet specified requirements to operate farm tractors and machinery. Accordingly, we assisted in developing two training programs — Vocational Agriculture Training Program in Safe Tractor Operation and Vocational Agriculture Training Program in Safe Machinery Operation—which were submitted to the Department of Labor with the request for exemptions to the agricultural hazardous-occupations order.

On April 28, 1969 Secretary of Labor George P. Schultz announced a proposed amendment to the agricultural hazardous - occupations order which would permit vocational agriculture teachers to sign exemption certificates for youth 14- and 15-year old vocational agriculture students who had successfully completed the vocational agriculture safety training programs. Specifically, the exemptions apply to sections 5 through 10 of the agricultural hazardous-occupations order which prohibit the operation of tractors over 20-belt horsepower and other farm machinery by youth under 16 years of age. (See the article by John W. Lacey in the December 1968 issue of *The Agricultural Education Magazine* for a list of agricultural occupations declared hazardous by the Secretary of Labor.) Secretary of Labor Schultz approved the amendments on June 27, 1969. The amendments to the agricultural hazardous-occupations order are published in the July 4, 1969 issue of *The Federal Register.*

John W. Lacey

Neil O. Snepp is Assistant Professor of Agricultural Education, Michigan State University, East Lansing. John W. Lacey is Program Officer, Vocational and Technical Education, Region VII, U.S. Office of Education, Denver, Colorado.

Neil O. Snepp

Training Programs

The training programs in safe tractor and farm machinery operation were prepared and published by the Rural Manpower Center at Michigan State University (see the box accompanying this article). Copies were distributed to teachers of agriculture through state supervisors.

The vocational agriculture training programs include two specific programs —one for safe tractor operation and one for safe farm machinery operation. We attempted to incorporate flexibility into the programs so they would be usable in the various regions of the country. No attempt is made to tell the teacher how to teach tractor and farm machinery safety or when instruction should be provided. Many of the items are in terms of suggestions.

However, there are certain requirements that must be met before a student is eligible to receive an exemption certificate. The emphasis at all times is on SAFETY. The program on safe tractor operation requires a *minimum* of 15 hours of instruction. Twenty-five hours would be more appropriate. Students successfully completing the safe tractor operation course must have supervised operating experience and pass both a written and operational skills test. A student must complete successfully the safe tractor operation course before he is eligible to take the safe farm machinery operation training program.

The farm machinery operation course requires a *minimum* of 10 hours of instruction. Fifteen hours would be more desirable. The particular types of equipment on which instruction is given will be decided by the local teacher. Students successfully completing the course must have supervised operating experience and pass both a written and prac-

(Continued on next page)

Hazardous Occupation Order: Exemption Granted for Vocational Agriculture Students

(Continued from page 57)

tical skills test.

Sample test questions and skills tests are given in the training programs. Several states have similar tests incorporated in various FFA activities and contests. These tests may be used provided they are not less difficult than those listed in the training program. Similarly, the references listed in the training program are intended to provide a starting place rather than being an inclusive list. Teachers are encouraged to use teaching materials with which they can be most effective.

Perhaps many teachers are presently teaching much of what is included in the training programs. No attempt is made to specify how instruction must be organized in a local school. The safety instruction may be integrated with the regular instructional program or it may be taught as a separate unit. There is no prohibition against teaching the safe operation courses after school or in the summer, provided students are regularly enrolled in vocational agriculture.

Exemption Certificates

Teachers should keep a record of the date, hours of instruction given, topics taught, and students present at each instructional period. Score sheets of students' tests should be kept on file until students are 16 years of age.

It is anticipated that initially exemption certificates will be reproduced and distributed through state offices. Certificates should be completed in triplicate and signed by the teacher and the student's parents. The student gets the original and makes it available to his employer while he is employed. The teacher retains one copy for his file and one copy should be filed in the state's vocational agriculture office.

It is permissable to issue a certificate for tractor operation only if a student passes the tractor operation program but not the machinery operation program. We recommend that a student not be issued an exemption certificate until he has passed both training programs. If the teacher has reservations about a student's ability to operate tractors or farm machinery safely, he should not issue that student an exemption certificate. It is the aim of the agricultural hazardous-occupations order to prevent accidents.

The vocational agriculture training programs do not replace the student-learner exemption when the student is placed for occupational experience. The student-learner exclusion applies to all 16 sections of the original agricultural hazardous-occupations order. The training programs in safe tractor and farm machinery operation apply only to sections 5 through 10 of the original order.

The intent of the vocational agriculture training programs is to provide quality, systematic instruction in safety. Students who successfully complete the training programs may be legally employed in the hazardous jobs listed on the exemption certificate. As in any instructional program, teachers are the key to the success of the safety programs.

VOCATIONAL AGRICULTURE TRAINING PROGRAMS

Formal training programs on the safe operation of tractors and farm machinery must be completed by vocational agriculture students less than 16 years of age who desire employment to drive tractors and to operate farm machinery. The instruction is prescribed by an amendment approved June 27, 1969 by the Secretary of Labor which grants certain exemptions to the agricultural hazardous-occupations order. The training programs titled **Vocational Agriculture Training Programs: Safe Tractor Operation, Safe Farm Machinery Operation** are published as Special Paper No. 8 (April 1969) of the Rural Manpower Center, Michigan State University, East Lansing. Dr. Neil O. Snepp, Assistant Professor of Agricultural Education at Michigan State University, prepared the training programs.

The publication describing the safety training programs includes instructional program outlines, references, procedures for practical tests, sample questions for written tests, and a sample exemption certificate. Copies of the vocational agriculture training programs have been distributed to teachers through state supervisors of vocational agriculture.

BOOK REVIEW

WELDING TECHNOLOGY by J. W. Giachino, W. Weeks, and G. S. Johnson. Chicago, Illinois: American Technical Society, 1968, 474 pp. $7.50.

This book sets forth basic concepts of welding in a very readable and well illustrated format. There has been a real attempt to clarify the various welding processes and identify applications for each in terms that persons other than those in the welding profession can comprehend. For those needing a good reference on selected aspects of welding, the book contains chapters on Gas Welding, Shielded Metal-Arc Welding, Gas Tungsten-Arc Welding, Gas Metal-Arc Welding, Resistance Welding, Special Welding Processes, Metallurgy of Welding, Weldability of Metals, Brazing and Soldering, Surfacing, Flame and Arc Cutting, Strength of Materials, Design of Weldments, Testing Welds, Production, Economy and Cost Estimating, Safety in Welding, and Welding Symbols. The authors are members of the Department of Engineering and Technology, Western Michigan University.

This complete and well-written book should be available to all students who express an interest in welding. The book could be used as a text in comprehensive high schools, vocational-technical schools, and technical school welding classes.

Edwin L. Love
University of Arkansas

Robert Johnson

Competencies in Farm Power Needed by Teachers

Marlyn Wacholz

ROBERT JOHNSON, Vocational Agriculture Teacher
Long Prairie, Minnesota
and
MARLYN WACHOLZ, Vocational Agriculture Teacher
Renville, Minnesota

Mechanization of American farms has increased at a tremendous rate in recent years. With mechanization has come new responsibilities for vocational agriculture teachers in selecting understandings and abilities which should be taught in agricultural mechanics. Accompanying these new responsibilities is a higher degree of competence in agricultural mechanics needed by teachers.

A group of specialists including teacher educators in agriculture, state supervisors of agricultural education, teacher educators in mechanized agriculture, and agricultural engineers were asked to indicate the degree of competence in farm power needed by vocational agriculture teachers. In addition, vocational agriculture teachers in Minnesota were asked to indicate the degree of competence in farm power they possessed and to specify where (at home, in high school, in college, in-service education, or self-taught) they had acquired competence in farm power. The competencies studied were grouped into the following categories: engine preventive maintenance, engine performance testing, and engine repair.

Degree of Competence

The list accompanying the article indicates the specific competencies to which specialists and teachers responded. The level of competence needed or possessed is reported in mean ratings ranging from 0 (no competence) to 4 (high degree of competence).

In all cases specialists indicated a higher degree of competence needed than the degree of competence teachers reported they possessed. Both the specialists and teachers tended to place greater importance on competencies pertaining to service and minor repair and less importance to competencies relating to major repair. For example, contrast the ratings indicated for installing and adjusting spark plugs with the ratings given complete tractor engine overhaul.

How Competence is Attained

Teachers were given six categories from which to select indicating the major means used for developing competence in farm power. The categories were home, high school, college, in-service education, self-taught, and other. College was indicated as the major source for the development of thirteen of the thirty-four abilities studied. Self-taught was the major source for the development for seventeen or the thirty-four abilities and was listed as one of the first three choices for all abilities. This finding may be partial-

(Continued on page 61)

Ability	Degree of Competence[1] Needed	Possessed
ENGINE PREVENTIVE MAINTENANCE		
Servicing the air cleaner	3.6	2.5
Servicing the oil filter system	3.5	2.4
Servicing the cooling system	3.4	2.1
Servicing the fuel system	3.4	1.8
Servicing the ignition system	3.3	1.7
Winter storage of power units	3.1	1.7
Adjusting tractor brakes	3.1	1.4
Adjusting tractor tappets	3.0	1.4
Adjusting the tractor clutch	2.9	1.4
Servicing the hydraulic system	2.9	0.9
Servicing the generator and alternator	2.8	1.2
Servicing the magneto and starter	2.6	0.9
ENGINE PERFORMANCE TESTING		
Operating a timing light	3.2	2.0
Operating a compression gauge	3.2	1.9
Operating a tachometer	3.1	1.9
Operating a dynamometer	2.7	1.3
Operating a spark plug tester	2.6	1.6
Operating a dwell-tach meter	2.6	1.0
Operating a coil and condenser tester	2.5	0.7
Operating an alternator-generator tester	2.5	0.7
Operating a hydraulic tester	2.3	0.5
Operating a fuel pump tester	2.3	.5
Operating an oscilloscope	2.3	.6
Operating an exhaust analyzer	2.2	.6
ENGINE REPAIR		
Install and adjust spark plugs	3.5	2.9
Install and adjust coil, points and condenser	3.1	2.1
Complete one-cylinder engine overhaul	2.9	2.4
Operate and maintain a parts washer	2.6	1.9
Engine disassembly and assembly	2.4	2.2
Replace tractor brakes	2.2	1.4
Identify and operate ridge reamer, sleeve puller, cylinder taper gauge, home and deglazer	2.2	1.4
Replace tractor clutch	2.1	1.2
Complete tractor engine overhaul	2.1	1.7
Operate a valve and valve seat grinder	2.1	1.4

[1]Degree of competence needed was indicated by specialists in agricultural education, mechanized agriculture, and agricultural engineering. Degree of competence possessed was indicated by teachers of vocational agriculture in Minnesota. The degree of competence reported for each ability is a mean rating ranging from 0 (no competence) to 4 (high degree of competence).

VIDEO TAPE:
An Aid in Teacher Education

THOMAS A. HOERNER
Iowa State University

Thomas A. Hoerner

Thomas A. Hoerner is Associate Professor, Department of Agricultural Engineering, Iowa State University, Ames.

Numerous studies have been conducted evaluating the effectiveness of video tape for instructional purposes. At present two experimental studies are underway at Iowa State University evaluating the effectiveness of video tape in teaching agricultural mechanics. A number of advantages of using video tape in agricultural mechanics can be pointed out based upon these and other studies.

Video tape allows for flexibility in instruction. Other visuals such as the overhead projector, models, charts, and the chalkboard can be used in conjunction with video tape. There is an ease of viewing materials by getting close-ups on small objects not normally seen by the total class. Individuals and information that cannot ordinarily be brought into the classroom easily becomes a part of classroom instructional through the use of video tape. Video tape adds variety to the instructional program promoting interest and motivation increasing student learning.

A point made by a number of researchers is that video tape is probably best used as a supplement to classroom instruction rather than the only means of presenting subject matter. Like any visual or teaching aid it can be over used and its effectiveness can be greatly decreased through improper use.

Video Tape in Teacher Education

Another possible use for video tape is that of teacher education and teacher self-evaluation. During 1969 twelve instructors in the Agricultural Engineering Department at Iowa State University used video-tape for self-evaluation. Each instructor presented an hour lecture in the classroom which was recorded on video tape. Following the lecture the instructors viewed the tape as many times as they wanted noting undesirable as well as desirable characteristics of their presentation.

Using video tape for instructor self-evaluation brought to mind the possibility of its use for teacher education in agricultural mechanics. Beginning with the fall quarter in 1968, each student in our course on Methods of Teaching Agricultural Mechanics presented a 15-minute demonstration which was recorded on video tape. During the quarter each student presents two 15-minute demonstrations and a one-hour lesson. Video tape was used on the second short demonstration thereby giving the students a chance to present one demonstration prior to the taping exercise.

Steps to Follow

I believe there are three basic steps to follow in using video tape for teacher education in agricultural mechanics.

Prior to the actual demonstration the student should be checked out by the instructor on the demonstration making sure that the student has all materials needed and that he can perform the skills he plans to demonstrate to the class. At this time the student also becomes familiar with the video tape equipment. As future vocational agriculture teachers they should learn how to use video tape equipment for many will have similar equipment in their high schools.

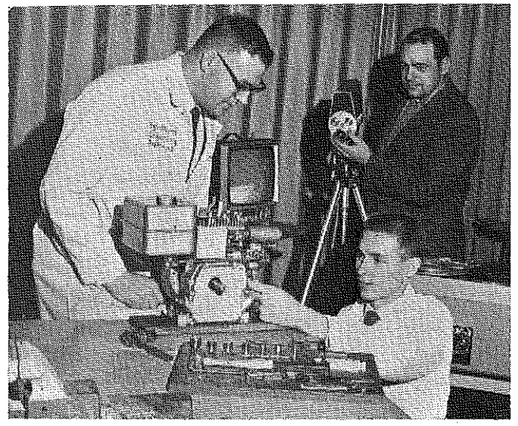
The second phase involves the student actually teaching the class. As shown in the photograph the student presents the 15-minute demonstration while the members of the class observe and evaluate his presentation. The demonstration is recorded on video tape. A camera operator is important. He uses the zoom lens to move in on small objects as well as follow the student as he moves in front of the class. Other visual aids such as the overhead projector, chalkboard, charts, and the demonstration equipment are used during the presentation. These visuals are quite easy to see on tape and add greatly to the total effectiveness of the demonstration.

The third phase involves the evaluation of the demonstration. The student and instructor observe and evaluate the 15-minute presentation noting strong and weak points of the demonstration. The instructor completes an evaluation form on each student assigning a grade to each presentation. After the student and instructor evaluation the student may view the tape as many times as he desires. An instructional media center on campus makes facilities available for the student to view the tape at his leisure.

Some Possibilities

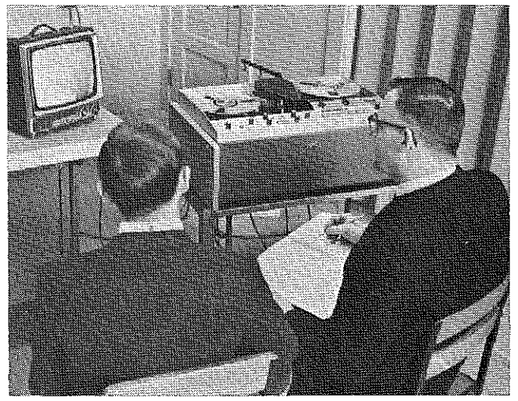
This program has been well accepted by the agricultural education students involved in the course. I believe it is good for the student to take a look at himself. There are many characteristics that can be noted such as how he writes on the chalkboard, how he holds a demonstration visual, how he moves in front of the class, and his eye contact with the class. The video tape serves as a memory mirror in that the student can take a look at himself over and over by reviewing the tape.

In my judgment a main purpose of our educational program is to aid the student in developing a self image. Self-evaluation is the key point of this exercise. I feel certain there is a definite carry-over for the student when he teaches the class for one hour later in the quarter, when he does student teaching, and when he actually takes a position as a vocational agriculture teacher.



STEP 1. The student and instructor go over the procedure for a 15-minute demonstration before video taping.

STEP 2. The student teaches the class while the instructor and other class members observe. The demonstration is recorded on video tape.



STEP 3. The student and instructor view the 15-minute tape evaluating the effectiveness of the demonstration.

Competencies in Farm Power Needed by Teachers

(Continued from page 59)

ly explained by the fact that most recently learned experiences are most easily recalled. As teachers teach farm power abilities to students, the learning situations appear to be self-taught although the basis for their knowledge may have come from some other source.

With one exception, teachers who were teaching agricultural mechanics possessed a higher degree of competence for all farm power abilities than did teachers who were not teaching agricultural mechanics. This would be expected since a teacher's interest and ability undoubtedly have some influence on the type of employment selected and the division of teaching assignments in multiple-teacher departments.

Teachers who had completed the minimum number of hours of agricultural mechanics in college reported the highest percentage of response with no competence in farm power abilities and the lowest percentage of response with much competence in the abilities studied. Teachers who had the highest number of quarter hours of agricultural mechanics in college generally reported a higher degree of competence in farm power abilities.

Recommendations

All the farm power abilities and understandings investigated in the study are appropriate for agricultural mechanics instruction in a vocational-technical school. In multiple-teacher departments offering specialized courses in agricultural mechanics classes, a majority of the abilities are appropriate. In single-teacher departments, where time is always a factor and equipment frequently a limiting factor, it may be necessary to select specific abilities for the farm power course.

For farm power instruction in single-teacher departments, we suggest the first seven engine preventative maintenance abilities, the first seven engine performance testing abilities, and the first six engine repair abilities. Other abilities could be included depending upon the needs of students, community demands, and employment opportunities.

Procedures for Purchasing Tools and Equipment

W. FORREST BEAR, University of Minnesota
and
TOM FOSSEEN, Minneapolis, Minnesota

PLAN AHEAD! This suggestion applies to the vocational agriculture teacher as he outlines his yearly agricultural mechanics program. The problem areas are selected and the "tools of the trade" for the agricultural mechanics program are inventoried and evaluated. If tools and equipment are not available in adequate numbers, the agricultural mechanics program will not be an efficient and effective educational unit.

Teacher's Responsibility

The agricultural mechanics teacher has the responsibility of knowing the tools and equipment which must be selected for the instructional program. The responsibility of tool selection and ordering should be assumed by the vocational agriculture teacher. Teachers who fail to assume this responsibility are often those with inadequate tools to conduct a satisfactory instructional program. If this responsibility is abrogated by the teacher, it will be assumed by the superintendent, business manager, or board of education. The teacher then loses effective control of his requests. Govern yourself accordingly. The ordering of correct tools and equipment takes time and an organized procedure is essential. We propose the following check list of duties which must be assumed when ordering tools.

• Prepare a list of desired tools and equipment and submit to the administration for inclusion in the budget. If necessary, divide into a two- or three-year acquisition program. For each item:

—List jobs to be performed by the new tool which cannot be done by the present tools or a less expensive tool.

—List jobs that can be done better by the new tool.

—Include a picture of the desired tool.

—List safety features of the new tool.

—Sketch a shop diagram showing location of the tool, non-skid area, and the safety zones.

—Specify voltage, phase and cycle, ventilation, gas supply, and similar changes that must be made to adapt the tool to the shop.

—List courses in which the tool will be used.

• Prepare a tool requisition list.

—For each item on the requisition provide a detailed description of the item with accessories, source addresses, catalog number, page number, quantity, unit price, and specify all items to be FOB school.

—List of accessories and supplies needed for existing tools.

—On large items it is advisable to submit the order on bids.

—Submit requests and bid according to school schedule. The earlier the better.

• Present the prepared materials to proper school administrative personnel. This could be the principal, superintendent, purchasing agent, or business manager. The teacher should discuss the preference listing and clarify any questions that might arise. If bids are received, teachers may need to analyze the bids and re-submit recommendations to the school administration.

• Check the order upon arrival, promptly install or store tools and equipment, and assist in the completion of reimbursement forms.

School Administrator's Responsibilities

School administrators have the following responsibilities in regard to purchasing tools and equipment for agricultural mechancis.

—Become familiar with requests as outlined by the the teacher.

—Present requests to the Board of Education.

—Initiate the necessary application approval forms if purchase order will qualify for reimbursement.

—Place tool and equipment orders or return requests to the teacher for placement of orders.

Bid Notice

It may be necessary for the vocational agriculture teacher to prepare a bid notice for tools and equipment. The following format for a bid notice is suggested.

Sealed bids will be opened on Vocational Agriculture shop equipment and tools for the respective departments in the public school of (name of town). Bids will be received by the Board of Education of (School District) until (time) (date) day of (month and year) at the school superintendent's office in (location of office). At such time the bids will be opened, read aloud and be available for inspection by interested parties. Proposed specifications are on file in the office of the Superintendent of School at (location of office).

It will not be necessary for suppliers to be present as a committee will be appointed to tabulate and analyze bids.

The tabulation and recommendations of the committee will be presented to the Board of Education for their consideration at the meeting of (time), (date).

Bids to include installation of all machinery complete, set up, and in perfect running condition, except for external gas, elctrical and dust connections. All debris removed at a date no later than 30 days from date set by the Board of Education. All bids shall be F.O.B. School. All machines fully guarded and grounded.

All motors to have sealed, greased ball bearings.

Delivery and installation is required on or before (date).

Each piece of equipment and tools to be priced separately and the Board reserves the right to accept or reject any or all bids or any part of any bid and to increase or decreases quantities and to waive informalities or irregularities in bidding. The bidder shall submit with the bid such specification, pictures, and catalog data as will make clear to the owner exactly what has been bid upon.

Each bid must be accompanied by a bid bond, cashier's check, or certified check for 5 per cent of the total amount.

Successful bidder or bidders must enter into contract and furnish 100 per cent performance bond within 30 days from award of bid. All machinery, accessories and tools must be guaranteed for a minimum of one year.

Brand names and model numbers used are for identification of quality only and all equal equipment will be given due consideration by the Board. The owner will consider as to each item: (1) How well it will serve the main purpose; (2) How well it is constructed; (3) Its appearance; (4) Its cost; (5) Service given by the vendor. The owner will award on the basis of ultimate economy and service.

The Board reserves the right to return any items for full credit found to be not needed.

A bidder may withdraw his bid anytime up to the time set for receiving and opening bids, but no bids may be withdrawn after that time until 60 calendar days have elapsed.

Clerk

It is essential to include with the bid notice a detailed specification of the item desired. The following is an example of a set of specifications for a drill press.

1- #2277 Clausing 20" variable speed drill press, speed range 150 to 2000 RPM, capacity 1⅛" in cast iron, ⅞" in steel, #3 MT spindle nose, 4" ground steel column, ½" thick wall, 2½" dia. quill, table O.D. 19½"x22", 2 T slots 15½" long, table travel 1 setting 20", maximum spindle to table travel 33⅛", maximum spindle to base 43⅜", base working area 13"x15½", base T slots 13" long. 1- #2216 table raising mechanism. Motor is sealed ball bearing, NEMA Frame, 1½" HP/3/4HP (dual HP) 1800/900 RPM (dual speed) 208/220/440/3/60 to complete with momentary contact on/off switch in head, #2371 magnetic starter, 1 - #1897 key chuck and 1 - #1898 arbor, 1 - #7022 lamp or approved equal $650.00

Tom Fosseen

W. Forrest Bear is Professor, Department of Agricultural Engineering, University of Minnesota, St. Paul. Tom Fosseen is Manager, School Sales, The Satterlee Company, Minneapolis, Minnesota.

W. Forrest Bear

Tabulation of Bids

Item	North Co.	East Co.	West Co.	Reason Item Recommended	Price
Oxyacetylene Welder	250.00	(360.00)	120.00	Only machine that meets specifications	$360.00
Grinder	140.00	138.00	(117.00)	Low bid meets specifications	$117.00
Drill Press	670.00	(660.00)	650.00	Low bid not complete, next low bid meets specifications	$660.00
Hacksaw	(285.00)	250.00	260.00	Low bid meets specifications but is not adequate, will explain	$285.00
Arc Welder	475.00	(265.00)	275.00	Will accept low bid even though it is not up to specifications	$265.00
				Total - - - - - - - - - - - - -	$1687.00

Making Recommendations

After the bids have been returned the teacher will need to summarize and evaluate them. The table accompanying this article illustrates how a set of bids can be tabulated for evaluation.

After completing the analysis of the bids, a report must be returned to the school administration. The following format may be used by the teacher in sending the resume and recommendations to the school administration and board of education.

Gentlemen:

Attached is a complete tabulation of all bids. Our total needs come to $50,000.00.

Specifications were drawn after surveying the needs of the community and consulting with the following: Architect, Citizen's Committee, Industry, visits to other schools, Farmer Board or Committee, Superintendent of Schools, Principal, Professors at Colleges and Universities, State Department of Education, Federal Government, Department of H.E.W., and salesmen in the school equipment business.

Our recommendations are, therefore, based on: need, quality, service, cost.

In most cases we have recommended the low bid when it met the specifications. This is the case in Items 2, 3, 6, 7, etc. Items 1, 8, 9, 10, etc. the low bid does not meet the specifications and are not suitable for our needs; therefore, other bids are recommended. Items 11, 13, 15, etc. can be deferred until next year if necessary. Item 4 we recommend the high bid, Brand X instead of Brand Y, because we realized after analysis that we had originally made a poor choice. Item 5 low bid does not meet specifications, but we feel it is adequate for our needs.

The immediate needs for the next school year total $35,000.00; the balance of $15,000.00 can be spread over a 2 year period and could be divided as follows:

Second Year:	
Radial Arm Saw	$750.00
AC DC Welder	650.00
Weld Tester	400.00
Third Year:	
Steam Cleaner	350.00
Overhead Crane	1500.00

We are happy to answer any questions you have.

Thank you for the opportunity to work on this project.

John Doe
Vocational Agriculture Teacher

The teacher must determine the tools and equipment needed for the agricultural mechanics program. Tool selection and submitting requests to the school administration must follow school purchasing procedures. The teacher should prepare the specifications for the bid notice and tabulate all bids received to assist in the final selection of equipment purchased. The competent teacher with the initiative to proceed and follow through with equipment purchase in a business-like fashion will have the administrator's support and generally an adequate tool inventory for the agricultural mechanics program.

A Post-Secondary Program in Farm Machine Technology

HAROLD D. HUBER
Spoon River College
Canton, Illinois

Harold D. Huber

Harold D. Huber is Dean of Vocational-Technical Education, Spoon River College, Canton, Illinois. He was one of the original vocational agriculture teachers employed in 1965 to develop and teach the Farm Machine Technology Program at Canton Community College (now Spoon River College).

When one has been a part of a pioneering effort, it is interesting to look back and evaluate. In this article I intend to present a candid picture of the development and operation of the Farm Machine Technology Program at Spoon River College, Canton, Illinois. I shall point up some of our problems and how we have attempted to solve them.

The Need

First, let us look at the need that stimulated the development of the Farm Machine Technology Program. The U. S. Department of Labor reported in 1963 that the average age of farm equipment dealership personnel was approximately 55. Another national survey showed that there was an immediate need for at least 20,000 farm equipment mechanics.

Following the enactment of the Vocational Education Act of 1963, officials of the Farm and Industrial Equipment Institute studied ways in which they could assist in the development of training programs to help alleviate the shortage of personnel in the farm equipment mechanics field. A study of the Illinois Retail Farm Equipment Association showed an immediate need for 500 farm equipment service mechanics in Illinois alone. With the help of a Supervisor of Training Methods and Program Planning for the International Harvester Company and the supervisory staff in agricultural occupations of the State Board for Vocational Education, the staff of what was then Canton Community College threw their energy into the development of the program. The four original instructors, including two technicians and two vocational agriculture teachers, were employed July 1, 1965.

The Curriculum

The present curriculum in farm machine technology is outlined in the accompanying table. Orientation includes one week of disassembly and reassembly procedures on an operative single-cylinder, air-cooled engine. The last three weeks of orientation involve disassembly and reassembly procedures on an operative four-cylinder, water-cooled engine. During the orientation instruction much time is devoted to inspection, analysis of engine-wear problems, and principles of operation.

During the four weeks of orientation instruction, students are scheduled into A.M. and P.M. sections. One-half of the students are in the shop and classroom area for five hours in the morning while the other half have a five-hour schedule in the afternoon. Each group is under the direction of two instructors. At the termination of the orientation instruction, students are grouped into four sections. The four groups rotate through the specialized phases of instruction. Students are in each phase for six weeks. A typical schedule is as follows:

Time of Day	Group	Subject or Phase
A.M.	A	Shop Procedures
A.M.	B	Electrical Systems
P.M.	C	Tractor Theory and Design
P.M.	D	Shop Procedures

During this phase of instruction, students work on 'live" tractors in the shop procedures class. These tractors are secured from farm equipment dealers. The parts and paint used in repairing the tractors are paid for by the dealer when he picks up the tractor to return it to his sales lot.

A six-week schedule of courses is offered during the summer between the first and second year of the program. A new course, Farm Tractor Overhaul Review, was taught for the first time during the summer of 1969. The main purpose of this course is to better prepare some of the slower students for the cooperative on-the-job employment experience.

Courses and Time Allotment for Courses in the Two-Year Curriculum in Farm Machine Technology

Course	Hours Instruction Per Week: Class	Lab	Shop	Semester Offered	Total Weeks Instruction	Total Hours Instruction
Gasoline Tractor Practice						
Orientation	10	15	..	1	4	100
Electrical Systems	5	20	..	1,2	6	150
Theory and Design	20	5	..	1,2	6	150
Shop Procedures	..	..	25	1,2	12	300
Introduction to Agribusiness	3	..	..	1,2	32	96
Shop Mathematics	3	..	..	1	16	48
Reading Techniques	1	1	..	1	16	32
Assembly and Handling Farm Machinery	5	..	20	2	4	100
Agricultural Communications	3	..	..	2	16	48
Farm Equipment Sales	20	5	..	Summer	1	25
Fundamentals of Electric Motors	5	20	..	Summer	1	25
Partsroom Procedures	5	20	..	Summer	2	50
Introduction to Diesel Systems	10	..	15	Summer	2	50
Cooperative Training	..	..	40	3,4	20	800
Advanced Tractor Overhaul						
Diesel Engines	5	..	20	3,4	5	125
Hydraulics	10	..	15	3,4	5	125
Transmissions	5	..	20	3,4	5	125

Occupational Experience

After summer school, students are placed with cooperating dealers throughout central Illinois. Many students begin work immediately after summer school; however, they are not officially in training under school supervision until early September. In September of the third semester, students begin twelve weeks of on-the-job employment experience. The second employment experience session is during the last eight weeks of the fourth semester.

The on-the-job employment experience time allotment and schedule was one of the most difficult problems faced in developing the program. During the first two years of the program, the twelve-week period of employment experience was scheduled during the last part of the second semester. Our evaluation indicated that for the most part students were not sufficiently competent to be placed in a dealership at that stage. After further study and advice from the Farm Machine Technology Advisory Committee, the program was altered to the present pattern. The reason for placing students for employment experience during the last eight weeks of the two-year program was primarily from the standpoint of job placement. The cooperating dealers indicated a desire to have the first opportunity to hire students whom they had helped train.

Instruction on campus during the third and fourth semesters involves advanced tractor overhaul. These courses are handled by dividing the group into the three subsections indicated and rotating the sections through diesel engines, transmissions, and hydraulics. Each specialized area is taught five weeks.

Staff

Our present staff consists of seven full-time instructors. The five technicians are non-degree specialists who have had experience in farm equipment dealerships as mechanics or owners. Two instructors, each with a Master's degree in education, are former high school vocational agriculture teachers. Teaching and coordinating responsibilities are as follows:

Area	Staff
Hydraulics and Coodination of Student Training	Degree Instructor
Shop Procedures	Technician (2)
Electrical Systems	Technician
Diesel Engines	Technician
Transmissions	Technician
Tractor Theory and Design	Degree Instructor

Evaluation

In evaluating a curriculum it is important to look at enrollment and retention of students. For the Farm Machine Technology Program the data are as follows.

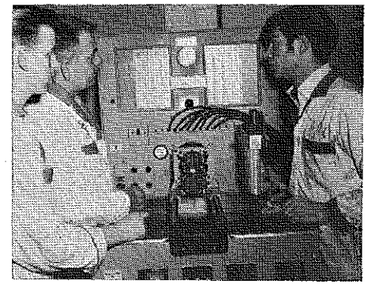
Program Years	No. Students Beginning	No. Students Completing
1965-67	40	36
1966-68	44	39
1967-69	48	42
1968-70	46	..

The on-the-job training coordinator maintains a job placement file listing employment opportunities available to graduates. A study of two graduating classes showed that 73 per cent of the graduates were working in a farm equipment dealership or in some related agribusiness on the first of September following graduation. After that date the percentage declined because many graduates entered the Armed Forces.

Some Observations

—Aside from other reasons mentioned in the article, employment experience has been most adaptable to the fall and spring months because that is the time of peak, seasonal work loads in the participating dealerships.

—The Farm Machine Technology Program is oriented toward tractor overhaul. This emphasis was recommended both by the Advisory Council and cooperating dealers. Dealers are in urgent need of personnel who can service modern equipment. Dealers feel that part-time labor can be hired for machinery setup.



A technician instructs students in the operation of a diesel pump test stand.

—Welding was removed from the program after the first year. Most of our students had studied welding in high school. The Advisory Council suggested that we use our time for more technical schooling. We now offer an optional welding course at night for those students who need additional instruction in welding.

—The repair of used machinery was also removed from the program at the end of the first year. We found that dealers repair very little used equipment.

—I am often asked by high school vocational agriculture teachers, "What should be taught in high school agricultural mechanics courses that would help students entering the Farm Machine Technology Program?" The most frequently observed deficiences of students are: little knowledge of hand-tool use and tool nomenclature; lack of general shop equipment usage such as thread types and sizes and drill sizes; little knowledge in safety and care of machined surfaces; little knowledge of basic engine operation; and lack of knowledge of the basics of trouble shooting and maintenance of farm equipment.

I feel that we are accomplishing the goal of preparing men for job entry into agricultural mechanization. The graduates who begin working in farm equipment dealerships and then migrate to other jobs do so primarily because of better wage conditions. The positions they move to are, for the most part, mechanics-jobs in automotive or manufacturing businesses. Those businesses are usually agriculturally related. I feel certain that when farm equipment dealerships become competitive with other businesses in wages, a greater number of the graduates will be retained in the farm equipment industry.

Public Relations for Vocational Agriculture

S. R. PUTNAM, Teacher of Agriculture
Danielson, Connecticut

Everyone concerned with vocational agriculture must be a public relations expert if vocational agriculture is to succeed in the 1970's. During the last decade many vocational agriculture departments closed both in urban and rural areas because of a lack of a viable program and a lack of good public relations. But during the same period many programs grew larger and stronger.

The factors common to those programs which succeed — and which are missing from the programs which fail — are a growing, adaptable, dynamic program and a constant, positive public relations effort. These two factors are generally inseparable. Without a continuing public relations program, an up-to-date curriculum alone cannot move us forward at the pace necessary for the 1970's.

Public relations is the concern of everyone in vocational agriculture — students, teachers, administrators, and supervisors. But the bulk of the responsibility falls on vocational agriculture teachers. Teachers must be concerned about public relations with everyone — students, parents, administrators, supervisors, advisory boards, boards of education, farmers, agricultural businessmen, other businessmen, legislators, prospective students, and the general public.

Using News Releases

In Connecticut the state FFA Convention is held at the end of June. This is an excellent opportunity for news releases indicating the awards and recognition achieved by students during the year.

News releases are effective public relations activities that should be used throughout the year. I have found it best to prepare several copies of each news release and send or carry them to daily and weekly newspapers, radio stations, farm editors of newspapers, farm reporters of radio and television stations, the school newspaper advisers, the student weekly radio program adviser, school administrators, and the state FFA reporter. Through experience we have learned how to write news releases so that very little editing is done, or if the release is edited, the least important part of the news is lost.

News releases should include the names of students and their parents whenever possible. The principal's and superintendent's name should be used whenever feasible. In our releases we stress the town which the student is from to get the public to understand that ours is a regional program.

I believe that the public has three basic misconceptions about vocational agriculture — that vocational agriculture students are less able academically than other students, that all vocational agriculture students are preparing for a farming vocation, and that vocational agriculture graduates cannot go to college. We must constantly nibble away at these misconceptions by subtle rebuttals in our news releases. Sometimes a subtle approach is more effective than a direct approach when dealing with deep seated misconceptions.

Informing Administrators

During the summer months it is very important that teachers keep school administrators informed of their activities. A plan for the summer should be submitted to administrators and to the state supervisor. The principal and superintendent should get weekly, biweekly, or monthly reports of how teachers are actually spending their time during the summer.

S. R. Putnam

S. R. Putnam is Head Teacher at the Killingly Regional Vocational Agriculture Center, Killingly High School, Danielson, Connecticut.

Days taken as vacation should be reported. In multi-teacher departments, at least one teacher should be on duty at all times during the summer and should check in at the principal's office daily to receive messages and mail and to let the office staff know that someone is on duty. The reporting of summer activities is very important. When my principal or superintendent is asked, "Why do you pay agriculture teachers during the summer?" I want him to be able to answer with information about my summer program and activities.

Involving Parents and Others

As supervisory instructional visits are made during the summer, relations with parents and employers are strengthened. I find it helpful to visit farms and agricultural businesses whenever you have half an excuse. Parents and employers should be made aware of recommendations made to students during on-farm or on-job instruction. This assures them that the calls are for instruction and not merely calls just to see the countryside.

We find it helpful to schedule an advisory committee meeting during the summer to summarize the year's activities and to present proposed curriculum changes and events scheduled for the next year. In August we schedule a FFA picnic including invitations to all incoming freshmen and their parents. Prior to this, home calls have been made for each incoming freshman where a teacher has discussed the student's planned occupational experience program with the student and parents. These activities strengthen teacher-parent relationships.

During the school's open house as a part of National Education Week we encourage parents to visit the vocational agriculture department. Parents are also encouraged to attend the few evening FFA meetings we have during the year. At these meetings we attempt to have programs that interest parents as well as students.

Involving Students

When school opens the freshmen class begins the year with an orientation unit. One of the main purposes of this unit is to teach them the purposes of vocational agriculture and the scope of local, state, and national programs. They also learn how our program is financed and administered. From that time on I expect each student to be a public relations assistant. I tell them so too!

Informing Prospective Students

A big opportunity for public relations comes with our recruiting program which begins in January each year. Each of the eleven public schools and seven parochial schools in our area is visited to meet with eighth grade students and present a program about vocational agriculture. Principals, guidance counselors, and eighth grade teachers attend these programs. Time is devoted to questions and students interested in vocational agriculture fill out a form indicating their name, address, and parent's name. Parents of all students who complete the interest forms are mailed complete information about our vocational agriculture program including information about FFA, facilities, sample curriculum, list of agricultural careers open to vocational agriculture graduates, and an application blank.

Prospective students and their parents are invited to an "open school" evening about the middle of February. The evening begins with a tour of the entire school conducted by vocational agriculture students. The program is held in the vocational agriculture department where the group is welcomed by the head teacher of agriculture, the superintendent, and principal. The head of the guidance department outlines high school courses offerings and courses taken by students, including vocational agriculture students in the college preparatory program. Each of the vocational agriculture teachers tells about the instructional program and career opportunities in his specialized area (horticulture, agricultural mechanics, and animal science). The program is concluded by a representative of the College of Agriculture telling about career opportunities in agriculture for college graduates and dispelling the myth that vocational agriculture students cannot go to college.

The deadline for applications for enrollment is early March. Students intending to take vocational agriculture are asked to schedule a conference with the guidance department. After information from the student's eighth grade school a decision is made concerning their acceptance for enrollment in vocational agriculture. The primary basis for acceptance is an apparent genuine interest in some area of agriculture. In addition, behavioral traits are considered and finally scholastic achievement. Letters are sent to the parents of each applicant informing them of the action taken on their son's or daughter's application.

FFA and Public Relations

National FFA Week offers an excellent opportunity for public relations activities. Some of our activities include displays at school, posters and displays in windows of local stores, and interview programs on the local radio station and in most years with the farm editor of a statewide radio station. For the past several years we have posted two billboards in the district. News releases on FFA are also distributed.

Spring brings district FFA contests in public speaking, parliamentary procedure, and tractor driving. These activities plus state livestock judging contests offer excellent opportunities for news releases.

Our annual FFA Parent-Member Banquet is a community effort and is an excellent public relations activity. Although our community is largely industrial, local merchants contribute almost all the food for the banquet. The local Grange cooks and serves the meal and provides a meeting place. Every FFA member has a responsibility for the banquet. The year's events and achievements are reviewed; foundation and chapter awards are given; honorary degrees are awarded and new officers installed. All administrators are invited and participate in the awards program. Teachers, farmers, and others who have helped the chapter are invited and recognized. Past honorary members are invited. All these persons are excellent public relations assistants.

Never Ending Task

Do not neglect public relations. A good public relations program has no beginning and no end. A day seldom passes which does not provide an opportunity to strengthen the public image of vocational agriculture. There are many ways to improve our public image. Put the good points of vocational agriculture out front so the public can see and talk about them.

"Public relations is the concern of everyone in vocational agriculture — students, teachers, administrators, and supervisors. A good public relations program has no beginning and no end. A day seldom passes which does not provide an opportunity to strengthen the public image of vocational agriculture."

A Program for Agricultural Machinery Mechanics

KENNETH E. HUTCHINSON, Instructor
Lake County Area Vocational-Technical Center
Eustis, Florida

K. E. Hutchinson

In the center of Florida in an area of citrus and vegatable production and processing and ornamental plant and flower growing the Lake County Area Vocational-Technical Center has made a good beginning in living up to it's motto of "Training Today for Tomorrow's Occupations." The program for agricultural machinery mechanics is one of many opportunities being offered by which trainees may prepare for tomorrow's occupations. Other programs offered are in the areas of citrus and ornamental horticulture. Programs in landscape maintenance and diesel engine maintenance are offered in the evening division.

The Program

The objective of the course in agricultural machinery mechanics is to prepare persons for gainful employment in the field of agricultural machinery. Instruction is geared primarily for students who desire employment in farm equipment dealerships as a mechanic, a parts clerk, or a salesman of farm equipment.

The course in agricultural machinery mechanics includes 1,200 hours of instruction completed in a ten-month period. The students attend school for six hours per day with one hour each day spent in a related course in marketing. Some 1,000 hours of instruction are devoted to study and laboratory practice on design, function, operation, service, and preventive maintenance of agricultural machinery. The instructional program is organized to provide students the opportunity to apply in practice the theory and the knowledge studied in the classroom. Theory is presented by lectures and demonstrations using mock-ups and cut-aways, diagrams, and other visual aids. In the laboratory, engines and tractors, including complete sets of tools and test equipment are used to instruct the students in the application of theory. In addition, there is a "live work" program in which tractors and other agricultural machinery, brought in by owners and equipment dealers, are repaired by students. "Live work" is accepted only when it fits into the instructional program.

Students are provided other opportunities to gain knowledge by using manufacturers' representatives as guest lecturers and by field trips to equipment dealers. Future plans include inviting manufacturers and local dealers to use the facilities at the area vocational-technical center for service schools. This activity has a two-fold purpose: not only will it aid the instructional program, but it will bring about more contact and cooperation between industry and the center which will enhance the success of the program.

Instruction in marketing is adapted to the farm machinery industry dealing with topics such as attitudes, marketing and management, selling, advertising, buying, consumer credit and financing, and distribution. Students are taught to develop a spirit of cooperation with fellow workers and a sense of responsibility toward their employer and job. They are taught to develop safe work habits and neatness and cleanliness in the work areas.

Occupational Experience

During the last quarter students who have progressed satisfactorily engage in a field work experience program where they are employed in a business firm for the last half of the school day. Their work is supervised by the instructor who keeps in close contact with employers. Students are required to complete reports of their field experience. Employment experience is a part of the instructional program. It is a test not only of the student's ability to perform in the occupation for which he is training, but it helps the instructor in the training program.

This year most of the firms that employed students for on-the-job training gave students a permanent job. Many firms needed additional mechanics. This gives us much encouragement. Our aim is to prepare people to match the skills that are needed. In this section of Florida, agricultural machinery mechanics is one field where skillful help is much in demand.

Employment Opportunities

Diesel, one of the major subjects taught in the course, opens many job opportunities. Some of these jobs are entirely different and separate field from the farm equipment industry. Hydraulics is another major field providing job opportunities.

Today agriculture, horticulture, and citri-culture are more and more dependent upon machinery. Tractors of all sizes, sprayers, fertilizer applicators, herbicide applicators, pickers and washers, sizers, and packing machines are being used in agricultural production. For example, in the citrus industry there is a search for a mechanical citrus fruit picker. Each year test models are tried. This will be an additional piece of equipment needing repair. Radishes, carrots, and celery are grown, harvested, washed, graded, bagged in plastic, and packed in cartons for shipment without ever having been touched by humans. Beans are grown, picked, and packed by machinery. There is much equipment used in industry and agricultural machinery mechanics are much in demand. Since Florida is one of the leading states in the production of many agricultural products, there seems little probability that there will be any less demand for technicians in this field.

Preparing Employees for Agricultural Machinery Dealerships

THOMAS R. STITT, Southern Illinois University
and
WILLARD H. WOLF, The Ohio State University

What should be included in a curriculum for students preparing for work in agricultural equipment dealerships? Should the curriculum be developed for specific job titles or are there compatible job titles which can be clustered into one curriculum? What are the most important abilities and understandings needed for the various jobs in agricultural equipment dealerships?

These are illustrative of the many questions which must be answered when developing a mechanics curriculum in vocational agriculture. Traditionally, the answers to these questions have been determined by using facts secured from the school community. This remains an excellent policy, but with extensive mobility of graduates and diversity of responsibilities of various job titles, it is critical to review employment needs and desired curriculum content on a basis more extensive than a school district or county.

Willard H. Wolf

Thomas R. Stitt

Thomas R. Stitt is Assistant Professor of Agricultural Industries at Southern Illinois University, Carbondale, Illinois. In April 1969 Dr. Stitt began a two-year assignment as an agriculture adviser on Southern Illinois University's Agency for International Development contract team providing professional guidance on educational development in Nepal. Willard H. Wolf is Professor of Agricultural Education, The Ohio State University, Columbus.

• Common Elements of the Curriculum

In a study of agricultural equipment dealerships in Ohio, six job titles were quite characteristic for the industry. The job titles were set-up man, shop foreman, equipment mechanic, partsman, equipment salesman, and truck driver-delivery man. The competencies needed for these jobs, including abilities and knowledge, were ranked according to their importance. The data indicated that curricula for potential employees in the industry should include safety and good housekeeping, oral communications, maintaining customers, meeting customers, and job functions of employees. These competencies should be a part of the curriculum for each of the six job titles.

• Curriculum For Set-up Man and Equipment Mechanic

The set-up man was ranked high in need for both the ability and understanding of the machinery and equipment sold by the dealership. The ability to repair, replace, and adjust parts was ranked in the highest need category for both the set-up man and the equipment mechanic. There were considerable similarities in the order of ranking of competencies for the set-up man and equipment mechanic. The major difference was in the degree of proficiency required which was greater for the equipment mechanic. For both the set-up man and equipment mechanic job titles, the ability to repair, replace, and adjust parts such as the clutch was ranked over understanding the function of the parts of the clutch.

In the example given, understanding the function of the parts of the clutch, it is important to note that many other other items were considered including transmission, differential, steering mechanism, brake system . . . corn harvesting machines, hay harvesting machines . . . diesel engines, gas engines, and two cycle engines. Each of the items indicated were prefaced with "understanding the function of" or "ability to repair and/or replace and adjust parts." The critical point is that for shop foreman, partsman, equipment salesman, and truck driver-delivery man "understanding the function" was ranked higher than the "ability to repair and/or replace and adjust parts."

• Curriculum for Shop Foreman

To understand pricing, ticket procedures, and service layout were the items rated highest for the shop forman. As reported earlier, understanding competencies were usually ranked higher than ability competencies. Perhaps an area of greater interest were those items which were ranked lower on the list for this job title. The ability to present services, present supplies to the customer, and the ability to utilize human resources through personal management were ranked low. The rating may be somewhat biased in that some of the arrangements for service work were made through the general manager or through a service manager. The cases differed and the responsibility depended on the size and structure of the dealership involved. Nevertheless, presentation of services and personnel management problems ranked low for the shop foreman.

• Curriculum For Partsman And Equipment Salesman

The partsman and the equipment salesman were rated high in knowledges and abilities dealing with salesmanship, human relation, and communications. These two job titles were also ranked high on items dealing with organizational structure and operational procedures of the equipment dealership. Specifically indicated were competencies dealing with understanding of the

(Continued on page 71)

Organizational Innovation in a Comprehensive Community College

GAYLE W. WRIGHT, Parkland College
Champaign, Illinois

One of the aftermaths of the Sputnik craze was a sudden awareness of the urgent need for vocational and technical education. This realization sparked the establishment of post-high school institutions which would provide both transfer and vocational-technical education. Without doubt, this was a major factor leading to the expanding community college movement in Illinois. As such, the occupationally oriented student now has a new dimension to consider—a dimension which fills a long-time void which has existed between high schools and baccalaureate institutions.

The comprehensive two-year institutions in Illinois are fostering a new spectrum in education which allows students the flexibility to pursue either occupationally oriented or baccalaureate oriented programs. These institutions also enhance the opportunity for adults to up-grade themselves through programs of continuing education.

One of these new institutions is Parkland College—a comprehensive community college serving a section of East Central Illinois. The community college district comprises a geographic area of 2,500 square miles and encompasses 26 high school districts. This new college is dedicated to serving the broad educational needs of its member communities.

Organizational Structure

East Central Illinois has developed around a nucleus of farming. The socio-economic complex of Parkland's district depends on a basic agricultural segment. Parkland has subscribed to providing agricultural programs which will meet the needs of the agriculturally oriented student.

Recognizing the importance of proper organization to achieve the objectives of the school, Parkland College provides academic and vocational-technical programs within a six-division concept. This approach to the intermixing of disciplines in social science, life science, mathematics and physical science, business, communications, and physical education encourages interplay among vocational-technical and academic instructional faculty and staff. Hopefully it promotes a unified faculty dedicated to the attainment of the basic goal of meeting the needs of the total student.

Isolation of instructional areas is discouraged due to the belief that fulfillment of the individual is a common responsibility of both vocational-technical and academic involvement. This concept welds together academicians and the traditionally isolated career-oriented faculty and prevents the divisiveness which so often occurs. Each division, administratively and physically, houses both career and transfer elements such that equal dignity and stature is accorded all programs. This eliminates the typical academically utopian concept depicted by the "Front Door" transfer programs and the "Under the Football Bleachers" emphasis too often given the vocational-technical programs.

Farm Equipment Technology

The organizational structure at Parkland College permits the linking of certain programs through the identification of "core" courses. Typical of this is the unification of automotive and farm equipment technology. Of prime concern in this endeavor is the efficient utilization of both personnel and facilities with emphasis on providing the best possible instructional media for the student.

Technical core courses which are considered common to automotive and farm equipment students include internal combustion engines, engine analysis and overhaul, power trains, electro-mechanical circuits and systems, hydraulics, and welding. These courses, reinforced by supportive and general education studies, account for the first year of a two-year associate degree program in either farm equipment or automotive technology. Upon completion of this common first year, students make their career selection and take specific courses during the second year directly related to their chosen area.

Gayle W. Wright

Gayle W. Wright is Chairman, Mathematics and Physical Science Division, Parkland College, Champaign, Illinois.

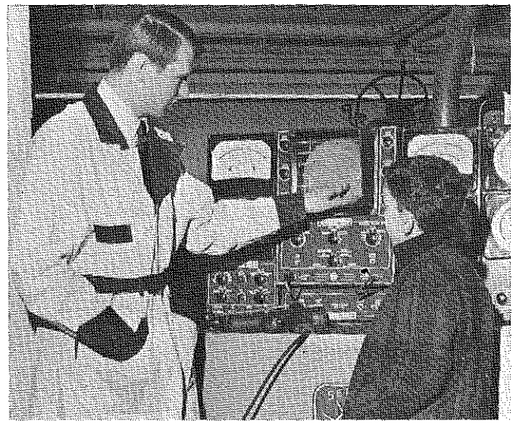
Conceding there are advantages to homogeneous grouping of students, I believe that if early in the instructional period correctly identified courses are core to more than one speciality area, students will gain a certain amount of "well-rounding" from a heterogeneous association. In addition, they will have more time to make a realistic career choice. And the public will be better able to comprehend the attempt at sound administration of the tax dollar and be more sympathetic to the financial needs of the evolving institution.

Vocational Courses

In Parkland's attempt to initiate the core concept it became apparent that some students, for varying reasons, would not successfully complete the two-year associate degree programs. A "spin-off" concept evolved. Through self-identification and consultation with advisors, parents and counselors, students may elect after one quarter of instruction to "spin-off" into a one-year certificate program. These programs are geared to skill development, are essentially vocational in nature, and take a "hands-on" approach to education. In light of this, potential college dropouts become spin-offs who have the opportunity to accumulate entry level skills which should enhance their competitive chance on the job market.

Representative of this concept are the alternatives in the automotive and farm equipment technology programs. After one quarter of study a student may "spin-off" and devote the remaining two quarters to either automotive or farm equipment service. If the student is correctly identified as a two-year student, this selection does not need to be made until the second year due to the core concept.

Students in the automotive-farm equipment technology program at Parkland College learn to use precision measuring tools and technical manuals in the small engine laboratory.



A student in farm equipment technology explains the scope pattern for a modern farm tractor to his younger brother during open house at the college.

Preparing Employees for Agricultural Machinery Dealerships

(Continued from page 69)

job functions of employees of a dealership and understanding company operating procedures. This might be expected since employees in these two job titles are involved to a great extent in moving parts and equipment through the dealership. Therefore, the decision-making ability of the partsman and equipment salesman keenly affects the profit-making potential of the organization and accounts for the high ranking of related items.

• Curriculum For Truck Driver-Delivery Man

This job title has traditionally been considered by those outside the industry as a job requiring little or no knowledge or ability in agricultural mechanics. In evaluating competencies for this job with employers, it soon became apparent that these workers must not only have some understanding but considerable ability in operation and adjustment of equipment, oral communication, and customer relations. The truck driver-delivery man also needs considerable knowledge of the facilities available with the dealership and the function of the dealership employees.

This degree of competency was much greater than the investigator had anticipated and prompted additional questions regarding this job title. To summarize briefly, managers reported that when delivering a new or used piece of equipment the delivery man represented the dealership. His ability and understanding of human relations and his ability to make minor adjustments of the equipment to provide optimum field performance have a benefits to the dealership. First, his performance of these tasks reduces the time and expense of sending a salesman or a mechanic to the field to make minor adjustments or to improve the damaged dealership image. All managers do not employ men of this caliber, but they indicated they would like to secure competent men for this job title. However, the salaries paid to truck driver-delivery men, the lowest among the job titles, do not indicate the employer's stated importance of this job.

• Conclusions

The relative importance of abilities and understandings varies with each of the six job titles in agricultural equipment dealerships.

There exists an inter-relationship between the abilities and understandings which require that both be incorporated into the curriculum for all of the job titles.

Curriculum content can be developed for a job title. However, curriculum content, regardless of the job title, should include safety and housekeeping practices, communication, human relations and understanding job functions.

MECHANICAL COMPETENCIES NEEDED IN AGRICULTURAL OCCUPATIONS

HAROLD ANDERSON, Teacher Education
and
JAMES Y. IHA, Graduate Assistant
Colorado State University

Technological changes in agriculture have caused a division of labor into agricultural production and off-farm agriculture. Although the percentage of people who work on farms and ranches is declining, greater employment opportunities are anticipated in fields related to agriculture. The increase in agribusiness occupations necessitates an evaluation of current programs in vocational agriculture to insure that students acquire skills useful not only in farming but in related agricultural occupations.

To be able to plan and recommend an agricultural mechanics program that will meet the needs of students preparing for both production and off-farm agricultural occupations, it is necessary to ascertain to what extent mechanical competencies needed by employees in off-farm agricultural occupations are related to those mechanical competencies needed by farmers. In general, previous research has shown that the agricultural mechanics competencies needed by off-farm agricultural employees were somewhat similar to those needed by farmers.

Study of Business Firms

To determine the relationship between a basic agricultural mechanics course of study designed for production agriculture and those skills needed by workers in off-farm agricultural occupations, a study was made of 25 agribusiness firms in North-central Colorado. The town of approximately 15,000 population is surrounded by diversified irrigated farms and ranches and contains most of the service related businesses for these production agriculture enterprises.

Personal interviews were made in each of the 25 firms. Each employer was asked to respond to the importance of 75 agricultural mechanics skills. These skills were obtained by reviewing recommended courses of study in agricultural mechanics in five western states.

The business activity of the firms included a variety of functions. The largest number of firms performed the retailing function, other firms were rather evenly dispersed among the functions of processing, wholesaling, purchasing, distributing, and manufacturing. The 25 firms employed a total of 725 persons; however, only 249 of these workers were employed on a full-time basis.

There was a relatively low relationship between the production agriculture agricultural mechanics skills and the skills needed by workers in off-farm agriculture. Only nine of the 75 skills received a combined rating as being important in both production agriculture and off-farm agriculture. The nine skills listed as important for all agribusiness employees were: practicing safety and shop cooperation; practicing shop discipline and housekeeping; safety instruction in use of hand and power tools; sharpening tools properly; repairing tools; arranging shop and mounting tools; compiling lists of tools and equipment; and inventorying shop tools.

Conclusions

Although many of the skills taught in the agricultural mechanics curriculum were not considered important to the total group of agribusiness employees, there was a direct relationship between these skills and those needed by employees in the farm machinery sales and service area. Some relationship was also found between agricultural mechanics skills and those needed by workers involved in the processing of agricultural products. A relatively low relationship was found between the agricultural mechanics skills and those needed by employees in agricultural supplies sales and service and horticultural products sales and service.

It is concluded that many of the competencies and skills needed by workers in off-farm agricultural occupations cannot be met in the traditional production agricultural mechanics curriculum. However, many of the skills required by workers in the specialized areas of off-farm agriculture can be met. With careful planning, a teacher can accommodate students destined for careers in production agriculture and those interested in off-farm agricultural occupations within the same class.

AGRICULTURAL MECHANICS FOR PROSPECTIVE TEACHERS

VINCENT M. SALMON, Teacher Education
University of Arizona

Vincent M. Salmon

Are agricultural educators exerting sufficient influence on the agricultural mechanics phase of training for prospective vocational agriculture teachers? How important is agricultural mechanics to the total vocational agriculture program? Who is responsible for providing leadership and finances in agricultural mechanics curriculum and instruction? What new curriculum innovations are taking place in agricultural mechanics training programs?

In an attempt to help answer some of these questions a study was undertaken to determine the arrangements in institutions with teacher education programs in agriculture relative to staffing of program specialists and administration of agricultural mechanics. A questionnaire was mailed to department heads of agricultural education and agricultural engineering in institutions responsible for training agricultural education undergraduate students in The United States. One hundred and one department heads responded.

Findings

- There is no clear cut division of responsibility relative to the teaching of major areas of instruction in agricultural mechanics to agricultural education trainees. The primary responsibility for teaching rests with departments of agricultural engineering, although there is some involvement by agricultural education departments. Some departments of agricultural engineering handle methods of teaching. There is little evidence of team teaching between the departments.

- The major areas of instruction in agricultural mechanics for agricultural education undergraduates are following traditional lines. Undergraduate offerings in agricultural mechanics for agricultural education students are not keeping pace with technological changes. The highest number of semester hours required for agricultural education undergraduates were in agricultural mechanics skills development, farm power and motors, farm machinery, and agricultural buildings and structures. The number of semester hours required for rural electrification and processing and materials handling were the lowest of the major areas of instruction.

- The total number of semester hours in agricultural mechanics required for agricultural education undergraduates is relatively low. This was found to average twelve semester hours which represents approximately 9 per cent of the total baccalaureate degree requirements. It appears that a need exists for more emphasis on this phase of the undergraduate agricultural education program if agricultural mechanics is vital to the total program. The range of semester hours in agricultural mechanics required varied from 0 to 29.

- Budgets in departments of agricultural education do not provide sufficient resources to defray instructor's salaries, operating expenses, or capital outlay for agricultural mechanics. Approximately 31 per cent of the department heads reported that agricultural education departments contributed 26 to 100 per cent of instructors' salaries for teaching courses in methods of agricultural mechanics. Operating expenses and capital outlay expenses were contributed by agricultural education departments in 20 per cent of the cases for courses in methods of teaching agricultural mechanics. As a result of the low monetary contribution, departments of agricultural education seem to have very little direct control of the agricultural mechanics program for their students.

- Agricultural mechanics instructors hold advanced degrees in their area of specialization. Sixty-two per cent of the instructors teaching major areas in agricultural mechanics held master's degrees, 36 per cent held doctor's degrees, and 2 per cent held bachelor's degrees. Nearly two-thirds of the instructors earned their degrees in agricultural engineering and approximately 29 per cent earned their degrees in agricultural education.

- The most frequently reported advantages of existing organizational patterns for training agricultural education undergraduates in agricultural mechanics were: provides for specialized instruction; provides for unity of purpose, objectives, and goals; cooperation with other agricultural courses taught; best utilization of physical facilities and equipment; and more economical to operate and administer.

- The most frequently reported disadvantages of existing organizational patterns for training agricultural education undergraduates in agricultural mechanics were: difficulty in coordinating the program; inadequate instruction due to background, interest, and attitude of instructor; limited number of courses available; and existing courses were too theoretical and lacked practical application to agriculture teaching.

- Anticipated changes in the next five years in the agricultural mechanics program for agricultural education undergraduates parallel changes made in the last five years. Changes identified as having taken place during the past five years were updating and intensifying course content, increasing emphasis on in-service education, revising requirements in the undergraduate program, and utilizing specialists to teach agricultural mechanics. Changes anticipated in the next five years were further revision and refinement of

(Continued on page 75)

The Laboratory-Work Areas Approach for Instruction in Agricultural Mechanics

G. M. WALKER and JASPER S. LEE
Mississippi State University

Instruction in agricultural mechanics can be made more systematic by organizing laboratory facilities and instructional content into laboratory-work areas. Systematic instruction in agricultural mechanics implies that objectives have been identified which will result in behavioral change. Instruction is natural, logical, and coherent. The conditions and tools of the learning environment are selected to facilitate the attainment of the objectives. Planned behavioral change, in this case the development of knowledge and skill in agricultural mechanics, is more readily attainable when instruction is organized around laboratory-work areas.

Organizing agricultural mechanics instruction into work areas does not mean that mechanics projects are outdated. Time is still provided, even though it may be after regular class hours, for the student who wants to paint a tractor or build a feeder. The laboratory-work areas approach attempts to remove weak links that frequently exist when projects comprise the total instructional program in agricultural mechanics.

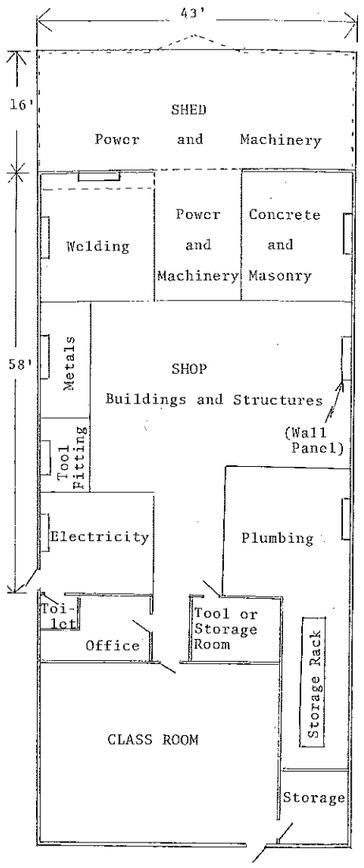
Relying upon students to select projects on which to develop skills is not the most efficient way to develop skills. Students may select projects with very little consideration given to their educational value or spend an excessive amount of time on an insignificant project. Some students may not have projects. Students enrolled in nonfarm agriculture courses may not have the opportunity to have mechanics projects, yet they still need to acquire mechanics skills. Many of the weaknesses apparent in total reliance upon individual projects can be overcome by systematic instruction through utilization of the laboratory-work areas approach in teaching agricultural mechanics.

Organization of the Laboratory

The organization of the agriculture mechanics laboratory using the laboratory-work areas approach is to provide instruction in eight basic areas: agricultural power and machinery, welding, electricity, buildings and structures (carpentry), plumbing, concrete and masonry, metals, and tool fitting. All of these areas include the knowledges and skills needed in agricultural mechanics.

Most secondary level agricultural mechanics shops can be adapted very easily to include the eight areas of instruction. The accompanying drawing illustrates how the work areas may be arranged. Variation can be made in the arrangement of the work areas to suit individual needs and the architectural design of facilities. The work areas contain all of the tools and equipment normally needed for the educational activities and projects conducted in that area. A central storage room is needed for tools that are used occasionally and for the storage of hardware items such as nails, bolts, and screws.

The work areas organization of agricultural mechanics facilities simplifies the inclusion of safety devices. For example, in the welding area a much needed safety device to prevent eye burns is the welding booth. Welding booths with see through plastic shields are economical and relatively simple to construct. Various power tools in the other areas become off-limits to students when they are assigned to a specific work area.



How the Approach Functions

The laboratory-work areas approach is based upon the fact that the agricultural mechanics instruction in the first courses should be structured around learning basic knowledge and skills. Projects, especially those requiring advanced knowledge and skill, are delayed until students have acquired the necessary basic skills. Often students are introduced to each work area of agricultural mechanics the first year in which they are enrolled. More in-depth instruction in the work areas is given in successive courses. The instruction is designed to move from the simple to the complex.

The teacher provides background knowledge and demonstrates special skills to the entire class prior to entering the work areas. The number of pupils in each work area varies, but six is the number generally considered appropriate. Several work areas may be functioning at a time. For example, in a class of eighteen students, six could be in welding, six in electricity, and six in carpentry. The groups of students rotate work areas when a satisfactory level of skill has been reached or when the assigned tasks have been completed. This procedure allows instruction to be designed for individual differences and is specially suited to students with special needs. Students can progress through each area at their own learning speeds. The time of the teacher is divided among the work areas in providing individual or group supervision and instruction. Students often work in pairs. Pairing students permits them to observe, discuss, and learn together by sharing knowledge and skill. In addition, pairing students is valuable in teaching the human relations aspect of on-the-job work.

The laboratory-work areas approach in teaching agricultural mechanics provides good occupational orientation. The experiences in the work areas are realistic and practical. Experiences are realistic and practical when each activity is representative of a function that a person employed in a specific agricultural occupation would perform on the job.

Instruction in buildings and structures is made realistic through the partial construction of a small frame building. Each aspect of the construction is according to that currently specified by building and housing specifications. Electrical wiring is taught by having students wire the building constructed. Plumbing can be taught through experiences provided in a simulated kitchen and bathroom. Similar techniques can be used to provide realistic instruction in the other work areas.

This approach to teaching agricultural mechanics simulates on-the-job work activities. The ability to transfer the skills learned to the world of work is increased. High school and adult students are enthusiastic toward the work areas.

Jasper S. Lee

G. M. Walker

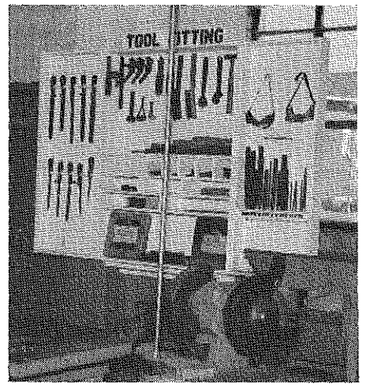
G. M. Walker and Jasper S. Lee are Associate Professor and Assistant Professor, respectively, Department of Agricultural Education, Mississippi State University, State College. *The laboratory-work areas approach for agricultural mechanics described in this article is explained in more detail in the publication, "Agricultural Mechanics Instruction in Secondary Schools," which is available from the authors.*

Some Advantages

Organizing the agricultural mechanics laboratory into laboratory-work areas indicates that planning has preceded instruction. A teacher who plans is much more likely to be providing systematic instruction. Planning should also indicate that the needs of the students have been considered.

Organizing the shop into work areas facilitates orderliness and provides for efficient use of tools in that students are working with them more of the time. Every tool has a storage place near where it is most often used. Tools are not carried to a central tool room and stacked on shelves. Orderly arrangement facilitates cleaning. A clean and orderly agricultural mechanics laboratory is an asset to any school system. Students learn work habits and how to care for working facilities by imitating the examples that are set before them.

Organizing agricultural mechanics instruction around laboratory-work areas shows the nature of the instruction being offered. School administrators appreciate an organized agricultural mechanics laboratory for systematic instruction. Visitors to the school like to observe the organizational arrangement and the activities being performed by the students. A well-organized facility that exemplifies the educational experiences that are provided is an aid in student recruitment. The general public admires a teacher who is able to show evidence of systematic instruction in agricultural mechanics.



Small tools are kept in conveniently located and attractively arranged wall cabinets. Content of the agricultural mechanics program is readily apparent when the work areas are labeled.

Agricultural Mechanics for Prospective Teachers

(Continued from page 73)

course content, increased requirements in agricultural mechanics, increased use of staff specialists to teach agricultural mechanics, and updating the instructional program in agricultural mechanics.

- Since departments of agricultural engineering are primarily responsible for determining course content and teaching agricultural mechanics for agricultural education trainees, persons in these departments must be cognizant of needs of prospective agriculture teachers.

Summary

Evidence seems to indicate that there is no common agreement on how to prepare prospective teachers of vocational agriculture in agricultural mechanics. No one is taking the major responsibility for determining what the agricultural mechanics undergraduate curriculum should be, nor do they seem to be concerned. The responsibility tends to float between various departments with agricultural engineering doing most of the teaching. Few curriculum innovations appear to be taking place.

Curriculum Revision in Vocational Agriculture

CHARLES HARVILL, Vocational Agriculture Teacher
Paragould, Arkansas
and
J. A. HAYLES, Teacher Education
Arkansas State University

There is growing evidence that vocational education in agriculture has made changes in curriculum patterns within the past few years. Agricultural education has been characterized by systematic planning at the local level. Persons in vocational agriculture recognize a need for reorganization of subject matter into a conceptual pattern that will produce greater understanding and depth of subject matter.

CURRICULUM REVISION

The teachers of vocational agriculture at Greene County (Arkansas) Technical High School saw the need for a flexible curriculum that would stimulate a desire for learning, relate the vocational agriculture program to the world of work, provide individual programs of study, prepare students for additional educational opportunities, provide personalized instruction, and increase the opportunities for social and leadership activities. A survey was taken to determine the job opportunities for students terminating their education with high school and to determine the areas of instruction needed in the high school. Facilities of the vocational agriculture department were evaluated to determine the feasibility of incorporating new courses in the curriculum and for making each course one semester in length.

The curriculum was revised to include courses in basic shop procedures for junior high school students. Two semesters are used to introduce and develop an understanding of mechanical drawing, tool identification, shop mathematics, leather work, rope work, woodwork, and the occupational opportunities available to students in vocational education. Three weeks of classroom instruction are rotated with three weeks of practical application in the shop.

Students are observed closely during the first year to determine whether or not they will be able to achieve in more advanced mechanics courses. If not, these students are placed in a special vocational education class for another year of instruction in shop fundamentals. Ten to fifteen per cent of the students need this extra training before enrolling in a regular agricultural mechanics course. The other 80 to 90 per cent of the students select with special counselors the courses which will provide experiences they need in their chosen field of occupational study.

THE CURRICULUM

The curriculum includes the following courses:

Agricultural Mechanics 1 Shop Skill Fundamentals. This course includes instruction in tool sharpening, woodworking, arc welding, plumbing, painting, small power tools, electricity, wood lathes, tractor maintenance, and concrete.

Agricultural Mechanics 2 Shop Skill Fundamentals. To enroll in this course, students have to have completed Agricultural Mechanics 1. This course is a continuation and advancement of Agricultural Mechanics 1 with soldering, house wiring, forging, and oxyacetylene welding being introduced. The use of the jig, band, and table saws, drill press, shaper, planer, jointer, and metal lathe are introduced.

Agricultural Mechanics 3 Gasoline Engines. Students are taught the theory of the operation of small engines through the repair and tune-up of multi-cylinder engines.

Agricultural Mechanics 4 Drawing and Blueprint Reading. Students learn to make orthographic, oblique, and isometric projection and learn to read blueprints.

Agricultural Mechanics 5 Metal Work. Instruction in advanced sheet metal work, oxacetylene welding, arc welding, and use of the metal lathe is given in this course. A prerequisite for enrolling in this course is the completion of Argricultural Mechanics 1 and 2.

Agricultural Mechanics 6 Electronics. Students learn about electronic circuits, conductors, resistors, tubes, transistors, coils, capacitors, power supplies, microphones, loudspeakers, amplifiers, oscillators, and the application of the superneterodyne principles and automation.

J. A. Hayles

Charles Harvill is Vocational Agriculture Teacher at Greene County Technical High School, Paragould, Arkansas. J. A. Hayles is Assistant Professor in the Department of Agricultural Education, Arkansas State University, State College, Arkansas.

Charles Harvill

Students in Agricultural Science 3, Horticulture, at Greene County Technical High School gain practical experience in the laboratory greenhouse.

Agricultural Mechanics 7 Carpentry. Students do advanced work in building construction. Students must have completed Agricultural Mechanics 1 and 2.

Agricultural Mechanics 8 Equipment Operation and Repair. Students learn the operation and maintenance of hydraulic-powered machinery, plows, harrows, cultivators, drills, planters, mowers, rakes, balers, and combines. Students must have completed Agricultural Mechanics 1 and 2.

Agricultural Science 1 Animals. Students are taught fundamental knowledge relative to livestock nutrition, feed stuffs, and digestion; selection, fitting, and showing; and reproductive systems, principles of genetics, and breeding practices. Students conduct research and gain practical experience in the animal science laboratory.

Agricultural Science 2 Plant and Soil. This course is an introduction to the basic plant and soil sciences with emphasis on soil properties, acidity and liming, fertility and fertilization, growth processes of plants, plant propagation, insects and diseases, and seed and plant selection.

Agricultural Science 3 Horticulture. Students learn procedures of greenhouse management and study the growing of fruits, vegetables, flowers, trees, shrubs, turf grasses, and other plants that are grown for sale, ornament, food, and interest. Students must have completed Agricultural Science 2.

Agricultural Science 4 Livestock Production and Management. This course includes detailed study and practical application of production and management practices pertaining to beef and dairy cattle, swine, and poultry. The prerequisite for enrolling in this course is Agricultural Science 1.

Agricultural Science 5 Crop Production and Management. This course includes detailed study and practical application of production and management of field crops such as corn, cotton, rice, soybeans. Students must have completed Agricultural Science 2 to enroll in this course.

STAFF AND ADMINISTRATION

There are three teachers in the vocational agriculture department with each assigned a field of specialization—plant and soil science, animal science, and mechanics. The number of sections of each course and how often each course is offered are controlled by the number of students who request each course. With this flexible curriculum, a student may enroll in as many sections which he is able to schedule.

Students terminating their education with high school graduation are given science credit for Agricultural Science 1 and 2 which enables them to take two or more semesters of vocational agriculture each year. Many students in their junior and senior years enroll in four, one-semester vocational agriculture courses each year. These students may take two semesters of junior high shop and twelve semesters of vocational agriculture courses in senior high. Class schedules are arranged so that students may take the courses they need to build a solid foundation for their future vocations.

NATIONAL VOCATIONAL-TECHNICAL TEACHER EDUCATION SEMINAR

The Third Annual National Vocational-Technical Teacher Education Seminar will be held at the Deauville Hotel, Miami Beach, Florida, October 20-23, 1969. The purpose of this seminar is to provide a vehicle for critically examining problems and new approaches related to the preparation and inservice education of vocational and technical teachers and to provide the essential national dialogue to meet these critical program needs. The seminar will focus on two major topics.

- **Micro-Teaching and Video Recording.** Inservice and preservice application of theory and technology; applications of face-to-face and remote supervision techniques; reports of highlights of ten phases of The Center project on micro-teaching and video recording.
- **Teaching the Disadvantaged.** Sociology of community ghettos; profiles of the nature of the disadvantaged student; devising teacher education programs relevant to the disadvantaged; and innovative programs.

Participants will be able to attend sessions concerning one of the two topics. In addition to major presentations by some of the country's most prominent educators, the participants will find the opportunity to discuss the problems in structured small group sessions.

For further information on the seminar contact:

Chairman, Teacher Education Seminar
The Center for Vocational and
Technical Education
The Ohio State University
1900 Kenny Road
Columbus, Ohio 43210

BOOK REVIEWS

GERALD R. FULLER, Special Editor
University of Vermont

FUNDAMENTALS OF SERVICE — ENGINES. Moline, Illinois: Deere and Company, 1968, 284 pp. $6.50 single copy; $4.85 each for ten or more copies; $64.00 for 194 color slides.

This manual covers all engine systems — fuel (three types), intake and exhaust, lubrication, cooling and governing. The 470 illustrations and actual photos of failed parts add interest to the material presented. Also included are test equipment and service tools needed for engines, engine diagnosis and testing, a complete chapter on tune-up, spot tests, and glossary. All theory in this comprehensive publication is related to actual use.

The Service Publications Department at Deere and Company researched the manual. Chapters were assigned to experts in the field. Service engineers at the Deere Waterloo and Dubuque, Iowa, factories wrote the key chapters. Copy was reviewed by the company's own design engineers and by outside vendors to assure technical accuracy and comprehensive coverage. As with other publications in the series, all material is presented objectively and without a commercial message.

The book was originally prepared for use in training apprentice mechanics at retail dealerships. But it should be useful to anyone interested in engines. The simple and clear explanations and the comprehensive coverage should make the publication applicable to a wide range of educational situations.

Benton K. Bristol
Illinois State University

FUNDAMENTALS OF SERVICE — HYDRAULICS. Moline, Illinois: Deere and Company, 1967, 170 pp. $5.00 single copy; $3.75 each for ten or more copies; $58.00 for 175 color slides.

This manual starts with the basic theory of modern hydraulics — both open- and closed-center — and presents oil hydraulics as it is commonly used to produce work on the farm and in industry. It compares the various types of hydraulic pumps, valves, cylinders, and motors; gives valuable tips on maintenance and safety for hydraulic machines; tells how to trouble shoot and locate failures; defines the many terms and symbols used in hydraulics; and has spot tests at the end of each chapter.

The publication is aimed at two audiences: machinery dealers for training new mechanics and high schools and vocational and engineering schools for courses in power machinery. The attractive, soft-cover book with quality paper, good layout, appropriate use of color, and many clear illustrations should be useful as an instructional aid and reference in high schools, technical schools, colleges, and universities. Anyone with an interest in hydraulics should benefit from studying the manual.

Benton K. Bristol
Illinois State University

FUNDAMENTALS OF SERVICE — ELECTRICAL SYSTEMS. Moline, Illinois: Deere and Company, 1968, 226 pp. $6.00 single copy; $4.50 each for ten or more copies; $45.00 for 135 color slides.

This manual starts with the basic theory of electricity by the use of simple color diagrams. Many types of circuits and components are compared. Generators, alternators, and the new transistorized regulators are described and discussed. The reader is told how to maintain circuits for safety and long service. Diagnosis and testing procedures are presented. Definitions of electrical terms and symbols and spot tests at the end of each chapter are helpful. The "how it works," "why it fails" and "what to do about it" approaches enhance the value of the book.

The main purpose of the book is to assist the reader to understand and service electrical systems with speed and skill in farm and industry applications. The publication should be useful to anyone with an interest in electrical systems whether he is an experienced mechanic, shop trainee, vocational student, teacher of agricultural mechanics, or electrical systems engineer.

Benton K. Bristol
Illinois State University

CEMENT AND CONCRETE REFERENCE BOOK. Chicago, Illinois: Portland Cement Association, 1964, 136 pp. (No cost)

This book is a product of the Portland Cement Association, an organization to improve and extend the uses of portland cement and concrete. The information contained in this publication undoubtedly is correct and of the latest source.

The text contains nine chapters beginning with what constitutes the portland cement industry, what is concrete and what is the Portland Cement Association. Then follows chapters on the uses of concrete in paving, urban development, structures, housing, masonry, farming, and other less well-known uses of cement and concrete. The publication contains many photographs, charts and graphs to tell better the story of cement and concrete.

The text is designed to give facts and figures on the industry as well as the scientific research involved. The text does not deal with the "how to do it" phases of concrete and concrete masonry. This text would best be used as a reference for each student. All of as a personal reference for the teacher and not as a required reference for each student. All of the companies who manufacture portland cement are listed as well as the Portland Cement Association District Offices.

Curtis R. Weston
University of Missouri

NVATA AWARDS were presented to these men during the 1968 convention in Dallas. Seated, left to right, are J. C. Atherton, Teacher Educator, Louisiana State University (Citation); Cayce Scarborough, Teacher Educator, North Carolina State University (Citation); T. L. Faulkner, State Supervisor, Alabama (Life Membership). Standing, left to right, are William Paul Gray, National FFA Executive Secretary, Washington, D. C. (Honorary Life Membership); Ernest DeAlton, State Supervisor, North Dakota (Citation); Sam Thompson, High School Principal, Dumas, Texas (Citation); and L. C. Dalton, State Supervisor, New Mexico (Citation).

Tom L. Devin (left), Dumas, Texas, NVATA President during 1968, presents the gavel to 1969 NVATA President William G. Smith of Freehold, New Jersey during the final session of the 1968 National Convention in Dallas.

News of NVATA

JAMES WALL
Executive Secretary

Following are a few of the activities and accomplishments of NVATA for the 1968-1969 fiscal year as reported by the Executive Secretary to the Executive Committee at their July meeting in Alexandria, Virginia.

★ Membership again surpassed all previous records with a total of 10,343 compared to 10,190 for fiscal 1967-1968. Student membership increased by 25 from 460 to 485 while regular memberships increased by 128. Four of the six regions showed an increase while one stayed the same and one decreased by 41 members.

★ Eighteen members received expense-paid trips to the Dallas Convention for winning national contests sponsored by business and industrial firms. At least one other member who was a state winner was sponsored by a firm within the state. Several other state associations are securing sponsors for state winners to the Boston Convention.

★ U.S. Steel, sponsor of the NVATA Outstanding Young Member Award, increased their contribution from $1,000 to $2,000 in support of the program. This will permit a winner in each of the six regions to attend the Boston Convention. NVATA is pleased that U.S. Steel found the program acceptable and decided to increase their contribution.

★ "Coffee Hours" were sponsored at the National FFA Convention for NVATA members and for student teachers.

★ For the third year, a Professional Personnel Recruitment booth was placed at the National FFA Convention. The booth had a new look thanks to the efforts of chairman of the event —Sam Stenzel. Hundreds of advisors and thousands of FFA members visited the booth.

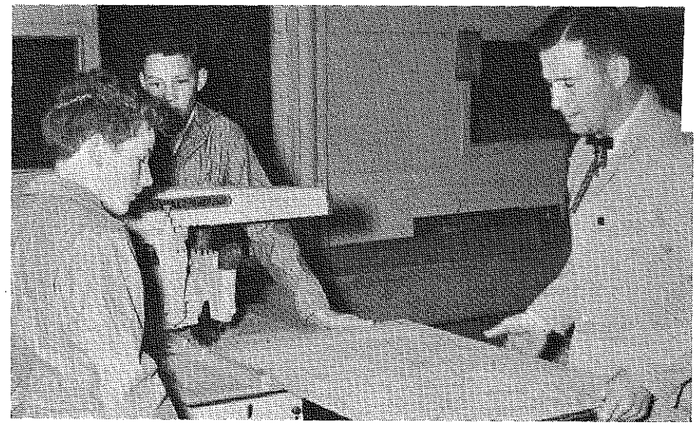
★ The NVATA By-Laws were reprinted to include all recent amendments and state associations were notified that a supply is available.

★ A certificate for the Professional State Association Award was designed and printed.

★ New application forms for the Outstanding Young Member Award and The Professional State Association Award were developed.

★ Eight state associations are buying additional copies of "News and Views of NVATA" for distribution within the state. These are mailed in bulk by the National Office at a cost of 2½ cents per copy. Associations now receiving "News and Views" are Washington, Kansas, Nebraska, Kentucky, Florida, Georgia, New Jersey, Virginia, and Montana. Nebraska sends copies to student teachers only. All others go to the state vocational agriculture teachers association.

★ Business, industry, and others continue to become more cognizant of NVATA as evidenced by more invitations to participate in meetings, appear on programs, and serve on important committees.



Don Monosmith, vocational agriculture teacher at Burlington, Colorado, provides small group instruction on the safe use of the radial arm saw. (Photo by Irving Cross, Colorado State University)

Stories in Pictures

ROBERT W. WALKER
University of Illinois

Boys and girls in a vocational agriculture class at Jackson (Michigan) High School learn to operate semi-auomatic baggers for potted plants. (Photo by Walter McCarley, Michigan State University)

Vocational agriculture students apply the results of research in agriculture. Plow, plant, and press both before and after is being done in one trip through the field by Richard Lee of Clark, South Dakota. (Photo by H. E. Urton, South Dakota)

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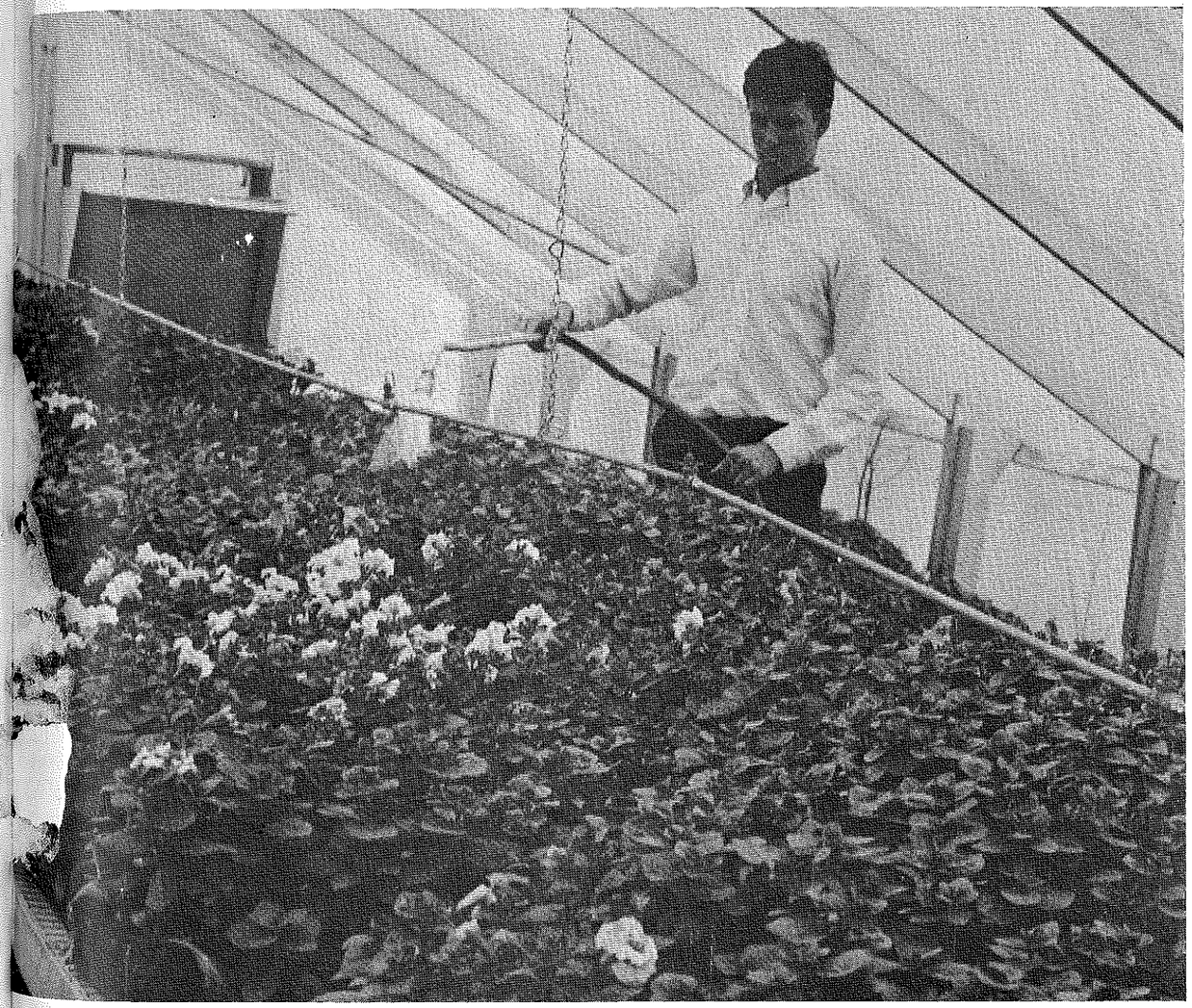

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