

The
**Agricultural
Education
Magazine**

July, 1986
Volume 59
Number 1



**THEME: Staying Current —
Classroom and Laboratory
Management**

THE AGRICULTURAL EDUCATION MAGAZINE



July, 1986

Volume 59

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Articles and photographs should be submitted to the Editor, Regional Editors, or Special Editors. Items to be considered for publication should be submitted at least 90 days prior to the date of issue intended for the article or photograph. All submissions will be acknowledged by the Editor. No items are returned unless accompanied by a written request. Articles should be typed, double-spaced, and include information about the author(s). Two copies of articles should be submitted. A recent photograph should accompany an article unless one is on file with the Editor.

PUBLICATION INFORMATION

THE AGRICULTURAL EDUCATION MAGAZINE (ISSN 7324677) is the monthly professional journal of agricultural education. The journal is published by THE AGRICULTURAL EDUCATION MAGAZINE, INC., and is printed at M & D Printing Co., 616 Second Street, Henry, IL 61537.

Second-class postage paid at Mechanicsville, VA 23111; additional entry at Henry, IL 61537.

POSTMASTERS: Send Form 3579 to Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, Virginia 23111.

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are \$7 per year. Foreign subscriptions are \$10 (U.S. Currency) per year for surface mail, and \$20 (U.S. Currency) airmail (except Canada). Student subscriptions in groups (one address) are \$4 for eight issues. Single copies and back issues less than ten years old are available at \$1 each. All back issues are available on microfilm from Xerox University Microfilms, 300 North Zeeb Road, Ann Arbor, MI 48106. In submitting subscriptions, designate new or renewal and address including ZIP code. Send all subscriptions and requests for hardcopy back issues to the Business Manager: Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, VA 23111. Publication No. 7324677.

The Scholarly Dimension of Teaching

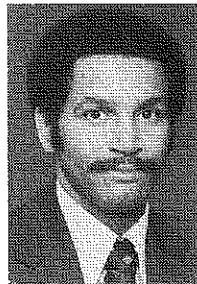
A major distinction between a social science and a "pure" science is a question of precision and control. A nutritionist can prove that one ration is more effective than another. On the contrary, a social scientist finds it difficult proving that one teaching style or instructional procedure is more effective than another because humans are extremely variable in their behaviors. Consequently, research findings in the social sciences must be tempered by the conditions underwhich the research is conducted.

Needless to say, many "pure" scientists are uncomfortable accepting social science research. Unfortunately, some social scientists also feel this research is less than scholarly. For example, an agricultural education researcher might find a high positive relationship between years of FFA membership and later earnings as an adult. Did this researcher prove that being in the FFA caused the earnings to occur? Of course not. The most defensible statement would be that as years of FFA membership tended to increase, so did later earnings as an adult. Obviously, other factors must be considered.

Control Needed

Another example occurs if you try to prove that Vocational Agriculture Teacher X can cause students to learn topics such as embryo transfer. While a teacher has a major impact on student learning, it is unwise to conclude that that person alone causes students to learn. Motivation, prior experiences, content in other courses, time on task, and other factors must be considered, yet they are very difficult if not impossible to control. Such control is needed, however, before you can accurately say the teacher alone caused the students to learn. Reality dictates that most educational research must be conducted in this context. As educators and social scientists, we must understand and feel comfortable with this type of scholarship. We must also interact with pure scientists to help them understand and appreciate the complex phenomena being studied.

A document prepared by the U.S. Department of Education will enhance our understanding of effective teaching and learning. **WHAT WORKS: RESEARCH ABOUT TEACHING AND LEARNING** summarizes in commonsense language the literature about effective schooling. Over 50 staff members of the Office of Educational Research and Improvement reviewed countless studies to prepare the publication. The document shows that the same caliber of evidence has been collected by several researchers. Consumers of research should take this and other credible evidence to form conclusions about what is true. Let's explore five points **WHAT WORKS** makes about effective classrooms and one concerning effective schools.



BY BLANNIE E. BOWEN, EDITOR

(Dr. Bowen is an Associate Professor in the Department of Agricultural Education at The Ohio State University.)

The Classroom

"Children learn science best when they are able to do experiments, so they can witness 'science in action' " (p. 23). Because agriculture is a science-based discipline, this finding suggests that students need to touch, smell, and perform as well as to know if their learning is to be most effective.

"Teachers who set and communicate high expectations to all their students obtain greater academic performance from those students than teachers who set low expectations" (p. 32). You get what you expect because students achieve at the desired level. That level must be known to students and of sufficient height to offer a challenge.

"How much time students are actively engaged in learning contributes strongly to their achievement. The amount of time available for learning is determined by the instructional and management skills of the teacher and the priorities set by the school administration" (p. 34). Cognitive learning requires time and psychomotor skill development takes even more time. Teachers have an obligation to manage the available time to keep students on assigned tasks.

"When teachers explain exactly what students are expected to learn and demonstrate the steps needed to accomplish a particular academic task, students learn more" (p. 35). Teachers must be able to demonstrate correctly the tasks expected of students. Just knowing the steps appears to have limited utility.

"Frequent and systematic monitoring of students' progress helps students, parents, teachers, administrators, and policymakers identify strengths and weaknesses in learning and instruction" (p. 43). This finding has particular application to Supervised Occupational Experiences students receive after school. Detailed planning, follow-up, and evaluation maximize learning.

The School

"Business leaders report that students with solid basic skills and positive attitudes are more likely to find and keep jobs than students with vocational skills alone" (p.

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The Scholarly Dimension of Teaching

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62). Many vocational agriculture teachers pride themselves on being able to teach mathematics, reading, and writing to students who do not perfect such skills in the earlier grades. Do such proclamations lead to dumping grounds? Should vocational agriculture teachers not insist that students bring basic skills with them to vocational agriculture?

Summary

Educators have an obligation to understand and use research findings because new knowledge prohibits boredom and stagnation. In the knowledge generation arena, social scientists explore new processes and procedures involving human interaction. Pure scientists discover new technical agriculture knowledge. Having one

without the other assures failure. The **WHAT WORKS: RESEARCH ABOUT TEACHING AND LEARNING** publication contains some of the latest ideas about the effective schooling. For a free copy, write to: The Consumer Information Center, Pueblo, CO 81009.

Reference

U.S. Department of Education. W.J. Bennett, Secretary (1986) **WHAT WORKS: RESEARCH ABOUT TEACHING AND LEARNING**, Washington.

About the Cover

Laboratory facilities take many shapes and forms. Students may be placed at a community owned facility such as a wildlife sanctuary for their SOE Program (Photo courtesy of Don Liebelt).

THEME

Looking Forward By Looking Back

There are a number of books on deer hunting in my personal library. Each book contains the same advice for hunters who move through the woods slowly in search of a big buck. The advice is — from time to time turn around and look back over your trail. Often a big buck will try to sneak away after you have passed.

This issue of **THE AGRICULTURAL EDUCATION MAGAZINE** is devoted to the theme "Staying Current: Classroom and Laboratory Management." The articles concentrate on current practices today. But I'm reminded of the advice in the deer hunting books — look back over your trail. Some excellent ideas and thoughts have been expressed about the importance of "staying current" in the past. If we don't look back over the trail some excellent thoughts may escape us, just like a big buck sneaking off in the woods.

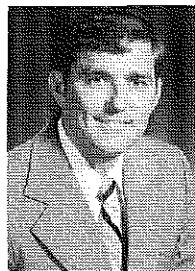
Following are excerpts from an editorial appearing in the Magazine "a few" years ago. Please read the paragraphs carefully. You will enjoy the wisdom and truth or what is being said and the manner in which it is written. Try to guess the year in which this material was written and by whom. I'll provide the answer at the end.

"Headlong Change and the Teacher of Vocational Agriculture

Valentine in **THE ART OF THE TEACHERS** says:

Nothing in history can compare with the rapid and profound innovations that have marked the life of the past thirty years alone. Those of us who have lived through that time have beheld such changes in the material, social, and intellectual structure of our world that we have actually been compelled to make greater adjustments, probably, than one living through a thousand years of any previous history would have had to make.

"Living a thousand years in thirty, living a hundred years in three. Verily, we in the present generation must



BY GARY E. MOORE, THEME EDITOR

(Dr. Moore is a Professor in the Department of Agricultural, Extension and International Education at Louisiana State University, Baton Rouge, Louisiana 70803.)

think as we run. 'He who pauses in the flight loses pace with the world and becomes a bewildered alien.'

"A book on human physiology I used to study said that the human body is remade every seven years. That seemed to me a rapid change. Agricultural education is being made over in less than seven years. A teacher of vocational agriculture graduating in 1977 is today an alien unless he has made a vigorous effort to keep up with the changes in agricultural education.

"It would be so comforting to many teachers if agricultural education would but stand still. This boon is impossible. It would make vocational agriculture a fixed, changeless, static, dead thing instead of the changing, evolving, dynamic living thing that it is. We must press adventurously forward. We must move along with the stream of evolving society. We do not wish for society to stand still; we must not yearn for the restful finalities of yesterday. Education today is vigorous because society is passing through tremendous changes. We would not have it otherwise.

"Are you an alien? Teachers of agriculture who possessed the qualities of merit that were acceptable a decade or so ago when the work was new, when the problems were simple, may be wholly incompetent to meet the

exacting demands of the modern, complex and bewildering turmoil incident to the birth of a new rural generation. During the ox-cart days in agricultural education, poorly prepared teachers with meager and shallow programs were frequently considered satisfactory. But today the modern complex pattern of social and economical rural life demand highly trained and technically trained teachers. Teachers who are not highly competent must give way to those who can measure up to the new requirements.'

"Dr. Field in an article "Professional Anemia" in the May issue of THE VISITOR, from which the above quotation is taken makes this statement: 'Teachers whose professional and technical collegiate preparation antedates the modern period by even a few years are guided by obsolete and antiquated ideas unless they have remained close students of the recent trends in social and economic affairs. Many of these teachers of agriculture from the 'old school' are rapidly approaching the western horizon of their teaching career. It is with compassion in our hearts that we view their fading professional sun prematurely sinking into the land of lost opportunities, of stolid conservatism — a land

unknown to the impetuous, virile youth of the oncoming generation.'

"Are you making a vigorous effort not only to adapt yourself to the change but to help create the change? Or do you belong to the group of the weary who realize that they are being left behind but who wish that things would stand still? Or, worse, do you belong to the group upon whom it has never dawned that they are aliens in a world of change?"

The above material first appeared in this magazine exactly 53 years ago this month, July 1933. The editorial was written by Carsie Hammonds, a teacher educator at the University of Kentucky. The date replaced with 1933 was 1926. What Hammonds wrote 53 years ago is just as applicable today.

Two articles in this issue concentrate on what the various states and universities are doing to help teachers remain current in the classroom and laboratory. You may find some ideas which can be used in your school or state. The other articles describe current trends or practices which are important.

THEME

What State Departments of Education are Doing to Help Teachers Stay Current

ALABAMA

C.W. Reed, State Specialist

In order to enable teachers to have the competencies and skills needed to stay abreast of changes made in course offerings and perform efficiently in new areas, a comprehensive series of summer workshops are conducted by the state staff during the year. Some of the areas included in workshops are: Computer Applications in Agriculture, FFA, Adult, SOE, Small Gasoline Engines, Electricity, Care and Maintenance of Power Woodworking Equipment, and Commercial Fruit and Vegetable Production. On the average, 18 workshops of short duration are available to give teachers needed skills for effective instruction.

To further strengthen the instructional program, individual supervising visits are made with all teachers. County, area, district, and statewide meetings are held.

CALIFORNIA

Warren D. Reed, State Supervisor

The Agriculture Education Unit of the California Department of Education deals with its responsibility to help

teachers keep current of classroom and laboratory management through two major activities. Foremost is our practice of Regional Supervisors meeting with teachers on a section level (28 in the state) from 6 to 8 times during the school year and on a regional level (7 in the state) twice a year. At these meetings, Regional Supervisors distribute materials and provide teachers with current information about issues in Agricultural Vocational Education. They also present or arrange for professional development presentations, workshops, etc., at these meetings. Regional Supervisors allocate about 10% of their annual work plan to this activity.

Also, the Department of Education contracts with California Polytechnic State University, San Luis Obispo, to develop and conduct a statewide program of teacher inservice activities. The project is funded with Perkins Act program improvement funds. Teachers, state staff, and teacher educators all provide input in the planning of the annual program of activities for the inservice project. Some typical activities are: School day and weekend

COMPILED BY GARY E. MOORE,
THEME EDITOR

(Dr. Moore is a Professor in the Department of Agricultural, Extension and International Education at Louisiana State University, Baton Rouge, Louisiana 70803.)

workshops and seminars on technical, leadership, and management subjects; speakers for various meetings; summertime extended workshops, annual conference speakers and workshop leaders; individual teacher-to-teacher consulting; and the California Agricultural Education Leadership Institute.

KANSAS

Les Olsen, Education Program Specialist

For the past two years, computer workshops have been conducted with over one-half the teachers participating. Perkins Act funding has been utilized to fund local schools requesting computers and software. Additional follow-up inservice meetings have been conducted with teachers participating in computer workshops. The staff person responsible for this activity has been contracted by the Department of Education.

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What State Departments of Education are Doing to Help Teachers Stay Current

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Each year, the department conducts spring and fall inservice meetings for secondary teachers and an annual vocational conference for all teachers at all levels. Teachers assist in selecting workshop topics for updating. Recent emphasis has focused on competency-based education.

A special committee has recommended that certification standards include basic competencies in agribusiness for students completing a degree program preparing to teach vocational agriculture.

KENTUCKY

Rodney Kelly
State Director

The major emphasis of inservice activities for vocational agriculture teachers in Kentucky from the State Department of Education has been the statewide conference held annually in late July. This has been a three-day conference the past few years, with the 1985 Conference being conducted as part of a joint Vocational Education Conference with all service areas.

The program typically provides one full day of technical update sessions in various areas of agriculture which teachers select. These include livestock production, crop production, insect and disease control, farm finance, farm management, horticulture, and agricultural mechanics. The remainder of the time is utilized for operational-type sessions such as curriculum development and implementation, computers,

FFA, YFA, supervised occupational experience programs, and first-year teacher sessions. In addition, general sessions are held to discuss program changes and future directions. State Extension and Research Specialists participate in the program. Teachers and teacher educators are involved with the state staff in planning and conducting the annual conference.

The state staff and teacher educators also provide inservice activities through regional workshops one-two times per year for specific programs or technical needs.

MICHIGAN

Richard Karelse
Occupational Specialist

The State Department of Education funded a project to provide training for vocational teachers to use microcomputers in their vocational program and to use occupational related software. Of the 12 trainers for the project, two vocational agriculture teachers were chosen. We found that teachers training teachers in their own program area is very successful. They can assist in recruitment as well as making sure the training is relevant. Even though the projects are generic — vocational education, we were able to tap that resource to fill agriculture specific needs.

In recent years, we moved the vocational agriculture summer conferences away from the university on alternate years. We meet "out in the state" and use "local agriculture" to conduct our inservice training sessions. We also conduct a one day "winter technical agriculture workshop." Our teachers like the out in the state conference

where they see and participate in applied agriculture.

MINNESOTA

Paul M. Day
State Supervisor

The economic crisis confronting agriculture vividly demonstrates the need for additional competence in farm financial management. A staff development grant was used to assist Minnesota's vocational agriculture instructors in integrating the John Deere and Bank Business Management Curriculum into the instructional program.

Jim Steward, co-author, conducted day long workshops for high school vocational agriculture instructors in the late spring of 1986 at five locations. Economic financial management principles and applications were included in the workshop agenda.

MISSOURI

Terry W. Heiman
State Director

Missouri inservice education is a joint effort between teachers, teacher educators, and state supervision. Teachers are not only recipients of inservice education, but are instrumental in conducting statewide advisory committees that set priorities for inservice activities and curriculum development. Based on the teachers' priorities, a joint staff comprised of all teacher educators and state supervisors plan the inservice program.

A typical year in inservice education will include a) inservice credit courses offered at various sites throughout Missouri; b) a series of 13 fall teacher workshops — recent topics have in-



Teachers need to be current in the classroom and laboratory both in pedagogy and technical content. (Photo courtesy of Gary E. Moore)



A group of Indiana teachers participating in a "Traveling Seminar." They are touring a greenhouse at the state penitentiary. (Photo courtesy of Gary Moore)

cluded curriculum materials and methods, computers, and program planning and management; and c) an annual teachers' conference with 30 technical workshops.

NEBRASKA

Ted D. Ward
Director, Agricultural Education

"A Futuristic Outlook To Strengthening Agriculture/Agribusiness Programs" is the theme selected by the Nebraska Agriculture/Agribusiness Education staff to address the future. The 1986-87 Agriculture/Agribusiness "Request For Proposals" are targeted to the theme in five areas. Area 1) Incorporating Telecommunication Services into Agricultural Education — how to access the various telecommunications sources available and how to incorporate telecommunications into the curriculum. Area 2) Agribusiness Instruction — to enhance instructor attitude in the development of concepts of agribusiness; to improve agribusiness curriculum instruction guides and/or materials; and to encourage an instructor internship experience with agribusiness in the local community. Area 3) Core Curriculum Revision — to utilize instructors in revising the Core Curriculum that was introduced in 1976. Area 4) Program Improvement — to assist in improving, expanding, modernizing or initiating new agriculture/agribusiness curriculum based on locally identified and documented needs. Area 5) Adult Programs — to provide, improve, and expand adult programs for individuals who require training/retraining to obtain employment or to increase their employability/entrepreneur skills required by changes in technology, processes, or economics.

NORTH CAROLINA

Charles L. Keels
Chief Consultant

It is said, "One cannot work on today's concerns with yesterday's equipment and expect a bright tomorrow." We believe our five emphasis areas are fulfilling the expectations of the theme.

One of the most critical steps in "Staying Current" is the process by which needs and interests are assessed. This question has always been a challenge in our state.

The most commonly used means to determine needs and interests of teachers have been surveys, question-

naires, and informal discussions with teachers. It appears there are weaknesses in each of these methods. Quite often, the results do not seem to identify true needs which are preventing teachers from being effective.

Nevertheless, using the "less than perfect" information as a basis, the leadership in our State attempts to plan professional improvement activities for teachers based on perceived needs.

Three major approaches are planned and coordinated primarily by the supervisory/consultant staff: 1. The Annual Summer workshops — a four-day staff development activity; 2. District meetings with teachers — at least two meetings per year in each of eight districts. The focal point of these meetings is communication and planning; 3. Workshops — conducted mostly during summer months; two-three days in length; many of these enable teachers to earn certificate renewal credit; university staff, agricultural business, and industry representatives, or other appropriate resource people usually plan and conduct these workshops.

In each of these approaches and in other types of inservice activities, it is desirable that teachers, teacher educators, supervisory/consultant staff, and a variety of resource people cooperatively plan, implement, and evaluate all professional improvement activities to insure effective results.

OHIO

James Cummins
Assistant Director

State supervisory personnel conduct four inservice meetings on a district or taxonomy basis annually. Statewide thrusts are identified by staff and all instructors of vocational agriculture are provided the opportunity to participate in small group meetings.

In addition, state supervisory staff assist individual teachers in the identification of needs and suggest alternatives which will help keep practicing teachers current in the classroom and laboratory. This is accomplished during regular supervisory visitation to the 340 departments of vocational agriculture in Ohio.

The state supervisory staff coordinates a two-day Technical Update with the Department of Agricultural Education at The Ohio State University. Instructors of vocational agricul-

ture may select from the 50 workshops which are taught by the faculty of the College of Agriculture.

TEXAS

Jay L. Eudy
Director, Agricultural Education

The educational reform package in Texas has rearranged many priorities. Mandated back to the basics and "high tech" have created a need by teachers for a different type of inservice program. Requests for workshops dealing with livestock shows, judging contests, and animal science have given way to such topics as agribusiness management, microcomputers, and prevocational curriculum.

Workshops continue to be exceptionally well attended. Research data gathered by the teacher training universities are used to make changes in courses and curriculum. Computer software developed by the universities has been readily accepted.

Advisory committees are heavily involved in the changes. Each committee has a good representation of teachers and teacher trainers to complement the agriculture sector. The State office must continue to coordinate these activities with the goal of providing the best possible program for our product — the students.

VIRGINIA

Tommy Johnson
Associate Director

During the 1984-85 school year, teachers had the opportunity to attend 20 inservice workshops. These workshops were conducted in the following areas: Computer Data Management, Maintenance and Repair of Laboratory Equipment, Horticulture, Agricultural Machinery Service, Electricity, New Technologies in Livestock Production, and Computer Networking.

Competency-based education continues to be a high priority in Virginia. Validated task lists in all six agriculture program areas offered in Virginia were made available to all teachers during the 1984-85 school year.

The Virginia Department of Education has been very fortunate to be able to fund two projects the past two years that have helped keep teachers current in Farm Business Management and

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What State Departments of Education are Doing to Help Teachers Stay Current

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Computer Technology. The Farm Management project contract was awarded to a local school which enables one local agriculture teacher to work full time with young farmers and teachers statewide to keep them abreast of the latest farm management practices. The computer project contract was awarded to Virginia Tech and provided several computer workshops as well as software packages.

WISCONSIN

F.J. Doering
State Supervisor

First and foremost we should say that we are not doing enough. Our staff has been reduced so we have only a state supervisor and FFA Executive Secretary left to do the work. In a state with 18,000 vocational agriculture students and the 5th largest FFA membership in the nation, this is hardly adequate.

We conduct a week long summer conference for the vocational agriculture instructors of this state. Our state is divided into 10 sections and we hold 10 district conferences for the instructors and 10 FFA sectional workshops in the Fall. In addition we con-

duct 10 meetings in February and March for instructor inservice. Several workshops in a variety of areas are held at different times during the year and especially in the summer. Summer conference workshops are held for two days using about 70 professors from the University of Wisconsin system.

We also have a funded project with the University of Wisconsin — Madison in which instructors are receiving inservice (with the assistance of Agri-Data Resources, Inc. of Milwaukee) in the use of computers. We are no longer able to make very many on-the-site visits for supervision, but we do participate in the vocational education evaluation program. As we said, not enough, but we do the best we can with a depleted staff.

THEME

Tried and Tested Techniques for Managing Laboratory Instruction

How many times have you had the class troublemaker absent from school and by the end of the period made the realization that if teaching and learning could be this effective every day your job would be much more enjoyable? Have you noticed that some days the class troublemaker is much easier to arouse than other days? Do the management practices used with the class provoke or suppress undesirable behavior? The purpose of this article is to share selected laboratory management techniques which have been found useful in making instruction effective, interesting and enjoyable for students and teachers.

Environmental Management

Environmental conditions in the instructional laboratory are known to have both positive and negative effects on learners. Although individuals react differently to each environmental circumstance, research has shown that the presence of loud noise makes people jumpy and reduces their ability to concentrate. Hot and cold temperatures provoke sensations of thermal discomfort in learners which causes them to be conscious of their own discomfort rather than having their attention on the topic of study. The presence of fumes, dust or poor ventilation can cause respiratory problems as well as diminishing the quality of the learning environment for our students.

The question is often asked, "What can I do about it?" The answer in most situations is a lot if we know what to do. The following are some exemplary practices used by teachers to improve the management of their laboratory and make instruction more effective for students.



BY STANLEY R. BURKE

(Dr. Burke is an Assistant Professor of Agricultural Education and Agricultural Mechanics at Virginia Polytechnic Institute & State University, Blacksburg, Virginia 24061.)

Lighting Quality

Mechanics Laboratory

Have you looked closely at the condition of your laboratory ceiling lately? Is it a dark color, unpainted and/or covered with dust and sediment? All are symptoms of a facility in need of some improvement. The trusses and underside of the roof, which typically make up the ceilings in most vocational agriculture mechanics laboratories, usually are not conducive to reflecting light to the work area below. Painting the trusses and underside of the roof a flat white color will greatly improve the overall brightness of the work area in the shop facility. When the ceiling is painted, approximately two feet of the upper side walls should be painted the same color as the ceiling.

The remaining side walls should be a different color from the ceiling. A light non-obtrusive color (pale yellow) may be used. Cleanliness and light quality may be further enhanced by painting the bottom five or six feet of the shop walls with an epoxy paint. This type of paint may be

washed when needed to remove dirt and restore light reflecting quality. The epoxy paint should be a neutral color (medium yellow or pale green) to prevent the color scheme from distracting students.

How can you get the laboratory painted? Many times such service is available from the school system maintenance crew, but it must be requested by the teacher or principal. One of the easiest methods of getting the facility painted is to establish a maintenance schedule with the school administration and maintenance staff, then follow-up the schedule each time your laboratory is due painting or other periodic service provided by this group. Although not advocated, some teachers have resorted to doing this type of work themselves with students.

Welding Booths

Many instructors feel that one of the biggest detriments to learning to weld is seeing the welding zone properly. It has been found that supplemental lights, strategically located in the welding booth, will assist the learner in seeing the welding zone more clearly. Supplemental lighting should be placed such that it reflects on the weld zone from an angle behind and above the welder's head. Such lights are particularly helpful to beginning students as they provide enough lumination for the student to see the electrode and position it in the right place before striking an arc.

Documenting Instruction

Are you into competency based instruction and in need of a good system to keep records of student skills and the time spent on tasks? One enterprising teacher has developed a system for recording student laboratory experiences and the amount of time each individual spends on skill development. Students punch in and out on a time clock as they enter and leave their daily lab work. The time cards are coded with the student's name and the specific tasks he/she will be performing each day of the week. Flexibility exists in assigning the student to work on the same task(s) each day or assigning different tasks for each day of the week.

Students may be graded daily or weekly. Grades can be posted on the time card for the student's benefit and later entered into the teacher's grade book. Time cards can then be filed, thereby giving the teacher, student and potential employer a record of skills studied, amount of time devoted, and degree of mastery achieved on each skill.

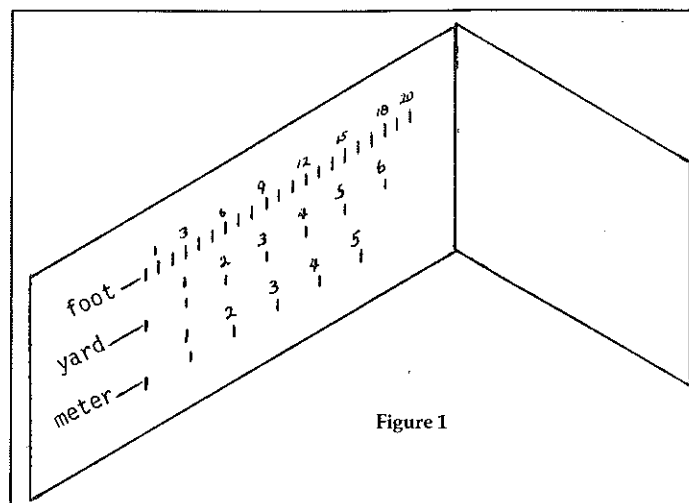


Figure 1

Instructional Management

Do your students have difficulty conceptualizing different units of measure, i.e. a foot, a yard, ten yards, twenty feet, a meter or kilometer? An effective technique to help students see actual units of measure is to display them on the wall of the classroom. Pieces of string, rope or colored paper may be used to mark-off a wall with dimensions being studied. Care should be exercised to place the displays at a height which will make them highly visible to students. In so far as possible, keep the displays at or near eye level. (See Figure 1).

Managing Tool Storage

Storage for Portable Electric Drills

Have you been looking for a way to organize portable hand drills for better accessibility and ease of storage? An effective technique found at one school allows individual storage of drills without the hassle of weaving drills through a maze of electric cords to secure one for use. Drills are stored on a metal storage rack made to fit inside a lockable wall cabinet. (See Figure 2).

To construct simply cut a short piece of pipe (1½") with a diameter large enough to allow the drill chuck to fit inside. Typically a 1¾" pipe will work for drills up to one-half inch in size. Weld the pipe to a piece of flat bar 3/16" x 2"; drill holes in the flat bar for woodscrews which will be used to attach the rack to the wall cabinet. Note — the wall cabinet must have sufficient inside clearance space to allow the doors to be closed when drills are in storage.

Controlling Consumable Supplies

Do you have difficulty maintaining control of consumable supplies? One enterprising teacher solved the problem by installing a computerized inventory system and maintaining it with students. The system operated as follows. All purchases were automatically added to a computerized supply inventory. A hard copy was printed and brought to the lab for student use. Students were assigned to manage the stockroom, on a rotating basis, as a part of their laboratory instruction. As student workers requested supplies from the stockroom, the manager withdrew and returned supplies to storage and to the computerized inventory record. Periodically, student records of supply withdrawals were taken from the computerized inventory, thereby maintaining an accurate record of supplies on

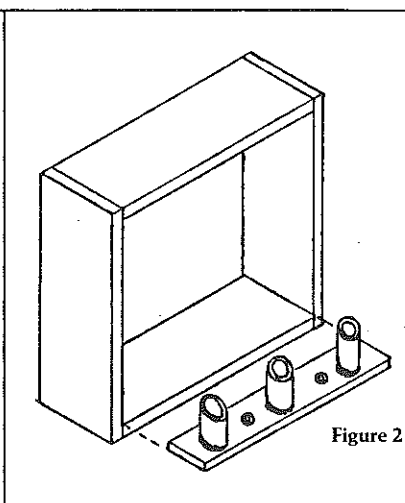


Figure 2

hand. This system pays educational dividends in allowing students to learn correct names of supplies, costs, units of purchase, as well as, allowing students to manage a well developed supply inventory system.

Student Assisted Instruction: A Teaching Strategy for the Vocational Agriculture Classroom

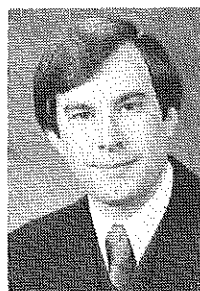
Teachers are constantly in search of different approaches to use in presenting material to their students. Student Assisted Instruction (SAI) is an approach which holds potential for use in the vocational agriculture classroom.

What is SAI?

SAI is a form of peer teaching during which several students, acting as teachers, simultaneously teach the same short lesson to several small groups of their peers. SAI's potential for use in high school vocational agriculture classrooms is tremendous. The vocational agriculture teacher can divide the class into small groups of four to six students each, designate one person from each group as that group's teacher, and give all the "teachers" an identical lesson to prepare to teach. The lesson topics can be drawn directly from the material ordinarily covered in the course. Extension publications, portions of textbook chapters, and publications provided free by industries are examples of teaching materials which can be used. Selecting topics which can be covered adequately in the time allotted is of importance.

The students designated as teachers should be given a few days in which to individually prepare to teach the lesson to their small groups. On the assigned day, the designated teachers all simultaneously teach their small groups the same lesson (or teach toward the same objective) with a time constraint of 10 to 15 minutes. The objective of the lesson will depend upon what is being taught. For example, the objective of the lesson for students enrolled in a production agriculture class would be to correctly answer test questions on the care of the baby pig at birth.

At the conclusion of the assigned period of time, the designated teachers must stop teaching. The students will then be allowed to reflect and then ask specific questions of their teacher concerning the material covered, allowing five to seven minutes for discussion. A short evaluation can then be made of the students' achievement. This short written test should be provided by the vocational agriculture teacher. Each group can grade their tests to see how well they did in comparison with the other groups. A large group discussion follows, conducted by the teacher, to summarize the material which was taught. The teacher should involve all the students in a discussion of the lesson, bringing out key points that might have been stressed by the designated teachers. These key points can be written on the chalkboard and should go into the students' notebooks to be used for reference at a later date.



By JERRY L. PETERS

(Dr. Peters is an Associate Professor of Agricultural Education at Purdue University, West Lafayette, Indiana 47907.)

A vocational agriculture teacher can easily have a new set of teachers and a new lesson the next day. With five students to a group, one week's worth of classes can be taught by the students, or perhaps a particular day of the week, such as Friday, can be set aside for SAI.

Results to Date

Over 600 high school vocational agriculture students in Indiana have participated in this new teaching strategy. After their participation in SAI, these students responded to the open-ended question, "What would you tell a new student coming into your class who will be participating in SAI?" Some of their remarks were:

- 1) It's a lot of fun, and is very interesting.
- 2) It makes learning easier and a lot more fun.
- 3) It's a great new experience.
- 4) It is not as hard as it may look.
- 5) I enjoyed it and it will be a good experience and you will learn a lot if you work at it.
- 6) I would tell them that it is somewhat difficult and to make your lesson effective you'll have to do some work and not just read the information it gives you. If every student, not just a few, will put their full effort into this project it can be very effective.
- 7) That you must work a little bit harder and it's a bit of a drag but worth it because you learn a lot easier this way.

The teachers' comments as to why they would use SAI again were very positive. Some of their remarks were:

- 1) SAI allows students to research and learn about the subject matter and the teacher can inform them in more depth.
- 2) SAI is an excellent tool for advanced classes.
- 3) SAI provides students the chance to speak in front of an audience, develop organizational skills, make them feel important, and involve the student.
- 4) SAI provides the chance for the teacher to be creative.

- 5) It promotes group learning and doubles learning.
- 6) SAI promotes out-of-class learning on the subject matter.
- 7) I will definitely be developing new SAI lessons because I feel it adds some "spice" to my teaching.

Benefits of SAI

This approach to teaching high school vocational programs can provide a novel experience which students might enjoy from time to time. It can also provide students with the opportunity to see teaching from the instructor's point of view. (Who knows, this might help solve a few discipline problems or at least give the students a better understanding of some of the problems teachers encounter.) It can also have a positive effect on the leadership skills of class members by giving them more opportunities to speak in front of a group, although small, and hold a leadership role.

SAI can also reduce the number of reading assignments for the class by allotting certain reading assignments to just those designated as teachers. This may eliminate some of the problems which arise for teachers who do not have enough textbooks for all the students in the class. Only a handful of students at a time would need to make use of the books.

SAI allows for a competitive atmosphere in the class-

room, if that is how an instructor wishes to make use of it. Thus, it is possible to again assure oneself that the designated teachers will come prepared to teach and the students will be receptive to the material being covered by creating a competition between the small groups concerning the groups' achievement on the evaluation.

Costs/Resources for Using

SAI would initially require extra teacher time for the planning and construction of lessons to be taught. However, this is true of any new teaching strategy, and if a teacher is well-organized and has lessons planned in advance, this should not pose a serious problem. Extension bulletins, free publications from industry and some textbooks may very easily supply the teaching material needed and thus solve this problem.

Summary

As teachers search for new approaches for presenting materials to their students, consideration should be given to this approach. It allows for a break in "normal" classroom routine, enables the students to discover the difficulties encountered in teaching, and holds potential for developing leadership skills. Perhaps SAI is a teaching strategy vocational agriculture teachers in other states might find worthy of further examination.

ARTICLE

Shop Injuries — Would You Be Liable?

Teachers have an obligation to their students both in shop and laboratory classes to assure that they have a safe working environment at all times. Basically, their responsibilities can be grouped into three major categories:

1. Teach and Enforce Safe Work Habits.
2. Supervise Student Work at All Times.
3. Maintain Equipment and Facilities in Safe Working Order.

These responsibilities seem simple enough and they are if teachers discipline themselves to carry them out. Let's explore each category and determine what some of the specific responsibilities and alternatives are.

Teach and Enforce Safe Work Habits

Safety may be taught by several techniques including lectures, audio-visuals, demonstrations (never demonstrate the How Not To), field trips, guest lecturers, or a combination of these. The same technique may not work with all students; for instance, academically disadvantaged students may require repeated demonstrations. Once the teacher has taught safety, he/she needs to evaluate the students in order to determine their level of competence. Although several methods may be used, a combination of evaluation methods are used by many of the teachers in our state. First a written exam is given; then each individual student must demonstrate with 100% accuracy his/her ability to perform the safety skills taught. Once the



BY GORDON D. PATTERSON

(Dr. Patterson is Coordinator of Agricultural Education in the Department of Vocational and Adult Education at Auburn University, Alabama 36849-3501.)

student achieves the desired level of competence, the evaluation instrument/checklist is signed by the teacher, student, and principal and placed in the student's file.

The results of a lawsuit brought against a teacher, principal, and the school board members by the mother of a student who was injured in a shop accident explain why safety instruction is important. The 14 year old student severed several fingers on a power saw in an industrial arts class. Just prior to the accident, the teacher had given a 20-minute review session about the proper use and operation of a power saw, including specific instruction as to all necessary precautions. The court held that (1) the teacher did not violate standards of care required of him by law in instructing students in dangers of using a power saw and appropriate procedures to follow in using the saw and (2)

(Continued on Page 12)

Shop Injuries — Would You Be Liable?

(Continued from Page 11)

the student's injuries were a result of his own contributory negligence (*Izard v. Hickory Hills School Board, 1984*).

If teachers do not enforce safe work habits, they are neglecting their duty to the students. For instance, having a state law requiring the use of eye protection devices when participating in shop activities is of little use if it is not enforced. The following court case is an example of what can occur. A 13 year old student lost the use of an eye when a drill bit he was using broke and a piece of the bit became imbedded in his eye. As a result of the injury, the boy's father brought action against the school district with the following results. The court awarded the boy and his father \$57,100 because the school did not supervise and enforce the wearing of protective safety goggles. It was pointed out that an individual pair of safety goggles was assigned to each student at the beginning of the school year and the students were instructed to wear the goggles, but the rule was not consistently enforced (*Scott v. Independent School District, 1977*).

Supervise Students at All Times

By looking at the results of several court cases, we can see that supervision can be in various forms which may include directly observing, warning about dangers, and/or instructing in the proper use of equipment and practice of other safety precautions, and developing and implement-



Constant supervision and instruction are needed for good laboratory management. (Photo courtesy of Gary E. Moore)

ing rules and regulations. The overriding factor is, if there is a known danger or possible danger to students, maximum supervision should be exercised.

This responsibility is one that is very likely to be violated by many teachers. Often when a teacher receives a telephone call, checks on students in another part of the building, or goes to the office, students continue working unsupervised. Telling students not to use equipment in your absence doesn't always work. Fortunately, new or remodeled facilities that are equipped with a key controlled master switch allows you to disable the equipment when proper supervision is not available.

The following case shows why we must provide supervision at all times. A 14 year old student attending an agriculture class where students were learning to weld severed an index finger while using a power saw which had been stored in the classroom. In this case, the teacher and other students testified that students were told not to use the power equipment. However, judgement in this case went in favor of the student (\$70,000) because (1) by leaving the shop area unsupervised the teacher, who knew the power saw was in the classroom and the safety guard was not on the saw, breached his duty to the student to supervise at all times during the class period because of the dangerous equipment; (2) the principal, who was aware that the saw was stored in the building, breached his duty to the student to see that the saw was stored in a safe manner whereby students could not get hurt; (3) the school board, which had actual knowledge of the storing of the saw in operating condition and without protective safety guard or warning signs, breached its duty (*Lawrence v. Grant Parish School Board, 1982*).

Maintain Equipment and Facilities

Maintenance of equipment is very important in the shop area, not only for safety, but also for effective utilization. Maintenance should include adjusting, cleaning, lubricating (hard wax on most woodworking equipment), checking belts and pulleys, replacing defective parts, and sharpening the cutting tool. In addition, the teacher is responsible for maintaining the safety guards and devices in proper working order and to seeing that they are used. *Power Tool Maintenance* by Daniel W. Irvin is a very good resource book to have on this topic.

In a court test, a student who had used a power saw without the guard in place injured a finger. During the trial, it was pointed out that other students and the teacher used the saw without the guard in place on some occasions partially because the fence was broken. The court's decision in this case was in favor of the student (*Ridge v. Boulder Creek Union Junior-Senior High, 1982*).

In another case, a student was awarded \$95,000 when he lost a finger while using a saw without a guard. In this case, the teacher had removed the guard from the saw early in the semester and it had remained off (*McKnight v. School District of Philadelphia, 1982*).

Equipment — saws, drill press, etc. — mentioned in previously cited cases has been what we usually associate with shop accidents. However, in one case a student was injured when a stool he was sitting on gave way. The student was awarded \$7,500 because the stool was defective. (*Castro v. Fireman's Fund Insurance Co., 1980*).

Summary

Only a few examples of accidents and ensuing court cases were cited in this article; however, it is clear that a verdict in favor of the student is very likely if negligence can be proven on the part of the teacher or the school. It is imperative that teachers teach and enforce safe work habits, supervise student work at all times, and maintain equipment and facilities in safe working order. Unfortunately, teachers may not be able to prevent all accidents, but by meeting these responsibilities, many can be prevented.

Cases of Court Record Cited

- Izard vs. Hickory Hills School Board, 315 S. E. 2d (NC Ct. App. 1984).
Scott vs. Independent School District, 256 N. E. 2d (MN Sup. Ct. 1977).
Lawrence vs. Grant Parish School Board, 409 S. 2d (LA Ct. App., 3rd Cir. 1982).
Ridge vs. Boulder Creek Union Junior-Senior High School District 140 P. 2d (CA Dist. Ct. of App. 1982).
McKnight vs. the City of Philadelphia and the School District of Philadelphia 445 A. 2d (PA Super. Ct. 1982).
Castro vs. Fireman's Fund Insurance Company 384 S. 2d (LA Ct. App. 1980).

ARTICLE

Classrooms Come of Age With National Computer Network

Approximately 4,200 students in West Virginia were recently linked to an exciting new agriculture computer education program. Fortunately, my department was among the 41 high school programs chosen to receive the service.

The national on-line system, called The Ag Ed Network, offers a comprehensive, up-to-date database of lesson plans, marketing information, and other agricultural topics. Students, adults, and instructors all stand to benefit from the availability of this microcomputer service in our vocational agriculture departments.

The Network marked the first statewide effort in the United States for bringing the electronic classroom to agriculture. The National FFA and AgriData Resources Inc., a Milwaukee-based electronic information service, worked with the West Virginia Department of Education to put the project together.

Ron Grimes, vocational agriculture program specialist with the West Virginia Department of Education, commented on the Network at orientation meetings. He sees West Virginia as "setting a precedent for other states by taking the lead in agricultural computer instruction." He said that, "Students, teachers and communities may all benefit from the vast resources within the microcomputer for agriculture."

In my high school classroom, we began using The Network in early March. Since that time, we have called up lesson plans and marketing information as well as questions for discussion on current events in agriculture. The computer has been accessed for student and adult classes and our general knowledge. Even though I have only touched the surface of what this network may do and mean in my vocational agriculture department, I am already inspired with the service.

More than 625 curriculum lessons are available. Some of the teaching modules include farm business management, taxes and accounting, farm production planning, and farm product marketing.

BY JOSEPH McDUGAL

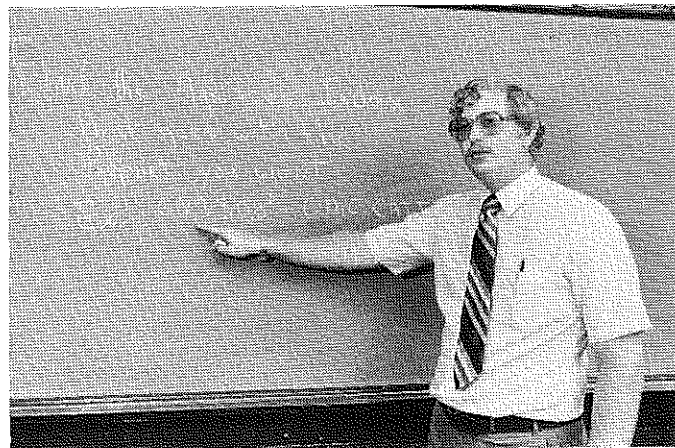
(Mr. McDougal is a Vocational Agriculture Instructor at Shady Spring High School, Shady Spring, West Virginia 25918.)

Another feature of The Ag Ed Network is access to major reporting services, including Cattle Fax, Doane's, Farm Futures, and Merrill Lynch. An Ag Ed Today portion of the service provides daily commentary and questioning on current events in agriculture. FFA news, announcements, and a catalog ordering section are also included.

Computer Options with Students

One of the most valuable services on The Ag Ed Network is the expanse of marketing information available. It is excellent in helping to explain commodity prices, market reports, trends, and predictions. Students as well as adults are often intimidated by such topics, but the system offers

(Continued on Page 14)



Students need clear directions on how to use The Ag Ed Network. (Photo courtesy of Joe McDougal).

Classrooms Come of Age With National Computer Network

(Continued from Page 13)

a visual and interesting method for showing what's happening in agriculture today. All marketing information is extremely accurate and is updated every 10 minutes.

I have called up markets from around the country to analyze and compare regional pricing for our classes. The Ag Ed Network stimulates interest among students to help them gain a better understanding of why crop and livestock prices differ among markets and fall-off at certain times of the year.

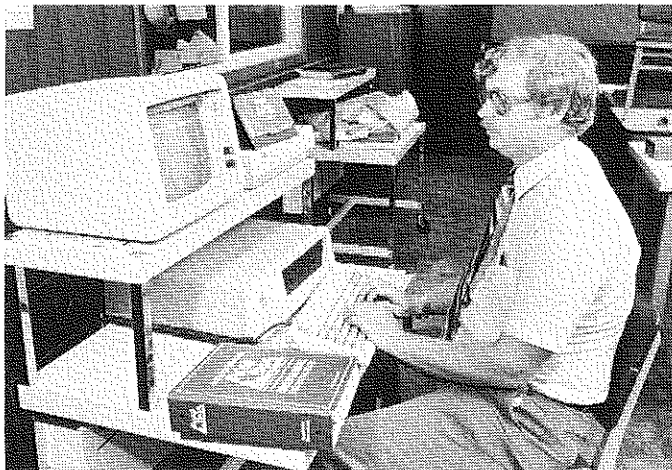
I also accessed swine, beef, and crop production lesson plans. These include a pretest, a discussion of the topic, practice problems, student tests, and answer keys. The lessons serve best as supplementary information or for simulating production programs.

The agriculture news and information portion of The Network is also beneficial for students. A daily commentary and a series of questions allow for discussion of agricultural events around the world. The topics cover most phases of agriculture and help explain how world events can affect commodity prices in our area.

Adult Computer Education

About 100 lessons on The Ag Ed Network are directed specifically toward adults. These lessons assume some prior knowledge in the specific area of interest. Some of the other AgriData services that aid the farmer are product information, daily governmental reports, weather forecasts, cash and futures prices, stock market information, and advisory services.

I've accessed AgriData information several times for the 20 to 30 adults who regularly attend our farmer meetings. In this area of West Virginia, there are a lot of part-time farmers who are realizing they must either leave agriculture or work smarter to stay afloat. Current information on regionalized marketing, transportation, and agricultural trends is helping them make educated crop and livestock decisions. The adults seem very pleased with all the reports I have used.



Teachers must practice and plan how to make the best use of computerized information systems such as The Ag Ed Network. (Photo courtesy of Joe McDougal).

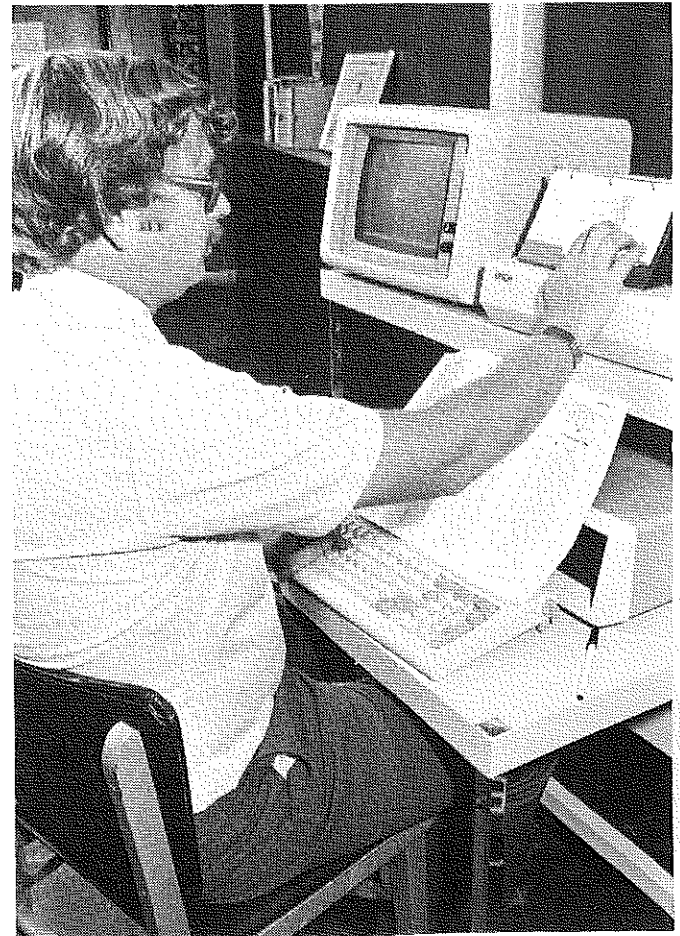
Further, an adult class on computer use in agriculture is being taught at Greenbrier East High School in Lewisburg, W. Va., by vocational agriculture instructor Harry Boone. Using The Ag Ed Network, he's teaching a 30-hour beginner's course for local farm adults. Boone instructs them on how to choose and access reports and then print-out hard copies. Most of his adult participants feel the system can serve as a real asset to their crop and livestock programs. Information on price, marketing trends, and crop and livestock hedging are the most popular.

A Look in the Future

Helping students and adults benefit from computer use in their agriculture vocations or careers is the goal of most agriculture instructors. Initially, it was difficult to comprehend the impact of a national on-line agricultural computer network, but after working with the system, we see its tremendous potential. Students generally have a positive attitude toward computer lessons.

Roger Shaver, a vocational agriculture instructor at Parkersburg South High School in Parkersburg, W. Va., feels his students are getting the training needed to qualify for better jobs. With only 10 to 12 hours of computer training, students should gain the basic skills needed to operate terminals at local agribusinesses and companies.

By attending computer classes and making more extensive use of The Ag Ed Network, vocational agriculture in-



Careful reading of both instructional manuals and on-screen directions is essential. (Photo courtesy of Joe McDougal)

structors can make better decisions concerning computers in their agricultural classroom.

Some of the choices include how to set up the system, obtaining funding, selecting programs, and whether individual or group instruction is more effective.

Summary

I am planning to supplement textbook instruction further as we continue our use of the computer next year. This may include both group and individual lessons depending on costs involved. Our microcomputer is being funded

through our county government during 1986. Other means for covering future costs are through local business sponsorship, FFA fund raisers, departmental budgeting, or grants.

By implementing The Ag Ed Network, the West Virginia Department of Education set a precedent and laid the groundwork for improved, modernized agricultural education. And by building on this foundation, students, adults, and instructors will stand to benefit from better preparation in order to face today's challenging agricultural environment.

THEME

Staying Current in the Classroom and Laboratory: What the Universities Are Doing

UNIVERSITY OF ARIZONA

Floyd McCormick
Professor and Head

Two recently developed and implemented efforts designed to help teachers stay current in the classroom and laboratory are in use in Arizona. The two efforts described here are above and beyond the "normal" graduate and inservice education. One such effort is a "field-oriented graduate program." This new effort is designed in such a manner as to provide teachers who are on the job with the opportunity to meet their need for graduate work beyond the bachelor's degree. The field-oriented graduate program incorporates professional content in the areas of: program planning, research, program evaluation, entrepreneurship, competency-based instruction, and adult education. In addition, participants are afforded the opportunity to complete industry-related internships and field-based problems for graduate credit.

In order to accommodate the schedules of teachers enrolled from various sections of the state of Arizona, the field-oriented program incorporates both on-campus and off-campus activities.

A second effort is a series of mini-workshops on topics appropriate to the needs of vocational agriculture teachers. The workshops are offered

during October, Christmas Break, May, and during the summer. Some of the workshops are held on a regional basis, i.e., northern Arizona/southern Arizona. Many involve eight hours or less of instructional time and, thus, can be completed in one day.

UNIVERSITY OF ARKANSAS

Nolan Arthur
Department Head

Staying current is a constant challenge and a vital component of any program at any level. This challenge demands team work and cooperation from all phases of our industry and educational systems. To meet this need and provide a service to the high school vocational agriculture teachers of our state, the Department of Agricultural and Extension Education at the University of Arkansas-Fayetteville:

1) works closely with the State Department of Vocational Agriculture and the Arkansas Vocational Agriculture Teachers Association to determine and provide inservice activities designed to update skills and knowledge.

2) surveys all vocational agriculture teachers annually to determine their priorities for inservice.

3) works in conjunction with the State Department in planning, providing for, and teaching a one-week annual summer inservice program for vocational agriculture teachers.

COMPILED BY GARY E. MOORE,
THEME EDITOR

(Dr. Moore is Professor in the Department of Agricultural, Extension and International Education at Louisiana State University, Baton Rouge, Louisiana 70803.)

4) hosts a one-week on campus summer workshop for vocational agriculture teachers utilizing faculty and facilities of all departments within the college.

5) plans, organizes, and conducts a one-week summer tour on an annual basis. Last year, for example, the tour was oriented to beef cattle production. Teachers were able to visit commercial and purebred operations, stocker programs, commercial feedlots, and slaughter operations.

6) coordinates with the Division of Continuing Education three off campus graduate level courses each semester. The need for these courses is determined by our vocational agriculture instructors and county Extension agents. They are taught by appropriate faculty from the various departments in agriculture at the University of Arkansas. Last semester these included: Pasture and Forage Crop Management, Advanced Livestock Production, and

(Continued on Page 16)

Staying Current in the Classroom and Laboratory: What the Universities Are Doing

(Continued from Page 15)

Microcomputer Applications in Agriculture.

The utilization of faculty from all departments within the college, representatives from industry, producers and farmers, and selected high school vocational agriculture teachers as instructors for various areas allows for practical, relevant programs.

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

Joe Sabol
Professor and Head

"Standing still is falling behind" so we developed a first year teacher course to provide encouragement as well as continue a pattern of professional growth for new teachers. We also coordinate the statewide inservice activity for both secondary and community college teachers. Special features of these two professional development programs include individualized on site attention to teachers in need.

Another unique program is a Leadership Institute especially designed to sharpen the communication, planning, and management competencies of the participants. Only 50 people were admitted this year to join the three year program which culminates with a "legislative experience" in the State Capital where participants meet with decision makers, lobbyists, and fellow agricultural legislators.

We also co-host the Annual Conference for Teachers which includes a unique balance of professional and technical inservice. Teachers have the opportunity to stay in San Luis Obispo for two more weeks and continue to sharpen their skills and knowledge with university coursework designed specifically for them. We do our best to keep teachers from standing still and from falling behind!

CALIFORNIA STATE POLYTECHNIC UNIVERSITY

David C. Whaley, Chairman

The Agricultural Science program at California State Polytechnic Univer-

sity, Pomona, addresses in three major ways the needs of agriculture teachers in Southern California for remaining current:

1. The department sponsors a skills development week during each summer. Teachers develop new skills or refine and update old ones while earning university credit.

2. Appropriate graduate level courses are offered for teachers during the late afternoons and early evenings. This scheduling provides full time teachers with the opportunity of pursuing additional coursework in a variety of applicable areas.

3. The staff regularly attends sectional, regional, and state vocational agriculture meetings in order to present workshops or to update teachers on university activities.

UNIVERSITY OF CONNECTICUT

Alfred J. Mannebach
Professor of Education

In addition to providing graduate courses for practicing vocational agriculture teachers, the University of Connecticut Agricultural Education Program has worked cooperatively with the Connecticut State Department of Education and the Marine Advisory Service to develop a vocational aquaculture curriculum. The natural resources teachers are being involved in a cooperative curriculum development effort to integrate vocational aquaculture into the natural resources curriculum.

CORNELL UNIVERSITY

Arthur L. Berkey
Professor and Coordinator

Inservice for New York teachers of agriculture is provided by the College of Agriculture and Life Sciences at Cornell University via courses, internships, and curriculum materials. The agricultural education staff teach courses on methods, curriculum, evaluation, SOE, and FFA as well as coordinating course offerings by technical departments. Offerings are based on a needs assessment by a statewide inservice committee of agriculture teachers. The courses may be used as credit toward the master's degree requirement for permanent certification. Opportunities for competency based educational internships in business and industry are also offered.

Information on non-credit offerings by business and industry is distributed via teacher newsletters.

Curriculum materials for teachers of agriculture are identified/developed by the Cornell Instructional Materials Service (IMS) based on a needs assessment survey of teachers. The IMS carries approximately 500 items which vary depending upon teacher needs. Cooperation with curriculum materials centers in other states provides for reasonably priced materials.

UNIVERSITY OF DELAWARE

R. Dean Shippy
Associate Professor

During the past year, several activities have been utilized to keep Delaware's vocational agriculture teachers current. First of all, a quarterly newsletter is published as a cooperative project of the University and the State Department of Public Instruction. Each issue contains 15 or 20 brief articles on the latest teaching materials and techniques, highlights of agricultural research, and a calendar of local and state professional meetings.

Another major activity is a week-long summer conference for all vocational agriculture teachers in the state. The typical summer conference agenda includes presentations by representatives from agribusiness firms, Extension personnel, university professors, and Department of Public Instruction personnel.

A pilot project to demonstrate methods of implementing Supervised Occupational Experience Programs was conducted last year. One vocational agriculture department in each county was selected to send its teachers to a special conference to develop record books, promotional materials, and related materials in SOEP operation. From this pilot program, additional schools were encouraged to emphasize SOEP as a result of a one-half day workshop presented at the Annual Agriculture Teacher Conference last June.

A key communication activity is our regular (every 6 to 8 weeks) DVATA meetings where teachers are updated on the latest information on State FFA Contests, statewide fund raising programs, reports on research conducted at the University, and federal and state funding opportunities for vocational agriculture departments.

For a small state, Delaware is very busy keeping its teachers of vocational agriculture current as they face the challenge of the 1980s.

UNIVERSITY OF GEORGIA

M.J. Iverson
Department Head

A service The University of Georgia offers vocational agriculture teachers in their quest to stay current is to encourage and help them to earn graduate degrees. We also provide numerous inservice workshops/clinics for teachers in such widely varied topics as computer use, forestry, live-stock production, agricultural mechanics skills, and advanced economics. Topics to be offered through inservice workshops are determined through surveys of the teachers and in close cooperation with the state supervisory staff.

Our faculty meets twice a year for three-day planning conferences with the state supervisory staff. These meetings allow comprehensive program review and identification of areas for inservice clinics. Our department conducts up to seven inservice clinics each year — usually during the summer — for the teachers in Georgia. We are able to coordinate and utilize, for each clinic, the extensive expertise and facilities of the Georgia Cooperative Extension Service. Other services rendered include: a departmental newsletter which includes upcoming events and opportunities for technical and professional updating, consultation assistance on an as-needed basis, and service as liaison between the teachers and various state specialists (Cooperative Extension Service, College of Agriculture, etc.).

UNIVERSITY OF HAWAII

Dale E. Thompson
Assistant Professor

Classes in ornamental horticulture and agriculture technology can be taken for science credit in the public schools of Hawaii. This allows vocational agriculture to become one of the choices of courses required for high school graduation.

The College of Education at the University of Hawaii is currently developing a vocational agriculture/science laboratory manual in cooperation with the Hawaii Department of Education. This manual will contain activities that integrate science and vocational agriculture. The activities are presented as scientific experiments.

SOUTHERN ILLINOIS UNIVERSITY

Jim Legacy
Professor and Chairperson

The Agricultural Education program at Southern Illinois University - Carbondale is developing new FFA contests as a means of assisting local vocational agriculture programs to stay current. Two new contests have been developed on campus. Once developed, teams of 3 to 5 agricultural education students travel to the contest site to conduct the event.

The two contests are the (1) Communications and (2) Computer contests. The communications contest features nine categories such as TV/Video and Radio broadcast which are critiqued by professional agricultural communicators. The Computer contest is held for both high school and community college students. It features four categories of computer skills such as understanding computer terms and

creation of an electronic spreadsheet template.

The pre-contest materials which are distributed to each high school or college teacher provide a source of current teaching materials. The team of agricultural education students provides the local teacher with assistance in evaluating the results of new and current agricultural information. The results of this program are 1) our agricultural education students are learning about teaching and 2) local teachers are learning new and current agricultural information.

UNIVERSITY OF ILLINOIS

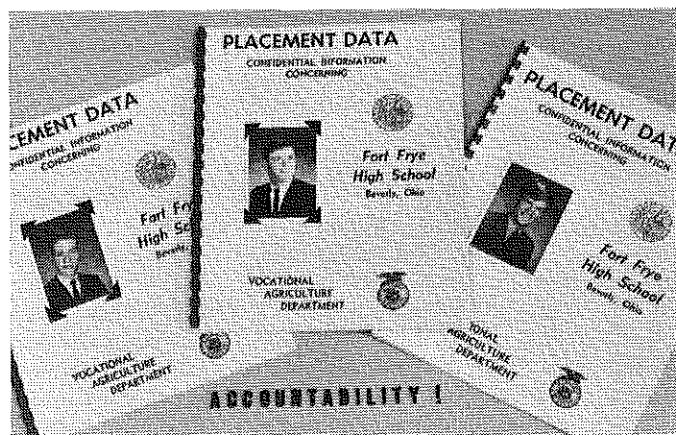
Dale A. Law
Vocational Agriculture Service

The Production Agriculture Release Packet service has been available to Illinois and out-of-state vocational agriculture teachers for several years and is sponsored by Vocational Agriculture Service (VAS) of the College of Agriculture at the University of Illinois. This service consists of a series of packets assembled monthly, October through April, containing new and revised publications in production agriculture and agribusiness. Subscribers automatically receive a copy of each new circular, most new bulletins, various newsletters, and releases from departments of the College of Agriculture, proceedings of conferences, seminars, and field days, and each new printed publication from VAS. Appropriate and relevant materials are also included from the state and federal departments of agriculture and from out-of-state universities. Many of these items are provided free while others are distributed at cost.

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A group of Alabama teachers enrolled in an off-campus graduate class (Photo courtesy of Gary E. Moore).



Placement of students is easier if instructional programs in the classroom and laboratory are current (Photo courtesy of Gary E. Moore).

Staying Current in the Classroom and Laboratory: What the Universities Are Doing

(Continued from Page 17)

This service has proven to be popular with teachers because it is an easy, efficient, and effective way to stay current with the latest available information in agriculture. Also included with each packet are a reference sheet and a set of 3" x 5" cards indexed according to the 73 categories used in the VAS filing system.

IOWA STATE UNIVERSITY

David L. Williams
Professor and Head

The three or four technical update activities conducted each year for Iowa vocational agriculture teachers focus on both "what to teach" and "how to teach", and commonly feature a partnership arrangement with industry, Extension, and/or academic departments at Iowa State University. Summarized below are some of the recent activities conducted in Iowa to keep teachers current in the classroom and laboratory.

Livestock Marketing. These district drive-in workshops (5:00 p.m. - 9:00 p.m.) were held at four locations. Teachers were encouraged to invite a livestock buyer, commodity broker, Extension person, banker, or livestock producer to attend the workshop with them. The Chicago Mercantile Exchange cooperated by providing a resource person and materials for the workshops. Topics covered included (1) basis of futures trading and hedging, (2) basics of livestock marketing, and (3) hedging using options.

Livestock Diseases and Parasites. In cooperation with the College of Veterinary Medicine, this one-day workshop was held on the Iowa State University campus. In addition to formal instruction on the topics, teachers were supplied with a filmstrip, manual, and computer programs they could use in their local instructional programs.

Crop Production Computer-Assisted Instruction. Five district workshops (4:00 p.m. - 9:00 p.m.) were conducted to assist teachers in using VisiCalc and BASIC in teaching crop production. Hands-on experience on the use of pro-

grams disseminated through the workshops was provided to the teachers.

Fruit and Vegetable Production and Market. The Iowa State University Horticulture Farm was the site for this one-day inservice workshop. Teaching and technical materials for fruits and vegetables commonly grown in Iowa were disseminated to teachers. Extension specialists and researchers provided firsthand information to the teachers.

Agribusiness Management. A partnership arrangement with Deere and Company facilitated these workshops (5:00 p.m. - 9:00 p.m.) at five district locations. The new book entitled *FARM AND RANCH BUSINESS MANAGEMENT* was disseminated and instruction was provided on ways and means to teach the management principles included in the book.

Corn Production and Marketing. *THE NATIONAL CORN HANDBOOK* was the basic resource used for this one-day teacher inservice education workshop held on the Iowa State University campus. Extension Agronomists and Economists assisted with this technical update activity.

Agribusiness Computer-Assisted Instruction. Inservice workshops (5:00 p.m. - 9:00 p.m.) held at five district sites provided computer programs and instruction to teachers on decision-making in a simulated feed and seed business and on using the microcomputer to access agricultural databases.

UNIVERSITY OF SOUTHWESTERN LOUISIANA

David Drueckhammer
Assistant Professor

Microcomputers for record keeping, advancements in beef cattle production, no-till farming, landscape planning, the production of peppers as a commercial crop, and organization of agricultural mechanics laboratories were some of the subjects covered in a course last summer provided for vocational agriculture teachers. Our department has offered a course for teachers the past several summers covering topics that are determined by a survey of the teachers. Teachers receive three semester hours of graduate credit for successful completion of the course. The course has always had a high level of interest along with a large enrollment and has proved to be productive

as well as helpful for both teachers and our department.

LOUISIANA STATE UNIVERSITY

Joe Kotlik
Associate Professor

The faculty were involved in six major activities during the 1985-86 year which were designed to keep teachers current. The activities were:

1. Visited and assisted first year teachers.
2. Took graduate courses off campus.
3. Conducted a summer traveling seminar to observe exemplary vocational agriculture programs in five states.
4. Assisted the state department in conducting workshops for vocational agriculture teachers.
6. Published a state-wide newsletter for vocational agriculture teachers. These activities will be continued in the future.

UNIVERSITY OF MARYLAND

Clifford L. Nelson
Professor and Chairman

The University of Maryland-College Park uses a series of techniques to assure that teachers stay current in the classroom and laboratory. A central focus is the early career teachers' course that is offered to new and returning teachers with less than 5 years of experience. The class is offered in the departments of the participants. University educators make special helping visits to individual teachers.

In conjunction with the Maryland State Department of Education, the annual teachers' conference has been extended to include special updating short courses on various agricultural classroom and laboratory topics. The curriculum materials center systematically circulates lists of the latest teaching materials and references to the teachers. The university assists the State Specialist in Agriculture in compiling of the statewide newsletter, *THE VO-AG NEWS*, which features book reviews and articles to update teachers on classroom and laboratory techniques.

UNIVERSITY OF MINNESOTA

Edgar Persons
Professor and Head

Two changes in our approach to inservice teacher education show promise of good pay-off. There has been an increase in the number of short, intensive courses offered to teachers. Specialized topics offered in one credit units have met with favor. Topics range from technical updating to pedagogical skills.

Most of the inservice courses are offered in locations convenient to teachers both during the academic year and the summer session. Special funding arrangements with the state educational agencies provide for the added costs of this type of delivery.

During the last year, about 300 of the state's 450 teachers enrolled in one of the inservice courses offered through these mechanisms or through the regular on-campus instructional program.

MURRAY STATE UNIVERSITY

Lloyd Jacks
Professor and Head

Special Needs Project: Student teachers, graduate students, and teachers participate in two seminar workshops to improve their knowledge/skills in teaching disadvantaged and handicapped students. Area teachers, state staff, and other resource personnel provide meaningful programs during a 6-9 p.m. dinner program each fall and spring semester. Funding of the project is supported through a small grant from the Kentucky Department of Education.

UNIVERSITY OF NEW HAMPSHIRE

David L. Howell
Associate Professor

Keeping a vocational agriculture curriculum in tune with employer needs for skilled workers is a major challenge in most high schools. The University of New Hampshire's Department of Vocational-Technical and Adult Education is assisting the staff at Coe-Brown Academy to meet this goal. With local support and funding, the vocational agriculture teachers, Bruce Farr and Paul Davis, are bringing together 12 to 15 vocational agriculture teachers for two intensive days to examine three specific program

areas. The University will serve as a resource and facilitator to assist with this project.

Participants will bring resources they are currently using as well as suggestions of the most successful activities used in teaching specific lessons. Agribusiness representatives will identify the skills needed for entry level positions in their business in New Hampshire. Lists of skills to be included in the curriculum will then be generated by the vocational agriculture teachers using the input of the agribusiness people and other available resources. A course of study, lesson plans, and a listing of resources will be developed by the teachers working in small groups and assisted by the university faculty and the state department. These materials will be duplicated and distributed to each participating school.

THE OHIO STATE UNIVERSITY

J. Robert Warmbrod
Professor and Chairman

The Department of Agricultural Education offers one to three week graduate courses designed specifically for teachers of vocational agriculture during the summer on-campus. Concurrently, graduate-level courses in technical agriculture are offered by other departments in the College of Agriculture. During the school year, graduate courses in agricultural education are offered off-campus for teachers. In 1986, the Department and College will initiate a TV link to offer simultaneously courses taught on campus and off campus.

Noncredit instruction in technical agriculture is delivered also through a two-day Technical Update for Teachers of Vocational Agriculture offered by the College of Agriculture. Planning the Technical Update is coordinated by the Department of Agricultural Education. All subject-matter departments in the College of Agriculture offer a series of workshops responding to an annual needs assessment of teachers. Faculty members in agricultural education conduct noncredit workshops in professional areas upon the request of groups of teachers, with workshops held both on and off campus.

A systematic inservice program for new and returning teachers is conducted each year. Teachers may elect to enroll for graduate credit.

OKLAHOMA STATE UNIVERSITY

Robert Terry
Professor and Head

The Oklahoma State University program of inservice education for vocational agriculture teachers is structured around a number of components which are intended to meet the technical update and/or professional improvement needs of an optimum number of teachers.

Two elements of the program are oriented specifically to first-year teachers. One of these is legislatively mandated and is a formalized year-long program of observations, written assessments, and committee meetings. These are conducted by a team consisting of a local administrator, a consulting teacher, and an Agricultural Education faculty member. Through this program each teacher receives considerable on-site, personalized aid in dealing with the demands of that critical first year in the profession. This effort is complemented by the long-standing New Teacher Inservice Program which, too, is a year-long series focusing upon assisting new teachers developing and/or honing basic program management skills. The unique features of this program are that most sessions are held in the field at locations convenient to participants and most of the skills training is conducted by experienced "master" teachers willing to share their expertise with their younger peers.

All teachers are expected to participate in the Annual Vo-Ag Summer Conference which follows an inservice training format with teachers playing a key role in structuring the content. This is accomplished in a spring planning session involving teachers, supervisors, and teacher educators. After sessions are planned, teachers are instrumental in arranging for facilities and resource personnel, most of whom are OSU College of Agriculture faculty. At the conference, teachers can enroll for one hour of credit, earned by participating in the "Special Interest Sessions" and by completing a follow-up outside assignment. Later in the summer, the OVATA hosts all the resource people at an appreciation cookout.

Each Fall and Spring term, the OSU Agricultural Education Department of-

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fers several courses scheduled in late afternoons or evenings to permit teachers to commute to the campus at the end of their school day. Summer courses are set-up in two or three week "blocks" which allow teachers to complete one or more courses during a Professional Improvement Leave taken in lieu of vacation.

OREGON STATE UNIVERSITY

Lee Cole
Department Head

By the time you have read the way several other institutions keep their teachers current, you may be ready for a new challenge. OSU uses instruction by example in the classroom and laboratory setting as many other institutions do for inservice to teachers. However, the one thing which I have noticed after ten years in the teacher inservice business is that teachers usually take additional inservice coursework in their areas of strength — not their areas of weakness. By selecting inservice courses in their areas of strength, teachers defeat the prime purpose of inservice education.

No one is foolish enough to believe that teachers can learn all they will ever need to know about agriculture in a four or five year teacher preparation program. The teacher should be continuously involved with professional and technical updating. To be most effective, the areas within which a teacher should get professional and technical update are those areas which are weak and need strengthening. Taking inservice coursework in their strength areas will add refinement to the current expertise a teacher has, but let us put priority on building expertise where there is none. I challenge teachers of vocational agriculture to elect inservice courses in their areas of weakness and seek to gain a balance in technical and professional skill.

PENNSYLVANIA STATE UNIVERSITY

Micheal G. Rush
Assistant Professor

Pennsylvania State University has an active outreach program involving a traditional mixture of credit and non-credit courses and workshops that provides both pedagogical and technological education. The Department of Agricultural Extension Education currently has three major thrusts to provide technological updates to teachers: Beginning teacher workshops; SOE computerized records system workshops; and high technology workshops in agriculture. The beginning teacher workshops target hands-on skills identified as needed by our first and second year teachers. These workshops are offered three times a year on Fridays and Saturdays. The first workshop focused on animal competencies. Others have covered machinery adjustment and sprayers.

The SOE computerized production records system workshops were offered in 12 centers throughout the state to update teachers. The new records system consists of a record program disk and a compatible production record book developed by Don Mince-moyer and William Williams. The computerized part of the record allows entry of income and expenses for multiple enterprises as well as budget, income tax categories, and various other reports.

The final thrust, high technology workshops in agriculture, has been funded as a special project through the State Department the past two years. Last year, a series of meetings were held throughout the state on infrared forage analysis, Chesapeake Bay cleanup, and agricultural applications of remote sensing by satellite. This year 60 teachers were involved in a two day, hands-on workshop covering embryo transfer, computer feeding, heifer management, and continuous no-till management. Teachers were actually involved in flushing reproductive tracts and on-farm activities. A resource notebook was also provided.

SOUTHERN UNIVERSITY

Ledell D. Virdure
Professor and Head

Here at Southern University in the Department of Vocational Education, we sponsor weekly seminars, annual

conferences, and workshops for pre-service and inservice teachers. We invite speakers, consultants, instructors, lecturers, and other agricultural personnel from the state and federal government as well as other state universities to speak. These persons bring to Southern University a very rich background of current information that we are using to "stay current."

For example, the preservice and inservice teachers' conferences/workshops focused on the following problems.

1) Identifying approaches and new strategies to use in teaching agriculture in the classroom.

2) Identifying approaches and new strategies to make use of agricultural agencies in the community (Cooperative Extension, Farmers' Home Administration, Soil Conservation Service, Production Marketing Association, etc.).

3) Identifying ways and means of marketing agriculture in order for people to be successful in rural and urban communities.

4) The use of the computer as an instructional and management tool in vocational agriculture.

S.F. AUSTIN STATE UNIVERSITY

Steve Woodley
Assistant Professor

Research was conducted to aid in determining inservice needs of vocational agriculture teachers in the area of agricultural mechanics. From the findings, three workshops for the summer of 1985 were planned and conducted.

Industry personnel were utilized to conduct two workshops: "Basic Hydraulic System Service, Maintenance and Troubleshooting" (John Deere Training Center Technical Staff, Dallas) and "Electrical Controls and Sensing Devices" (Sponsored by Texas Power and Light). The third workshop, "Preparing Shop Projects for FFA Agricultural Mechanic Project Shows," was conducted by the agricultural education staff and vocational agriculture teachers recognized for their expertise and innovations in preparing shop projects. These workshops were very successful in terms of attendance, teacher evaluation, and staff evaluations.

UNIVERSITY OF TENNESSEE - KNOXVILLE

John D. Todd
Associate Professor and Chairman

Keeping current in the field of agriculture is an important responsibility of vocational agriculture teachers. To assist with this task the University of Tennessee offers or sponsors numerous workshops for the teachers. Most of the vocational agriculture teachers are employed on an extended contract for the summer months and can utilize at least 10 days of their time participating in workshops. The workshops usually extend for five days, even though a few are conducted for a shorter period of time. Approximately 75 percent of the teachers avail themselves of at least one workshop during the summer.

During the past five years the following workshops have been conducted: agricultural business management, using credit in agriculture, livestock management, fruit and vegetable production, field crop production, live carcass and meat evaluation, using computers in agriculture, arc and gas welding, agricultural mechanics skills, and using solar energy in agriculture. These workshops are taught by specialists in their respective fields. These persons are employed by the Agricultural Extension Service, the Tennessee Valley Authority, or in industry directly related to the technical area. Sometimes vocational agriculture teachers, distinguished in the area of study, have been used as instructors or resource persons.

UNIVERSITY OF TENNESSEE - MARTIN

LeeRoy W. Kiesling
Professor and Chairman

One or two week workshops are offered each summer for vocational agriculture teachers at The University of Tennessee at Martin. The subject matter covered during these workshops by university professors in the School of Agriculture or by outside experts in a given field is based upon the expressed needs of the teachers as determined through surveys.

Usually these workshops are funded by the State Department of Vocational-Technical Education. If these funds are not available, the participants will then have to enroll in the workshop for credit and pay the requested fees.

MIDDLE TENNESSEE STATE UNIVERSITY

Cliff Ricketts
Assistant Professor

Relevancy in education is the goal for all in a teacher education program. The process for the vocational agriculture teachers at Middle Tennessee is a continuing process. It begins at the freshman level in college and continues throughout their career. The students are required to have 10 contact hours as a teacher's aid in the first teacher education class, Education as a Profession. The agricultural education students tutor high school students for 12 contact hours as a requisite for their Educational Psychology class. At the junior level, students teach a unit in a vocational agriculture classroom. This is a pre-student teaching instructional experience which is a requirement for the Methods of Teaching Vocational Agriculture class. Of course, each student also student teaches for 10 weeks during the senior year.

Two weeks of inservice education are allowed for all vocational agriculture teachers as part of their summer employment. Each summer two workshops are offered. The content for the workshops is determined at a meeting of teachers, teacher educators, and State Department of Education Supervisors. The goal in these workshops is to keep the teachers current in the area of greatest need. Last summer, a microcomputer applications in agriculture workshop and a goose-neck and farm trailer workshop were conducted. This summer a keeping farm records on computers and a tractor overhaul workshop will be conducted. During the year, a series of small group meetings are also conducted for the vocational agriculture teachers.

TEXAS A&I UNIVERSITY

Eugene Jekel
Professor and Head

Each summer several non-credit inservice education workshops are offered for vocational agriculture teachers through the coordination of our Agricultural Education program. Usually these will include two full days of refresher-type activities held on the ATI campus or at an off campus location. To conserve travel expenses, some of these have been scheduled "back-to-back" so that a teacher may

attend two different workshops during one trip away from his/her school.

The agricultural mechanics program teaches credit courses in agricultural education and agricultural mechanics off-campus one night each week during the long terms. Two-week courses are offered during the summer months off campus.

A two-week credit course in conservation is offered on campus each summer. In most cases, the hometown Soil Conservation Districts pay the tuition costs for the teachers. This course is taught by on-the-job professional people and includes several field trips.

TEXAS TECH UNIVERSITY

Curtis E. Paulson
Assistant Professor

Texas Tech University is currently involved in several areas of vocational agriculture research designed to help practicing teachers keep current with state of the art information and technology that can be used in the classroom and laboratory. The results of this research will be disseminated to teachers through workshops, state meetings, and research publications.

We are developing computer/video interactive software for plant science, animal science, and agricultural mechanics. Each year we sponsor a summer agricultural mechanics workshop. During this three week workshop, teachers have the opportunity to update their agricultural mechanics skills for personal gain or state certification.

VIRGINIA POLYTECHNIC INSTITUTE

Stanley R. Burke
Assistant Professor

Virginia is currently involved in two activities to assist teachers in better managing the vocational laboratories in which they teach. A series of power equipment maintenance workshops are being conducted during the summers of 1985 and 1986. Because liability suits are being litigated against some teachers of agriculture, safety materials used in mechanics instruction are being revised.

Workshops are being conducted throughout the state. Specific pieces of power equipment are earmarked for maintenance instruction in the agricultural mechanics laboratory with the

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intention of enhancing teacher confidence and skill to perform these important functions. Each workshop is conducted in two schools; one day is spent on the equipment in each of the departments. Teachers are rotated during the two day period to maximize experience and exposure to each piece of power equipment. The workshop emphasizes maintenance procedures and performing these procedures in a real setting. As an outgrowth of these workshops, teachers are encouraged to include selected maintenance procedures as a part of their mechanics curriculum; thereby, involving students in an important learning activity and at the same time, assisting the

teacher to keep power equipment in top operating condition for instructional purposes.

Responding to teacher and supervisor concern for improved safety instruction, Virginia is currently revising the materials which it will recommend for teacher use in teaching safety in agricultural mechanics. The new materials will incorporate legal recommendations as well as operating and safety practices set forth by equipment and tool manufacturers. The new materials will focus upon tool nomenclature, recommended operating procedures and safety practices, written tests, and performance tests. Materials will be disseminated via inservice workshops after development is completed.

WEST VIRGINIA UNIVERSITY

Layle D. Lawrence
Professor and Chairman

Our vocational agriculture teachers are periodically surveyed to determine

needs and interests. Survey results and observations of the Joint Staff (teacher educators and state supervisors) are translated into courses and workshops in technical subject matter and pedagogy. Joint decisions are also reached as to appropriate dates and locations for offerings.

For the past several years, inservice efforts have been concentrated in agricultural mechanics, computer applications, and advanced teaching methods. Dr. Marion Kimmons has offered three or four off-campus workshops in various areas of agricultural mechanics each year. Ron Grimes, vocational agriculture program specialist, has conducted a number of workshops in beginning and advanced computer applications in vocational agriculture. Faculty in agricultural education coordinate workshops and offer courses in pedagogy and curriculum development. Future offerings will include workshops in recordkeeping, audiovisual aids, forestry, and landscaping.

BOOK REVIEW

UPGRADING WASTES FOR FEEDS AND FOOD by D.A. Ledward, A.J. Taylor and R.A. Lawrie, Woburn, MA: Butterworth Publishers, 1983. 321 pp., \$69.95.

UPGRADING WASTES FOR FEEDS AND FOOD is a compilation of research reported at the 36th Easter School in Agricultural Science Symposium: University of Nottingham. The 20 chapters were contributed by international experts in fields related to foods and nutrient usage. The book's content is organized into five divisions: Sources, Recovery of Food Waste, Manipulation and Modification of Food Waste, Utilization, and Conclusions.

The Sources section contains two chapters and addresses the world food outlook and implications of increasing world population. Food waste is discussed (European perspective) as a viable component of human diets as the finite resources of land and water begin to limit conventional human food supplies.

Recovery of Food Waste is a section which concentrates on modern food processing. Chapters three through six discuss recovery of food nutrients from the by-products of food processing industries, and chapter seven deals specifically with new technology for mechanical meat recovery.

Manipulation and Modification of Food Waste is detailed in chapters eight through twelve. Chapter eight describes the practice of silage production from fish by-products for recycling as fish feed. Enzymes and microbial agents as treatments for upgrading food by-products are topics of chapters nine and ten. Chapter eleven concentrates on production of worm protein for animal feeds utilizing processing by-products, and chapters twelve and thirteen respectively discuss texturization of recovered proteins and conversion of bone to edible products.

Utilization of waste materials is discussed in chapters fourteen through

seventeen including such uses as additives to meat, meat products, beverages, and heat processed foods. Additional suggested uses include feeds for livestock and pets.

The Conclusions Section discusses nutritional and health implications and economic considerations of wastes for feeds and food.

The audience to which this book is directed is the scientific community. The content is of a technical nature, yet the book is useful to the non-scientist who is interested in new technology and the human food supply. The predominant use of this book should be as a reference for senior college level teaching and research activities.

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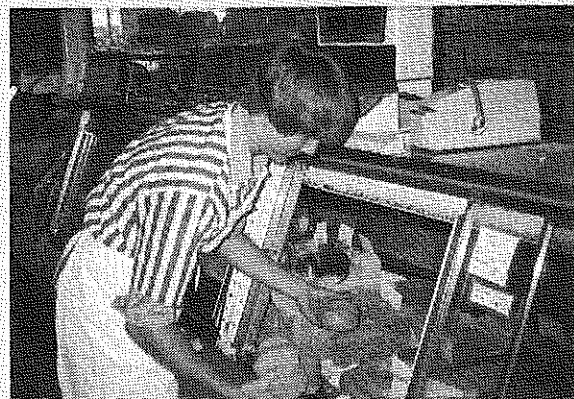
1987 Themes

Please contact the theme editors if you have an article or materials to contribute.

ISSUE AND THEME	DATE DUE	THEME EDITOR
JANUARY Balancing Your Professional and Personal Life	September 12, 1986	Dr. L.H. Newcomb 208 Agr. Admin. Bldg. 2120 Fyffe Road The Ohio State University Columbus, OH 43210-1099
FEBRUARY Smith-Hughes at 70	October 10, 1986	Dr. John Hillison Agricultural Education Virginia Polytechnic Institute Blacksburg, VA 24061
MARCH Agriculture in a Global Perspective	November 14, 1986	Dr. Eddie A. Moore Agricultural & Extension Education 410 Agriculture Hall Michigan State University East Lansing, MI 48824-1039
APRIL Women in Agricultural Education	December 12, 1986	Dr. Joy Cantrell Agricultural & Extension Education Armsby Building The Pennsylvania State University University Park, PA 16802
MAY Teaching the Basics	January 9, 1987	Dr. Terry Heiman Director, Agricultural Education Elementary & Secondary Education State Dept. of Education Jefferson Building - Box 480 Jefferson City, MO 65102
JUNE Agricultural Education in the Political Process	February 13, 1987	Mr. Woody Cox, Director National FFA Alumni Association P.O. Box 15058 Alexandria, VA 22309
JULY Coping with Declining Enrollments	March 13, 1987	Mr. Wayne A. Nattress, Consultant Vocational Agriculture State Department of Public Instruction Grimes State Office Building Des Moines, IA 50319
AUGUST Agricultural Opportunities for Rural Nonfarm Students	April 10, 1987	Dr. David Howell Dept. of Vo-Tech. & Adult Ed. Pettee Hall University of New Hampshire Durham, NH 03824
SEPTEMBER Recognizing Excellence in Teaching	May 15, 1987	Dr. Paul R. Vaughn Agricultural & Extension Education Box 3501 New Mexico State University Las Cruces, NM 88003
OCTOBER The Future of Agricultural Education in Secondary Schools	June 12, 1987	Dr. J. Robert Warmbrod 208 Agr. Admin. Bldg. 2120 Fyffe Road The Ohio State University Columbus, OH 43210-1099
NOVEMBER Enhancing School and Community Relationships	July 10, 1987	Dr. Roland L. Peterson Div. of Agricultural Education 320 Vo. Tech. Building University of Minnesota St. Paul, MN 55108
DECEMBER Serving Minority Groups	August 14, 1987	Dr. Willie Rawls Agricultural Education Fort Valley State College Fort Valley, GA 31030

Stories in Pictures

The Many Faces of Classrooms and Laboratories



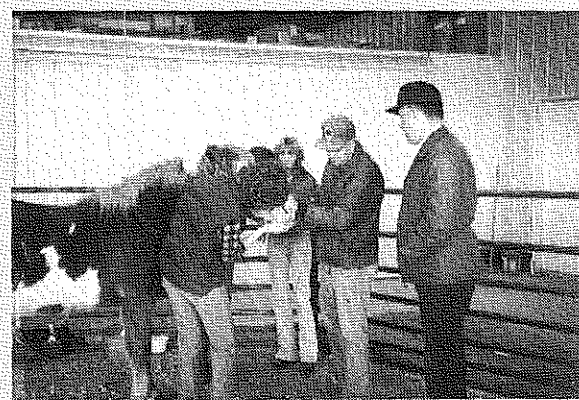
Students interested in meats processing and merchandising get experiences both in school facilities and local markets. (Photo courtesy of Don Liebelt)



Greenhouses serve a variety of purposes in vocational agriculture programs. (Photo courtesy of Don Liebelt)



Field trips and tours provide experiences not available at school facilities. (Photo courtesy of Chris Townsend)



FFA Alumni members serving as resource people in demonstration for students during study of fitting and judging horses. (Photo courtesy of Bushnell-Prairie, Illinois, FFA Alumni Affiliate)