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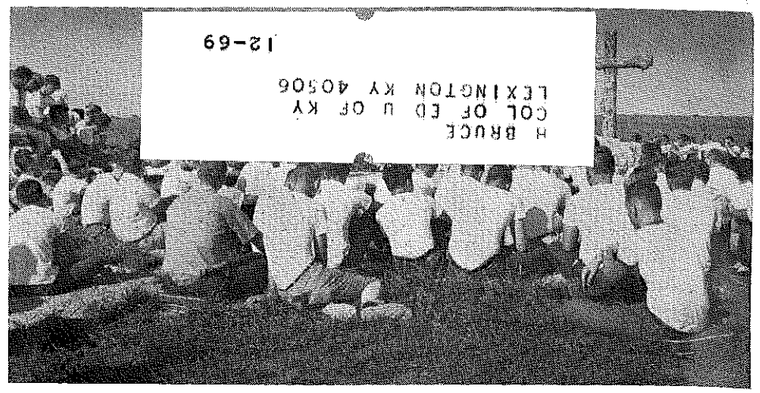
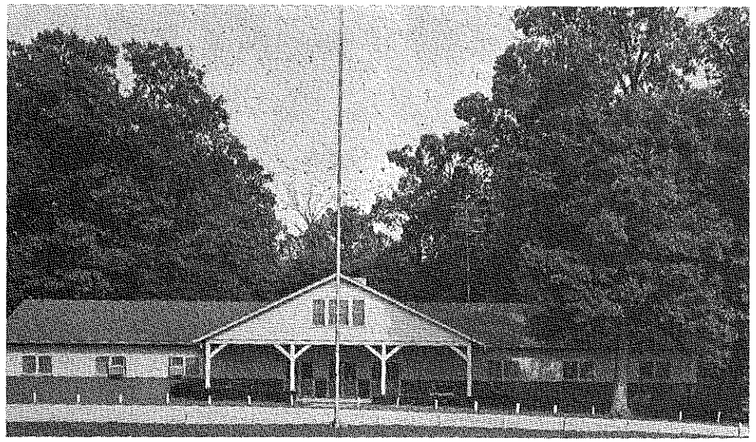
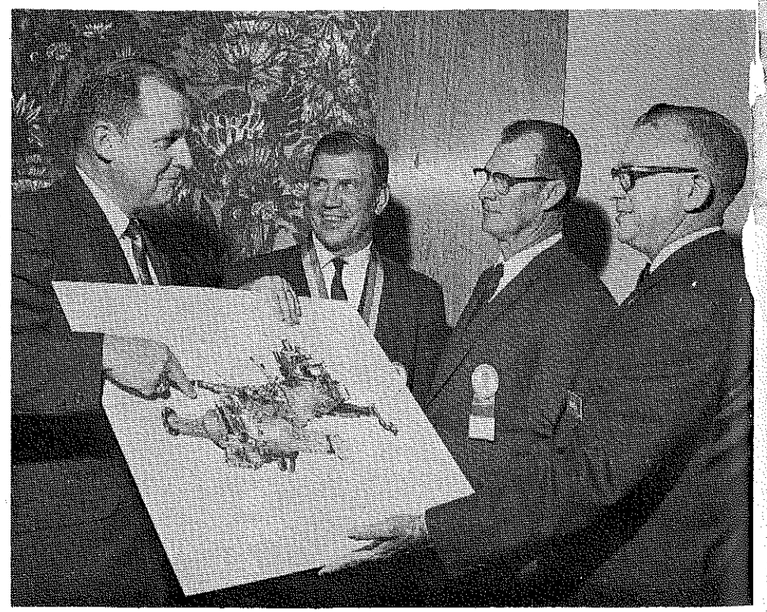


Attending leadership training camp is an important activity of FFA chapters. FFA members attending the Kansas FFA Leadership Camp participate in a vesper program. (Photo by Earl Wineinger, Kansas Board for Vocational Education)



Administration Building at the Kentucky FFA Leadership Training Center. The Leadership Training Center is used during the summer each year to train local chapter officers from approximately 125 schools in Kentucky. (Photo by James D. Maddox, Executive Secretary, Kentucky Association FFA)

Stories in Pictures



James Wall (right), Executive Secretary of the National Vocational Agricultural Teachers' Association, looks on as Blair E. Pederson explains Ford Motor Company's program of tractor power train donations to Frederick S. Warren (second from left), teacher of agriculture at Holden, Massachusetts, and Orton E. Yearty, teacher of agriculture at Havana, Florida. As 1968 recipients of the Honorary American Farmer Degree, Mr. Warren and Mr. Yearty will be able to nominate a school to receive a power train for use in classroom instruction.

AGRICULTURAL EDUCATION

Agricultural Education

Volume 41 April, 1969 Number 10

Featuring—

TEACHING — INSTRUCTIONAL MATERIALS

THE
AGricultural EDucation
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Vol. 41 April, 1969 No. 10

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EDPRESS

Editorials

From the Editor . . .

Some Myths About Problem Solving


J. Robert Warmbrod

In agricultural education we hear much about the problem-solving method of teaching. Some hail problem solving as the best approach to teaching and learning in agricultural education. Others claim that problem solving takes too much time, that it will not work with many students, or that problem solving has been used so long in agricultural education that it is time for a new approach. Are these criticisms valid? Is problem solving out of date? My position is that problem solving is grossly misunderstood and, consequently, flagrantly misused. There are several myths about problem solving that must be debunked if its potential as an approach to teaching and learning is to be realized.

Myth One: Problem solving is a "method" of teaching. Teachers who perceive problem solving as a method or technique of teaching define problem solving narrowly. Problem solving is more accurately described as an "approach to teaching and learning" which is grounded solidly in some of the basic tenets of the psychology of learning. For example, the following concepts are basic to a problem-solving approach to teaching: instruction is student-centered rather than subject-centered; instruction aims at the development of and change in behavior of individuals rather than "covering" subject matter; content is organized such that it is psychologically meaningful to students rather than in a manner that is logical to an expert; teaching and learning is a cooperative venture between the teacher and students rather than a completely teacher-dominated process; students are capable of and will share in planning, conducting, and evaluating what is taught and how it is taught; learning is an active rather than a passive process; and learning is improved when students "inquire into" (discovery or inductive approach to learning) rather than being "instructed in" subject matter.

Myth Two: Problem solving demands an inflexible sequence of activities and involves a limited number of

(Continued on next page)

Guest Editorial . . .

Don't Forget the Cart


John W. Matthews

"Don't put the cart before the horse." This old adage says something about the relative importance of different phases of a program. It deals with priorities. It assumes that one element should lead and another should follow. We might paraphrase the old adage by saying, "Don't use a horse without a cart if you want to carry a heavy load."

The horse which must come first in an instructional program is the curriculum guide, course outline, or teaching plan. These terms, although not exactly synonomous, are used here to designate materials prepared primarily with the teacher in mind. These materials include such things as objectives, problems, lead questions, ideas for organizing and conducting the unit of instruction, lists of references, and evaluative criteria. Without a good curriculum guide, instruction is aimless and likely to result in a hodgepodge of inefficient effort.

We in the Vocational Agriculture Service at the University of Illinois are convinced that unless adequate subject matter material is available to be placed in the hands of the students, the curriculum guide is a "horse without a cart." Many a fine teaching outline gathers dust because the teacher lacks quantity copies of suitable instructional material that is oriented toward the student.

All of us were exposed to one or more college courses in which the professor had a course outline with profuse notes for his own use. He sought to impart knowledge to his students by lecturing from these notes. We accused him of confusing *teaching* with *telling* and observed that only those students who could make it on their own survived. The teacher of agriculture who has a good course guide and nothing else has no alternative but to lecture to his class. This is even less effective in high school than in college.

There is a current upsurge of interest in establishing curriculum materials laboratories in various states across our nation. Some of these have received grants of federal

(Continued on next page)

John W. Matthews is Professor, Vocational Agriculture Service, College of Agriculture, University of Illinois, Urbana.

From the Editor . . .

activities or techniques, consequently, it is boring to students. A chief advantage of problem solving is its flexibility. An activity-centered curriculum is essential to the problem-solving approach. The gamut of techniques and activities appropriate to a particular situation is limited only by the teacher's creativity. Just look at some of the possibilities: laboratory and field experiments; occupational experience programs; simulation; field trips; use of resource persons; on-job instruction; films, slides, and pictures; video and audio recordings; independent study; individualized instruction; computer assisted instruction; supervised study; discussion; and in some cases even lecture. Although there must be some order to any approach to teaching, problem solving demands no inflexible sequence of events or techniques. Incidentally, what is more boring to high school students or adults than lecture every day?

Myth Three: Problem solving emphasizes supervised study in the classroom and cannot be used effectively unless there are adequate reference materials for student use. One teacher put it this way, "If there is no text available, you are done." Basic to understanding this misconception is the realization that learning is an active process. Frequently we rely solely on reference materials when other techniques, particularly laboratory and field experimentation, are more appropriate. Why do teachers frequently ignore or overlook the real thing (plants and animals) when teaching agriculture? A problem solving approach helps students see the need or reason for study which is a difficult task in some cases.

Myth Four: Students cannot or will not share in developing objectives and goals or in defining problems and questions for study. This statement should be an obvious myth to anyone who has taught high school students or adults. The simple fact of the matter is that students can and will share in a constructive manner if given ample guidance. We do not expect students to learn to weld properly without instruction, so why should we expect them to participate actively and constructively in the teaching-learning process without appropriate instruction and guidance?

Myth Five: The aim of problem solving is to answer questions. To equate the problem-solving approach to teaching with question-answering is inexcusable. Too many teachers attempt the latter under the guise of the former. In problem solving, the process of arriving at answers to questions or solutions to problems is just as important as the answers or solutions reached. Problem solving aids students in learning a systematic approach to the recognition, analysis, and solution of problems. The approach emphasizes the development of general principles through specific situations, questions, and concerns that are meaningful and of interest to students.

Any approach to teaching is no better than the skill, enthusiasm, and dedication of the teacher. Criticism of problem solving in agricultural education should be for reasons other than an inadequate understanding of its basic tenets. All of us who teach should continually strive to enhance our understanding and use of effective approaches to teaching and learning. —JRW

Guest Editorial . . .

funds; others are state supported. Some deal with agriculture only; others operate in all vocational fields. Some distribute their materials on a sales basis; others make them available to schools in the state without charge.

The emphasis in many of these new laboratories appears to be on the *course guide* type of material. Some of them are developing large volumes of materials, but all teacher-oriented. I maintain this may be a "horse without a cart."

In visiting with a teacher from another state recently, I got a strange reaction. This state has a laboratory which has produced several fine curriculum guides and has distributed them to all of the agriculture departments in that state. When asked to comment on these materials, the teacher replied, "They put them out but we don't use them."

If true, this is not necessarily the fault of the material. It may be because it is just part of an incomplete package.

Themes for Future Issues

May	***Program Planning and Curriculum Development***
June	***Public Information Programs***
July	***Policy and Policy-Development in Agricultural Education***
August	***Guidance in Agricultural Education***
September	***Instructional Programs in Agricultural Mechanics***
October	***Instructional Programs in Ornamental Horticulture***
November	***Instructional Programs in Agricultural Supplies***
December	***Instructional Programs in Agricultural Resources***

THE COVER PICTURE

Dan Vogler (right), Lead Agricultural Occupations Instructor at Parkland College, Champaign, Illinois, teaches a student enrolled in an agricultural technology program. Instructional media used in the technical agriculture programs at Parkland College include audio-tutorial laboratories, programed instruction, and computer-assisted management instruction. (Photo supplied by Dan Vogler, Parkand College, Champaign, Illinois.)

TEACHING ON TARGET

CURTIS E. LOEWEN
Oregon Board of Education

It takes a highly skilled marksman to hit consistently the bull's-eye. The best of sharpshooters cannot hit a target that is obscure. Even a shotgun offers little guarantee of finding an indistinct mark.

Since vocational agriculture has been broadened to include preparation for off-farm as well as on-farm agricultural occupations, many teachers are experiencing increased frustration in delimiting course content. Some have attempted to teach all things to all students resulting in a generalized, academic instructional program. In any case the task at hand has been thwarted and the students have been shortchanged. Evidence of these problems is reflected in ambiguous instructional objectives.

Instructional Objectives

Let us review some examples of instructional objectives that commonly appear in lesson plans: to appreciate the importance of proper fertilization; to grasp the significance of supply and demand; to know parliamentary procedure; to understand how a combine works; to become familiar with common livestock diseases; to ascertain the factors influencing litter size in swine. These objectives share one glaring weakness—a poorly defined target. Two questions arise in the case of each objective: What specifically will be taught? and How will it be known that it has been taught?

Vocational agriculture has enjoyed a history of successful teaching based upon a simple principle some educators are just beginning to discover. That principle is "learning by doing." Inherent in this principle is a clue for determining what to teach and how we should be teaching. An inference may also be drawn from it that will assist us in clarifying instructional objectives.

Developing Objectives

The following steps are suggested for teachers in determining what should be taught and how to evaluate what has been taught.

- Determine what it is that the student is expected to DO at the termination of the instructional period. Occupational competencies should be considered in deriving these DOING elements. Some examples of occupational competencies are: give a speech, maintain a tractor, feed a sow and litter, conduct a meeting, or determine profit or loss.
- Determine what the student must KNOW and UNDERSTAND in order to perform intelligently the DOING units. Stress underlying principles and include technical and safety information as they apply to the KNOWING elements. Examples for each DOING element indicated in the foregoing step are: speech organization, operator's manual, nutritive values of feeds, rules of parliamentary procedure, and record keeping.
- Write instructional objectives in BEHAVIORAL (performance) terms. Use words that describe the activity you would like the student to be able to demonstrate at the time your influence over him ends. Note the following examples.
  - —Organize, prepare, and present a five-minute speech on an agriculture subject.
  - —Perform routine maintenance on a tractor as recommended by the manufacturer.
  - —Design a ration using locally grown feeds that will satisfy the nutrient requirements of a sow and her litter.
  - —Conduct a business meeting according to Robert's Rules of Order.
  - —Arrange a list of inventory, receipt, and expense items for a given enterprise and calculate the amount of profit or loss.

Curtis E. Loewen

Curtis E. Loewen is Coordinator of Agricultural Education, Oregon Board of Education, Salem, Oregon.

Using Objectives

This procedure provides the criteria for selecting significant content and learning activities to be included in the curriculum. It is equally pertinent in preparing daily or weekly lesson plans. Once the objectives are clearly identified and stated as behavioral outcomes, it becomes more obvious what procedures, content, methods, and test items are to be selected.

Another advantage of clearly specified objectives is that students are provided a framework for evaluating their own progress and for directing their efforts toward relevant activities. With clear goals in view, students are able to select that part of the instruction which is apropos to their success. They need not spend useless time trying to "psych out" the teacher, which has all too often rewarded the wrong students.

Regardless of the teaching skill of the teacher, it is impossible to resolve the question of what to teach and how best to teach until instructional objectives are understandably and unequivocally defined. It is only then the teacher can finally measure students' performance according to the predetermined goals.

D. Richard Hackenberger

PUT REALITY IN CLASSROOM INSTRUCTION

D. RICHARD HACKENBERGER
Vocational Agriculture Teacher
Millersville, Pennsylvania

Teachers should be continually looking for ways to make teaching more realistic. Learning is more effective when teaching provides answers to real problems and provides real objects to stimulate questions. Vocational agriculture abounds in opportunities for developing realistic classroom experiences. The area of soil science is no exception.

REALISTIC TEACHING AIDS

Soil profiles are effective teaching aids. But unless the teacher knows what a profile is and what soil characteristics can be illustrated with soil profiles, the profiles will probably be only attractive displays and not effective teaching aids. A soil profile is a record of the soil's history and a clue to its future. It can be used in teaching topics such as the following: color, depth to bedrock, depth of plow layer, depth of topsoil, depth of subsoil, inherent fertility, structure, texture, drainage, root penetration, parent material, and changes that have occurred such as alluvial or colluvial action, glaciation, flooding, and degree of erosion.

Soil profiles are not difficult to prepare if done as a group effort by teachers. A teacher, soil scientist, or conservationist who is familiar with the soils of the area and understands the procedure for lifting and mounting profiles is the first requirement for a successful workshop. It is important that all teachers participating in the workshop learn how to select a site and lift a profile from a pit.

MAKING SOIL PROFILES

Collecting profiles should be a long-term project. Teachers should be alert to opportunities for lifting profiles. For example, house foundations, road cuts, stream banks, and tiling operations provide opportunities to lift profiles in a relatively short time with a minimum amount of digging.

Before taking a soil profile, the teacher should decide how the profile will be used and what soil characteristics are to be illustrated. One suggestion is to make a series of profiles from a soil catena which contain samples of a series that illustrate different degrees of internal drainage and surface erosion.

The selection of a site for lifting the profile is important. Use a soil survey map to select a site that has a large area of the type of soil that is to be sampled. This will reduce the chance of getting a profile that is a mixture of different series. For example, if a profile is wanted to show poor drainage, select a site in the middle of a relatively large area of a poorly drained soil.

Equipment Needed

—A wooden box with inside measurements of 48 inches long, 6 inches wide, 2 inches deep. The box should be put together with screws so it can be taken apart to remove soil.
—Strips of tobacco muslin or cheesecloth
—Pick or grubbing hoe
—Round pointed shovel
—Square shovel for facing the pit
—Brick hammer or geologist's hammer
—Butcher knives
—Pruning shears for cutting roots

Steps for Lifting Profile

—Smooth face of pit so box touches entire length
—Mark outline of soil column with knife around outside of profile box
—Isolate column of soil by digging back along sides with brick hammer
—Shape column of soil to allow box to slide on; space can be allowed at top of box for vegetation or ground cover
—Dig around behind column of soil at about the center and tie with cloth to hold box on soil column
—Continue to dig behind profile, working towards top and bottom, tieing soil to box as you proceed
—When soil column is free, take to shop or laboratory

Laboratory Materials Needed

—Mounting board ¾ inches thick, 9½ inches wide, and 54 inches long (exterior plywood or white pine)
—¾ inch quarter round molding (about 10 feet)
—Knives
—Heavy duty vacuum cleaner
—Nitrate airplane glue (clear nitrate dope)
—Plastic solution for dipping profiles prepared by mixing the following in the proportions listed: one gallon Methyl Isobutyl Ketone; two gallons Acetone NF; four pounds or 1,800 grams Polyvinyl Plastic Powder. The mixture should be shaken on an automatic shaker for about 12 hours or stirred slowly with a paint mixer on an electric drill to get the plastic powder dissolved completely in the liquids. (A six-gallon mixture will saturate from six to ten profiles.)
—Dipping tank, 5 feet long, 11½ inches wide, and 5½ inches deep.
—Slats, rope, nails

Laboratory Procedure

—Remove excess soil from profile leveling with sides of box
—Apply airplane glue and invert into mounting board
—Remove profile box by taking box apart
—Scrape off excess glue and soil along edges of profile
—Cut quarter round and nail tightly along profile
—Pick away excess soil to restore natural look; allow soil to protrude above quarter round
—Let profile air dry for several days
—Soak profile in plastic solution until completely saturated
—Remove profile and allow to dry for 24 hours
—Label profile and soil horizons

Soil profiles make attractive displays for the classroom and arouse a great deal of interest among students for studying soil science.

Policy Statement on the Relationship Between the Office of Education and Student Organizations*

The recent review of the Office of Education's role with respect to student organizations has resulted in establishing the following policy position:

—The Office of Education will establish and maintain advisory relationships with student organizations through staff participation in appropriate student group programs and activities, but the Office of Education will not direct the activities of student organizations.

—The Office of Education will provide on request the services of an employee to serve as an advisor to student organizations whose activities are related to an instructional program.

—These advisors may provide guidance and counseling but they are not to participate in the administrative decision-making of student organizations as officers nor are they to participate in activities involving the solicitation, receipt, or accounting of funds or fees.

—The designated advisor will be permitted to carry out his advisory functions as part of his official Federal assignment.

—The Office of Education will not provide permanent office space, supplies, and services or pay the salaries of student organization staff.

The Office of Education is very much in favor of the work of student organizations principally affected by this policy and does not in any way want to harm their programs. Therefore, it anticipates a gradual implementation of these provisions.

The Office of Education will not, in the application of this policy, go counter to any legal provisions which may require modification of a particular item in a specific instance.

***This policy statement resulted from a Task Force established to examine the U.S. Office of Education's relationships with student organizations. A statement of the U. S. Office of Education dated December 6, 1968 states that "the Commissioner has approved the attached policy statement on OE relationships with student organizations . . . This policy is effective immediately with complete implementation to be accomplished as soon as feasible."—The Editor**

Plans for Implementing Office of Education Policy

Meeing in Washington, D. C. during January 1969, the National FFA officers and Board of Directors voted to comply with the Office of Education policy as follows:

—That the problems and concerns of the Board Members with regard to the OE policy be conveyed to OE officials.

—That legal counsel be sought to determine the full implication of the new policy in relation to P. L. 740.

—That steps be taken to comply, as soon as feasible, with all of the OE policies directed by the U. S. Commissioner of Education which are not in conflict with P. L. 740.

—That funds in the 1969-70 FFA budget be diverted to implementing the policy, even though this will involve curtailment of planned programs.

TEACHING ABOUT COOPERATIVES IN VOCATIONAL AGRICULTURE

PAUL M. DAY
Teacher of Agriculture
Faribault, Minnesota

Failure to provide meaningful classroom instruction on the principles of cooperatives seriously jeopardizes the students' concept of the American free enterprise system. It is our responsibility to see that students are familiar with the types of business found in a free enterprise system, whether the business be individually owned, owned in partnership, by investors, or by persons who need and use its services. Teaching the principles of cooperatives is necessary for the intelligent application of farm management principles. It is equally beneficial to students who will be employed in non-farm occupations.

All students should be aware of the ways business are organized, their method of acquiring operating capital, the distribution of earnings, taxes paid, methods of electing the governing body, and the rights, privileges and responsibilities of customers. This knowledge and understanding of the American business system will become an increasingly important economic tool in production and marketing. We should teach the principles of the cooperative way of doing business. We should clearly define and clarify the advantages and disadvantages of each type of business. Armed with this information, students must make their own decision about the type of business they will patronize.

Paul M. Day

This article is based on a presentation made by Mr. Day to the Agricultural Education Division of the American Vocational Association during the annual convention held in Dallas, December 1968.

Organizing Instruction

A logical sequence for the introductory phase is a study of the services available from cooperatives in the local community. Cooperatives provide a wide variety of services to their members. Some enable farmers to obtain production inputs at lowest possible cost. Included in this group are the member owned farm credit agencies and insurance and artificial insemination associations. Marketing cooperatives enable farmers and ranchers to realize greater returns on the products they have to sell. A knowledge of the role of local, state, regional, and national cooperatives provides students a better understanding of how cooperatives aid the farmer.

An instructional program on cooperatives should include employment opportunities provided by cooperatives as well as the educational and training needs of prospective employees. Cooperative leaders have played a prominent role in developing programs of supervised occupational experience for students in vocational agriculture. They have provided training stations, aided in developing training programs, and supervised students on supervised occupational experience programs.

Instructional Materials

In Minnesota we are fortunate to have a teaching outline on cooperatives written by two former teachers of agriculture. The teaching outline was presented to each school by the Minnesota Association of Cooperatives. Included in the outline are suggested study guides, films, references, discussion questions, quizzes, and suggested learning experiences. The guide includes five suggested lesson plans for each high school class and for adults. Each unit becomes increasingly more complex and challenging giving students a deeper insight into the operations of a cooperative. Many teachers have modified the guides to fit their individual method of presentation. A number of state Farmer Cooperative Councils make similar outlines available to teachers.

As a student reference, I use primarily a booklet entitled "Your Off the Farm Business" which is available from the Cooperative League of the USA. Another reference, "How We Organize to Do Business in America," and many other useful references and films are available from the American Institute of Cooperation. Other publications may be obtained from the Farmer Cooperative Service, U.S. Department of Agriculture. Especially useful is their publication entitled "Cooperatives in Agribusiness." Your state Farmer Cooperative Council or regional cooperative may have additional publications that will be helpful in teaching about cooperatives.

Teaching

I feel that in teaching about cooperatives it is important to involve a representative of a local cooperative in planning the instruction. These persons can be used in teaching part of the unit also. As resource people they help you out when students ask extremely technical questions. We use personnel from cooperatives on our advisory councils at the local and state levels. You will find these gentlemen are very capable and most willing to assist you.

Another device which I have found helpful in teaching cooperatives is a field trip to a cooperative. In addition to observing the services provided and the specialized equipment owned by the cooperative, the manager can describe the membership, scope, financial policy, net margins, patronage dividends, capital equities, and other topics. We also take field trips to investor owned businesses for the same purpose. Other means of improving instruction in the cooperative way of doing business include the establishment of cooperatives in vocational agriculture classes for the operation of a school farm, greenhouse, or forest, for supervised occupational experience programs, and for the establishment of a junior cooperative.

I strongly recommend participation in the FFA cooperative awards program sponsored by the American Institute of Cooperation. Each year four national winners are selected from the state winners in the four regions and they receive expense paid trips to the AIC Institute. Many state cooperative organizations send a representative of the state's winning chapter to this Institute also. I recommend that teachers of agriculture attend one of these institutes which are held at a different land-grant college each year. The 1969 conference will be held at the University of Illinois, Urbana, August 3-6.

This contest becomes the vehicle for implementing subject matter in meaningful, worthwhile programs which will not only motivate students but will offer them an opportunity to become involved in community service activities, develop leadership ability, and promote effective citizenship. The need for teaching principles of cooperatives is obvious. The methods of teaching, however varied they may be, will be most rewarding.

Dr. Walter Jacoby (left), Youth Director of the American Institute of Cooperation, presents the State Cooperative Activities plaque to the president of the Faribault FFA Chapter for its outstanding achievements in cooperation.

AN INSTRUMENT KIT FOR TEACHING ELECTRICITY

CLINTON O. JACOBS, Teacher Education
University of Arizona

Instruments to measure voltage, amperage, and wattage become important tools when teaching the elementary principles of electric current flow. Likewise, inductive loads experienced when studying electric motor characteristics can be more clearly explained when the proper tools are available.

Instrument Kit

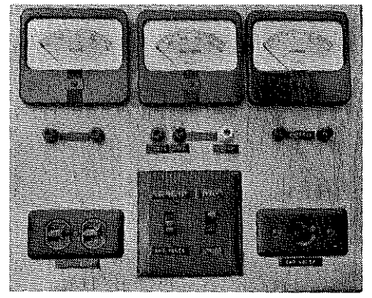
The accompanying pictures illustrate a low cost, compact, portable electric instrument kit to eliminate much of the makeshift and entanglement of wires usually associated with current measurement. The tool is designed so that appliances of 120/240 volts, 15 amperes maximum, can be plugged directly into the appropriate receptacles and volts, amps, and watts read directly. The instruments may also be individually attached to the circuit being tested by using the binding post and banana plug type leads.

A by-pass switch allows high starting current type electric motors to be operated without exceeding the amperage capacity of the ammeter. With the exception of the meters and special plugs, all materials used to construct the kit are common to house wiring.

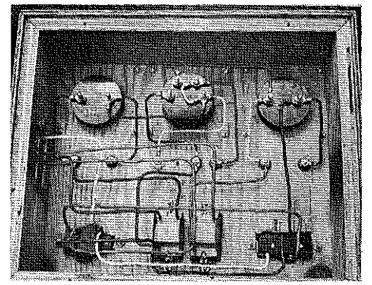
Bill of Materials

1—Ammeter, 4½", 0-15 amp, Simpson Model 59
1—Voltmeter, 4½", 0-250 volt, Simpson Model 59
1—Wattmeter, 4½", 0-3000 watt, Simpson Model 79
2—Toggle switches, three-way, 15 amp/125 v
1—Outlet, single receptacle, 15 amp/125v grounded type
1—Outlet, single receptacle, 15 amp/250v grounded type
2—Cover plates, one gang single type
1—Switch cover, two gang type
1—Motor base receptacle, male type 15 amp/125 volt, grounded
1—Motor base receptacle, male type 15 amp/250 volt, grounded
3—Binding posts, universal type, red color
3—Binding posts, universal type, black color
1—Binding post, universal type, white color
3 ft. No. 14 TW conductor, black color
3 ft. No. 14 TW conductor, red color
3 ft. No. 14 TW conductor, white color
2 doz. solderless terminals.

Construction details and size of the unit may vary with individual desires and materials available. Protection to the meter fronts during transport or storage are provided with a cover held in place by two 2¾"x1½" draw bolts.



Instruments to measure voltage, amperage, and wattage are important tools when teaching electricity.



A note accompanying this article indicates how a wiring diagram for the instrument kit can be obtained.

The wiring diagram plan for the instrument kit described in this article is available from the Department of Agricultural Education, College of Agriculture, University of Arizona, Tucson 85721.

For More Effective Teaching . . .

Use Audio-Visual Materials

NORMAN PAUTZ
Teacher of Vocational Agriculture
Chilton, Wisconsin

How do we learn? Research shows that 85 per cent of what we know comes through sight, 11 per cent through hearing, and 4 per cent via taste, touch and smell. Would it not seem proper then that we direct most of our teaching toward the sense of sight? One of the most effective ways of teaching is to supplement one's methods of teaching with audio-visual materials.

A Commendable Record

Education has retained in too many cases the antiquity of a lecture-and-listen type classroom. All over the nation we see a trend to shed the chains of antiquity through wider usage of multi-media in teaching. Because of the nature of agriculture, it has always lent itself to the wide use of visual aids. These aids include models, pictures, films, graphics, and displays. I hope that many teachers of agriculture have not just been tied to lecture and the chalkboard. Agriculture teachers have always used field trips which is another way of bringing the community into the classroom.

We know that direct purposeful experience enhances learning. Experience programs have been an example of a purposeful experience which for years has been an effective way of teaching and learning in vocational agriculture. Many other departments of the school are now coming to this realization and are using agriculture as a model though they may not say so. However, let us remember that whatever the means, method, or media used, it must be well planned, organized, and carried out or its effectiveness is lost as a learning experience.

New Media

Vocational agriculture cannot afford to rest on its laurels, however. New audio-visuals warrant our consideration. Think of the possibilities of the portable tape recorder. It is great to take along on a field trip, to record an interview, or to bring back the realistic noise and background of a factory type field trip to the classroom. Many of us have not used fully the 16 mm film to say nothing of 8 mm film loop or closed circuit television. Locally made colored slides are helpful in any community. The overhead projector is a must in every classroom and its use is only limited by your ingenuity.

Using Media Effectively

Remember that media must be planned to fit a learning situation and only then will their real effects be seen. Media are not a short cut or an easy way out for the teacher. Once we have established a goal of what we hope to accomplish, we must then select the proper techniques and media to achieve best that goal.

We must obtain trained staff to help teachers prepare, use, and understand all forms of media from the chalkboard to closed circuit television. Schools should be planned with an Instructional Media Center. The days of the library as a place where books are kept is gone. We must look at the Instructional Media Center as a place that includes books, tapes, films, individual study areas, and a host of other learning materials that are available to all students.

How long has it been since you introduced an innovation into your method of teaching? As teachers we should have a fear of getting into a rut in our method of teaching. It is equally as hard to get out of our accustomed patterns. Put yourself in your students' shoes. Would you find yourself interesting? Let us vow that whatever media we choose in the future that it will not be used in doses of more than one-half hour each—lecture included. I challenge you to use some new media in your classes. You will be a better teacher for it and your students will love you!

Norman Pautz

Norman Pautz is Vocational Agriculture Teacher and Audio-Visual Coordinator at Chilton High School, Chilton, Wisconsin.

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Improving Teaching in Vocational Agriculture

B. K. CHAUBEY, Allahabad Agricultural Institute
Allahabad U.P.I., India
and
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The Ohio State University

Maintaining the quality of teaching in vocational agriculture, while at the same time instituting changes in curriculum and program, creates a problem for teachers and administrators in agricultural education. Recognizing the importance of high-quality teaching, research was undertaken in Ohio to identify factors believed to influence the quality of teaching of vocational agriculture.

Important Factors

In order to identify the factors which were most important in influencing the quality of teaching, a list of factors was rated by each teacher of vocational agriculture in Ohio. A comparison was made of these ratings with ratings of 10 per cent of the teachers judged to be most successful and with ratings of a jury of experts comprised largely of teacher educators and supervisors. All three groups agreed that the following factors have an important influence on the quality of teaching in vocational agriculture.

—Students with appropriate interests, resources, and capacities are enrolled in vocational agriculture classes.

—The type of occupational experience program is such that it contributes to the learning needed by students in entering an agricultural occupation.

—Modern curricular materials and teaching tools are used regularly during classroom instruction.

—Provision is made for adequate time for preparation for teaching.

There were other factors where less agreement was shown among the three groups. These factors included the development and use of a program of instruction for vocational agriculture classes, the influence of extra-school duties on the quality of teaching, and the academic potential of students in vocational agriculture compared to other students in the school.

The Situation

Each teacher indicated the presence or absence of certain conditions related to the factors believed to influence the quality of teaching in vocational agriculture. These findings provide a benchmark about teaching procedures at a particular point in time.

Most teachers believed that their enrollment included primarily students who should be enrolled. They also believed that they were geting their share of outstanding students as well as meeting the needs of their share of disadvantaged students.

The amount of time used in preparing for classroom teaching was limited. Only about one hour of preparation was used by teachers for each two and one-half hours of classroom teaching. This situation was aggravated by the fact that more than two-thirds of the teachers spent an hour a day on extra-curricular school duties such as conducting homerooms and study halls and assisting with athletic teams.

A majority of teachers were following a program of instruction which had been developed for each class. Ninety-two per cent of teachers had programs of instruction which had been revised within the last three-year period.

A variety of curricular materials were used to enrich classroom teaching. About 90 per cent of the teachers were using 16mm motion pictures and 2x2 slides. Only about 60 per cent of the teachers were using overhead transparencies, and about 5 per cent were using some of the newer curricular materials such as video tape and 8mm continuous loop motion pictures.

All teachers of vocational agriculture, the most successful 10 per cent of the teachers, and the jury of experts were also asked to rank in a hierarchy of importance the factors believed to influence the quality of teaching in vocational agriculture. There was a significant positive relationship between the rankings of the factors by the jury of experts and the most successful teachers. There was no significant relationship between the rankings of either the jury of experts and all teachers or by the most successful teachers and all teachers.

Help Which Teachers Need

As a final step teachers of vocational agriculture were asked to indicate what they believed were the most promising educational measures which could be used to improve the quality of teaching. Here are their recommendations for help which might be provided by teacher educators and state supervisors.

—Teachers were concerned with the development of more understanding

(Continued on page 241)

B. K. Chaubey

This article is based on B. K. Chaubey's Ph.D. dissertation, "Factors Influencing the Quality of Teaching in Vocational Agriculture," which was completed at The Ohio State University in 1968.

Ralph J. Woodin

PRINCIPLES—
An Effective Approach for Organizing Subject Matter

ROLAND L. PETERSON, Teacher Education
University of Nebraska

The curriculum of the secondary school has undergone considerable change during the past few years. It has been common for students, teachers, and parents to recognize and experience curriculum changes in mathematics, biology, chemistry, physics, social studies and a number of other subjects. Each program has introduced new content into the curriculum. Each innovation has reorganized subject matter into a conceptual pattern with the idea that this process of education will produce greater understanding, depth, and transferability of learning.

A Question

A crucial question facing agricultural educators is: "What about new changes in structuring vocational agriculture subject matter?" As technological development has been observable in all of society, it has been most dramatic in the field of agriculture. Yet, a good deal of effort in agricultural education today has been directed primarily at assessing the number and type of clientele to be served by vocational agriculture programs with little regard for structuring subject matter.

Although a number of agricultural educators have urged for a structuring of vocational agriculture subject matter, relatively few studies have emerged which focus on identification and organization of basic concepts, principles, and modes of inquiry. Considerable credit is due Professor Sidney Sutherland of the University of California for providing the framework for the principles approach in a biological science course applied to agriculture. Research efforts at The Ohio State University, The Pennsylvania State University, and Oregon State University continued the development of the principles approach.

Roland L. Peterson

This article is based on Roland L. Peterson's Ed.D. dissertation, "An Experimental Evaluation of the Principles Approach for Teaching Vocational Agriculture to High School Students," which was completed at the University of Nebraska in January 1969. A former teacher of vocational agriculture in Nebraska, Dr. Peterson is presently an Assistant Professor of Agricultural Education, University of Nebraska, Lincoln.

A New Curriculum

Researchers at the University of Nebraska under a research grant from the U. S. Office of Education developed four courses of study in which agricultural subject matter was structured around the underlying biological science, physical science, and economic principles which were considered most vital to agriculture. The courses of study were given agricultural titles to avoid a misunderstanding that teachers of vocational agriculture were teaching the sciences. In reality the courses are based on the principles which are considered most important to agriculture. Subject matter specialists at the University of Nebraska critically reviewed each course for accuracy of content.

The following courses were developed: Animal Science Principles for a ninth grade course; Animal, Plant, and Soil Science Principles for a tenth grade course; Agricultural Mechanics Principles for an eleventh grade course; and Agricultural Marketing and Management Principles for a twelfth grade course.

The Teaching Procedure

Each unit of instruction is designed so students discover the underlying principle. This discovery process is accomplished by having students determine why a situation or action is occurring as they observe and perform activities such as an experiment, demonstration, or a simulated game which illustrates the principle. During the discovery phase of the unit, the teacher functions in a nondirective manner. The teacher continually poses the question of why a certain situation is occurring. After the students have indicated to the teacher's satisfaction that they have discovered and defined the basic underlying principle, the teacher provides factual information concerning the subject matter along with directing the students through several problem-solving situations which have direct agricultural application. Thus, the student is provided a blending of why, what, and how.

The Study

As a result of these developments for structuring agricultural subject matter, a companion study was undertaken to compare the principles approach and the traditional approach in teaching animal science at the ninth grade level; animal, plant and soil science at the tenth grade level; agricultural mechanics at the eleventh grade level; and agricultural marketing and management at the twelfth grade level. The study involved 393 vocational agricultural students enrolled in ten Nebraska public high schools.

Five schools were randomly selected as the experimental group with the remaining five schools as the control group. Four agricultural achievement instruments were used to obtain pretest and posttest scores. Several standardized instruments were used to collect data on a number of independent variables.

Major Findings

—An overall analysis of student achievement in all grades resulted in significantly greater achievement for students taught agriculture based on principles.

—Students in the ninth grade Animal Science courses and the eleventh grade Agricultural Mechancis course attained significantly greater achievement as a result of instruction based on the principles approach.

—No statistically significant difference existed between the achievement of students taught agricultural subject matter based on principles and those taught in a traditional manner in the tenth grade Animal, Plant and Soil Science course and the twelfth grade Agricultural Marketing and Management course.

What happened to students' attitude toward the teacher? What were the results for students with less than average mental ability? What were the results for students with specific interests in subject matter?

—An analysis of students' attitude toward the teacher and the teaching method revealed that no significant differences existed between the two groups.

—An analysis of intelligence quotients and student interest in agriculture, science, mechanics, or business revealed that students with below average mental abilities or particular interests were not handicapped as a result of structuring agricultural subject matter around principles. The data concerning these questions indicated no significant differences between the two groups.

—An analysis of teachers' opinions revealed that teachers felt the principlies approach resulted in improved instruction. They also indicated the new curriculum necessitated more practice in using a variety of teaching techniques.

—School administrators strongly supported the prinicples approach for organizing agricultural subject matter. They indicated a change was needed in vocational agriculture programs, and in their opinion the new principles approach was a highly favorable change. All administrators felt the principles approach provided improvement in their vocational agriculture courses.

Some Implications

As a result of previous research and the findings of this study, it seems apparent that vocational agriculture students achieve significantly better when taught agricultural subject matter organized around basic principles. Evidence from the literature indicates that a new curriculum in vocational agriculture which focuses on structuring agricultural subject mater around principles closely parallels new curricular developments in secondary school mathematics, biology, social studies, English, chemistry, physics and a number of other areas.

This kind of change was recognized by school administrators as an improvement in vocational agriculture. It is also evident that this change in curriculum tends to draw the academic areas of education and vocational agriculture closer together. As a result of a closer relationship between educators, it seems obvious that students will benefit from an approach which relates factual information and principles to practical and applied problems in agriculture rather than fragmented bits and pieces of information. The principles approach provides an opportunity for vocational agriculture to compliment the academic areas of biology, physics and economics.

The principles approach provides vocational agriculture an opportunity to keep pace with curriculum reform and explore agricultural subject matter in depth. The new approach provides for the use of both discovery and problem-solving learning and an opportunity to present both the why and how of agricultural subject matter to students of vocational agriculture.

Improving Teaching in Vocational Agriculture

(Continued from page 239)

and better organization of guidance and counseling services in schools.

—Teachers believed that developing and making available additional curricular materials would be helpful. They expressed strong approval of and appreciation for teaching units and similar curricular materials which help in developing new programs.

—Teachers recommended more and better in-service education programs in curriculum development, in the use of curricular materials and teaching devices, and in the organization of appropriate occupational experience programs for students. Teachers gave equal importance to credit and non-credit types of in-service education.

—Teachers believed they needed updated and improved policies in schools to assist in the further development of vocational agricultural programs. They believed that they needed policies regarding the rescheduling of working hours for teachers, the reduction of extra school duties, provisions for financing more effective teaching materials, and the establishment of a better public understanding of the vocational agriculture program.

Summary

There are dangers in making generalizations from this study to other states where conditions may vary. It would seem, however, that the involvement of all teachers in Ohio as respondents in the research certainly increases their awareness for the need for high quality teaching. It also seems likely that teachers generally agree upon the major factors which affect the quality of their teaching. The fact that there is a consensus provides a useful basis for in-service education and other professional assistance to teachers.

If Ohio teachers are typical, then teachers are generally making more use of the newer hardware of education. However they are not utilizing all of the newer teaching resources that are available. Teachers agreed on what teacher educators and supervisors could do to help improve the quality of their teaching.

The Effectiveness of Instructional Materials in Improving Teaching and Learning

WILLIAM J. BROWN, JR., Research Coordinating Unit
North Carolina State University

Are instructional materials effective in improving teaching and learning? This question poses at least two viewpoints. There are those who feel that effective instruction must be developed within the existing learning environment through interaction of teacher and student. This viewpoint precludes the use of structured resource units which suggest objectives for the group, teaching-learning activities, and subject matter content. On the other hand, some educators suggest that units of instruction can be identified which are relevant to the needs of many students. With this assumption, curriculum developers identify the content to be included in a unit of instruction, psychologically organize or sequence the content in a manner that is most meaningful to students, and develop suggested teaching procedures.

Judging from the emphasis currently placed on the development of curriculum guides and instructional materials, the effectiveness of instructional materials is apparently assumed. This current emphasis upon instructional material development assumes that they facilitate the teacher's instruction and thereby enhance student learning. However, we have little evidence which indicates that student learning is improved. In fact, the consensus of most research indicates that instructional materials, for example modules of instruction, resource units, and programmed learning, have limited impact upon student learning.

Current Research

Hensel[1] evaluated instructional materials that were developed to help introduce off-farm agricultural occupations instruction into the vocational agriculture curriculum. He found that the instructional materials had, at best, a limited impact on the curriculum. When the teachers who purchased the instructional materials were surveyed, only 37 per cent of those responding had used the materials. This rather low percentage of users raises serious questions with regard to teacher acceptance of instructional materials especially in new areas of instruction.

A concurrent question relates to how the materials were used. Hensel's study revealed that although the instructional materials were written for teacher and student use, they were used primarily by teachers in lesson preparation rather than as student references. Evidently, teachers who used the materials envisioned them primarily as aids for teachers rather than for students.

A second assumption that instructional materials facilitate instruction and thus improve student learning also seems in jeopardy. Several studies investigated the effectiveness of furnishing various types of instructional materials to teachers. Legg[2] compared the use of programed instructional materials with conventional methods of teaching farm credit. No significant differences in student learning were detected. Similar results were found when the study was replicated by Hull and McClay[3]. Ehresman[4] investigated the effects of providing structured versus unstructured instructional materials to teachers. No significant difference was detected in student achievement between schools where teachers received structured and unstructured materials.

Up to this point, the research reviewed has primarily compared the efficacy of one type of instructional material with another type. This is really not the complete picture until a comparison group is used which does not receive any instructional materials. Drawbaugh[5] and Shontz[6] furnished teachers resource units including teacher guides and student subject matter resource booklets and compared them to a control group of teachers who taught the same content but used their own instructional devices. They found that furnishing instructional materials significantly improved student learning when compared to the control group whose teachers used their own instructional materials.

A subsequent study by Brown[7] tested the relative effectiveness of the various components which are included in a resource unit. For example, some resource units include only a teacher's guide while others develop subject matter references for students. To determine which was most effective, forty teachers were randomly assigned to use one of the following: a course outline and a list of references, a teacher's guide, a subject matter handbook, or a combination of teacher's guide and subject matter handbook. Half of the teachers assigned to each resource unit component had received inservice education and the other half had not. There was no significant difference among the four experimental groups in student achievement, however, teachers using the subject matter handbook alone were significantly higher in achievement than the group using the course outline. Thus, the type of instructional materials furnished teachers has an effect on their learning but does not necessarily affect their students' achievement.

Adjusting Our Rationale

Research challenges the effectiveness of furnishing instructional materials both in terms of facilitating learning and in terms of gaining teacher acceptance of the materials furnished. One should quickly note, however, that the effectiveness of the instructional materials was studied in field experiments with all its confounding variables. Although field experiments are the appropriate testing ground, researchers probably should not have expected to detect measureable differences in student learning without a more powerful experimental variable. Instructional materials are evidently not powerful enough in themselves to produce a statistically detectable change in learning. Likewise, generalizations about teacher acceptance of instructional materials cannot be based on the findings of one study. Thus, there are limitations in the research cited which prevent broad generalizations that indicate that instructional materials are ineffective.

However, sufficient uncertainity exists about the effectiveness of instructional materials to cause re-thinking about the basic rationale underlying the development and dissemination of instructional materials. Although developing instructional materials still seems to be a vital factor in implementing new instructional areas, it obviously is only one of the things needed in order to influence teacher acceptance of new curriculum areas and to facilitate student learning. The rationale for developing instructional materials should be adjusted to relate instructional materials to other important factors affecting the learning process. Continuing in-service education and supervision efforts beyond the graduate course to the actual instructional environment of high school teachers may be necessary to change teacher behavior. In-service education programs within each school may be necessary in order to measurably change the learning environment of the student.

[1]Hensel, James W. and Johnson, Cecil H., Jr. "An Evaluation of the Off-Farm Agricultural Occupations Materials." Research Series No. 21, The Center for Research and Leadership Development in Vocational and Technical Education, The Ohio State University, 1967.

[2]Legg, Otto P. "Programed-Instruction and Lecture-Discussion Methods Compared for Effectiveness in Teaching Agricultural Finance to Vocational Agriculture Students." Unpublished Doctor's thesis, Pennsylvania State University, 1962.

[3]Hull, William L. and McClay, David R. "A Comparison of Programed and Lecture-Discussion Methods of Teaching Farm Credit to High School Youth and Adults." Bulletin 722, Agricultural Experiment Station, Pennsylvania State University, 1965.

[4]Ehresman, Norman D. "An Experimental Study to Evaluate the Effectiveness of Certain Structured Teaching Materials." Unpublished Doctor's thesis, University of Illinois, 1966.

[5]Drawbaugh, Charles C. "A Teaching Experiment in the Use of Greenhouse Facilities in Vocational Agriculture." Unpublished Doctor's thesis, Pennsylvania State University, 1963.

[6]Shontz, David F. "An Experiment in Teaching Agricultural Occupations Information to High School Students." Unpublished Doctor's thesis, Pennsylvania State University, 1963.

[7]Brown, William J., Jr. "The Effect of In-service Education and Resource Unit Components on Teacher and Student Learning." Unpublished Doctor's thesis, Pennsylvania State University, 1967.

PRESERVING PLANT SPECIMENS

HUGH COFFMAN
Vocational Agriculture Teacher
Vincent, Ohio

Hugh Coffman

One of my biggest disappointments in teaching has been the seemingly lack of time to organize teaching materials into a suitable form for use in classroom instruction. I find the use of clear contact paper to be very helpful. The most extensive use I have made of this material is to preserve plant specimens.

The procedure I use in preserving plant materials is as follows:

—Cut clear contact paper into sizes convenient for storing. I use pieces 9 inches by 24 inches.

—Remove backing from contact material.

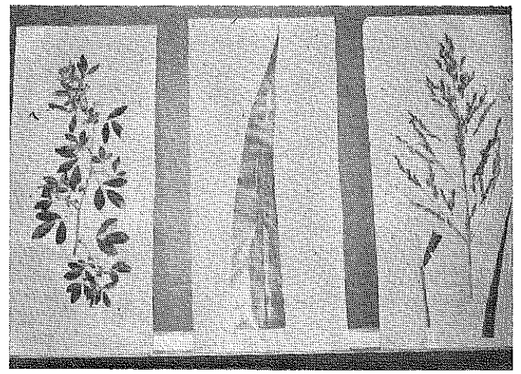
—Lay contact paper with self-adhesive side up and mount the green plants on paper by gently pressing them into the desired position. Pressing green plants for 6 to 8 hours first will help the plants lay flat on the contact paper.

—Press backing paper (reversed from original way) to the self-adhesive paper firmly to exclude all air pockets. Poster paper may be used instead of the backing paper.

—Store in a dark place to help keep natural color in plants.

Often I find pictures that can be used over and over. A concern is keeping them in good condition. By sandwiching these pictures between two pieces of clear contact paper, the problem is solved.

Contact paper is available in most variety stores. The only limit to its use is the imagination of the teacher. It has many uses which enables the teacher of vocational agriculture to make more effective use of visual materials.



Plant specimens preserved with clear contact paper.

SOME SUGGESTIONS FOR STIMULATING STUDENTS' INTEREST

N. L. MOSS
Vocational Agriculture Teacher
Matador, Texas

N. L. Moss

In recent years many devices have been introduced to stimulate the interest of students. Some of these instructional aids are effectively used by teachers. Think of persons who have tried to stimulate your interest in a group setting during the past several years. Do you recall the devices used? Or do you just remember the fact that he got his point across to you in such a manner that you still remember it?

Discussion and Interest

Teachers who maintain interest in the classroom generally know their subject matter well. They know something about the technical and practical phase of their subject and are willing to learn more about the topic by continuing study. They are never in too big a hurry to stop and answer questions or let students discuss or relate experiences. One of the quickest ways to stifle interest is to ignore someone who would like to participate in the discussion. Better teachers encourage active participation in classroom activities. The teacher by asking leading questions and acting as the moderator of classroom discussion will find a discussion session one of his most valuable methods of instruction. A slow-thinking teacher may suddenly find he has a bull session on his hands; but, with proper guidance, good discipline, and student participation, this method of teaching can certainly stimulate interest.

There are a few teachers who are neither dedicated nor professional in their attitude toward students. Students can sense almost immediately the sincerity and the concern of the teacher and they react toward the learning process in almost the indentical manner in which they are being treated. Why should students get concerned if the teacher doesn't care if they learn?

Vary Techniques

Sometimes we stimulate or smother interest by the type of testing we do. Do we try to ascertain the amount of important knowledge retained by the student, or do we ask relatively unimportant and easy-to-grade questions? Do we keep our lesson plans and procedures up-to-date? Is our instructional material current? Are students interested in securing a certain instructor because they want to learn or because they have all of his old tests?

Teachers should use a variety of teaching techniques and methods. Some educators say the same techniques should not be used for more than fifteen or twenty minutes at a time. The effective teacher will try different methods on a particular unit until he finds the most effective method. We should not be afraid to try a new method for giving information or making the subject more interesting or more understandable to the students. I dare you to put just ten minutes of what you consider to be your most effective teaching on tape and be your own judge as to why your students act as if they may be thinking of greener pastures!

Stimulating Interest

A certain amount of equipment and teaching aids are necessary for most effective teaching. But the teacher is the primary determiner of interest in the classroom. Teachers stimulate interest by:

—Maintaining a sense of humor at all times.

—Being actually interested in students.

—Keeping lesson plans and subject matter up-to-date.

—Maintaining good classroom discipline; you must have a student's attention before you can stimulate interest.

—Varying teaching methods and techniques.

—Placing correct emphasis, but not overemphasis, on teaching aids.

—Remembering that he is a teacher and that his responsibility is to teach.

—Remembering not to put blocks in the way of original and creative responses by pupils. Let students think for themselves and discover vital points that are being taught.

—Being well prepared for every class.

A Description and Source Listing of Professional Information in Agricultural Education, 1968-69

This compilation of instructional materials is developed annually by the Professional Information Committee of the Agricultural Education Division, American Vocational Association. Instructional materials are listed for Agricultural Mechanics, Animal Science, Conservation and Forestry, Farm Business Management and Marketing, Off-Farm Agricultural Occupations and Business, Ornamental Horticulture, and Plant Science and Soil. Listings for professional information include Curriculum Development and Course of Study, Guidance and Occupational Opportunities, Occupational Experience Programs, Supervision and Teacher Education, and Teaching Materials.

Copies (10 cents each) of the publication are available from: Vocational Agriculture Service, 434 Mumford Hall, University of Illinois, Urbana, Illinois 61801.

Instructional Materials for Ornamental Horticulture

DAVID R. McCLAY, Teacher Education
The Pennsylvania State University

The following units and slide series developed through Project DIMENSION are available at cost from the Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

Retail Flower Shop Operation and Management
Landscape Maintenance and Establishment
Landscape Design
Turfgrass Maintenance and Establishment

The following units will be available after July 1, 1969.

Greenhouse Crop Production
Nursery Production

Ornamental horticulture has been growing in importance in the northeastern states in recent years both in value of product and services and in employment opportunities for youth. Opportunities for occupational education in the field has been expanding rapidly. However, instructional materials and competent teachers have been lagging.

The Department of Agricultural Education at The Pennsylvania State University began a training and development project titled "Development and Evaluation of Instructional Units in Ornamental Nursery, Floriculture, and Turfgrass Occupations for High School Students and Adults in Northeastern United States" in 1965. The project, shortened to the title Project DIMENSION, receives financial support from the U.S. Office of Education. The purposes of the project are to develop instructional units for teacher and student use and to conduct workshops for improving teachers' competence in teaching ornamental horticulture.

Progress to Date

Teacher manuals and student handbooks have been written, field tested by teachers, and revised for the following units: Retail Flower Shop Operation and Management, Landscape Maintenance and Establishment, Landscape Design, and Turfgrass Maintenance and Establishment. Units on Greenhouse Crop Production and Nursery Production are in the final stages of revision.

Each unit is organized by problem areas or lessons which include sections on student learning objectives, key questions, new words, job opportunities, and relevant information written for high school and adult learners. Each unit is illustrated with photographs. In addition the teacher manuals for each unit also include suggested references, supplies, audio-visual aids, suggested learning activities, suggested placement experiences, and a comprehensive examination. A series of color slides was produced for each unit. Three-week and one-week workshops have been held in which approximately eighty vocational agriculture teachers enrolled.

Other achievements of Project DIMENSION include the preparation of suggested courses of study, lists of equipment and reference texts, and building plans and facility layouts for instruction in ornamental horticulture.

Future Plans

Student handbooks and teacher manuals are planned for the following units: Arboriculture, Horticultural Mechanics, Plant Propagation, and Pest Control for Ornamental Plants. Informational bulletins are planned on Facilities for Instruction in Ornamental Horticulture and Courses of Study in Ornamental Horticulture. Additional workshops are planned for teachers who wish to improve their competence in teaching ornamental horticulture.

A teacher of floriculture demonstrates flower arranging to high school students preparing for employment in flower shops.

Some Principles of Learning

LOYD R. HUGHES
Yavapai College
Prescott, Arizona

The bell rings signaling the start of another school day. Twelve pushing, laughing, joking, scrambling, energetic sophomore boys and three somewhat quieter girls enter the agriculture classroom. Johnny who is six feet tall sits next to Charlie who is four feet six inches tall. Charlie talks continually and loudly while Henry is extremely quiet and hardly speaks even when asked a question. Jane may present a problem in a class of boys. Kurt's father is a prominent farmer in the community. Bill's father is a janitor at the public service building. As this situation is repeated throughout the day, it is not unusual for the teacher to ask "How do I teach fifty students with so many different abilities, interests, backgrounds, capabilities, and opportunities?"

What does a teacher do in this situation? He relies on his background and experience and what he has been taught in student teaching and undergraduate and graduate courses. He may simply try what he hopes will work. Hopefully, he will ask questions of other teachers and read articles in professional journals.

It is with this latter thought that this article is written. The principles of learning presented have been gleaned from educational psychology. They have been selected because of their applicability in teaching agriculture. Teachers of agriculture have at their disposal the facilities to utilize most effectively these principles of learning.

Loyd R. Hughes

Loyd R. Hughes is Associate Dean for Vocational and Technical Education, Yavapai College, Prescott, Arizona.

All Behavior Is Caused

Three primary factors determine a student's behavior: his physical inheritance, his background of learning, and the present forces acting upon him. The first variable is not subject to manipulation but the other two are and our responsibility as teachers consists of manipulating these variables to produce the most desirable changes in behavior of students. It must be remembered that there is always a reason for each student's behavior. Since the background of learning and home environment are different for each student, we should not expect the same behavior from each. Agricultural occupations teachers make home visits and visit the employment locations of students. These visits can be extremely helpful in understanding students' behavior.

Student Perception Causes Responses To Vary

Each student perceives things in terms of his past experience and the present environment. Therefore, these perceptions will vary with each student. However, it is how things seem to the student which is important not necessarily how they actually exist. The implication is for teachers to determine how the student sees things before they attempt to change that image.

Student Responses Will Vary According To Classroom Atmosphere

Changes in the environment will elicit changes in student behavior. Studies have shown that students react differently under autocratic, democratic, and laissez-faire social atmospheres. A democratic atmosphere is most conducive to the physical and emotional well-being of students. Students respond for teachers who are democratic, energetic, interested in them, cheerful, and fair.

Motivation Is Essential To Learning

Motivation is the drive to satisfy needs. Each student has needs so each student is motivated. The problem arises when the drive to satisfy needs is through a socially unaccepted medium. If this occurs the problem is to show the student by reinforcement and other means that his needs may be achieved through socially acceptable channels. Teachers must direct the activities of students so they identify needs and become motivated to use proper channels to resolve these needs.

Without A Sufficient Stage Of Readiness, Learning Is Inefficient

Students vary widely in their ability to do various things so a teacher should not expect all students to weld proficiently or read with competence. The teacher should not expect to decrease materially the differences between students during the period of one year. If teaching is effective, there may be an increase in differences among students. Often students in the ninth grade are all expected to read at the same level. Those who can not read at that level become frustrated and subsequent reading improvement becomes even more difficult to achieve. The same principle applies to any learning activity.

Students Learn To Do By Doing

Teachers of agricultural occupations have always recognized the importance of this principle. Sometimes they have not emphasized it enough. Teachers have a tremendous opportunity to place the student in actual doing situations through supervised work experience, supervised farming programs, and school laboratory and shop activities. It is very difficult for a student to determine fertilizer application per acre of alfalfa by listening to a lecture on fertilization. But if he is actively involved in solving a problem regarding the rate of fertilizer application, he will develop the knowledge and ability to solve such problems and later he will be able to apply this learning to new situations.

Maximum Transfer Of Learning Is Accomplished By Learning Material In The Way It Is To Be Used

The primary value of education lies in the application of the material learned to a life situation. If the material is learned in the way it is to be used, then maximum recall and application is possible. Teachers should use actual situations such as on-the-job instruction whenever possible. Demonstrations, audio-visual aids, field trips, and other means to closely resemble the actual situation should also be emphasized.

Meaningful Material Is Learned Easier And Retained Longer

To be meaningful, new information must be related in a meaningful way to previously learned material. Therefore, it is important that teaching be organized so that what is being taught is built on what has already been learned. For example, the basic principles of feeding should be taught before attempting to teach students how to balance a ration.

Immediate Reinforcement Is Necessary

There are many kinds of reinforcement such as approval, recognition, and successful performance. The effectiveness of each depends upon the individual student and the situation. One primary application of this principle is applicable to testing. The test should become a learning situation with immediate reinforcement of correct responses. One way to achieve this is by constructing objective or short answer tests and allowing the students to grade their own papers.

A Model for Teaching Landscape Design

MAURICE DeHOFF
Teacher of Ornamental Horticulture
Alliance, Ohio

When teaching principles of landscaping, there are certain concepts which are difficult for students to visualize. One concept is that of asymmetrical and symmetrical balance. The model shown in the accompanying photograph serves as a teaching aid to help students visualize the balance concept along with several other related ideas.

The Model

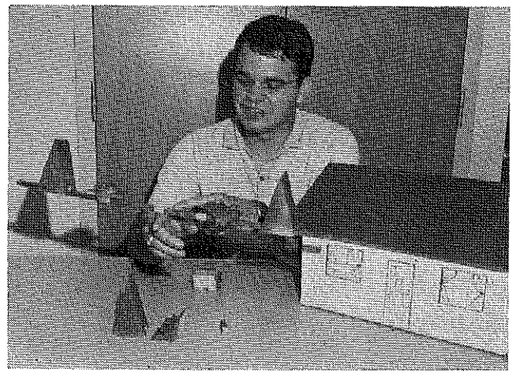
The materials needed are a cardboard box (approximately 8 inches by 12 inches by 24 inches) white and green paint, a sheet of styrofoam (2 inches by 12 inches by 36 inches), and a balance stick. The cardboard box is painted white and doors are drawn in with a felt-tip pen. When drawing in the doors it is advantageous to locate the door in the center on one side and off-center on the other side. This allows the illustration of both symmetrical and asymmetrical balance in the foundation planting.

The plants for the model are made from the styrofoam and painted green. The best way to cut the styrofoam is by using a hot wire device sold for that purpose. The most useful shapes for plant materials are pyramidal, spreading, and global as shown in the photograph. The styrofoam plants are notched in the bottom so they can be wedged on the balance stick and moved to various positions.

Using the Model

It is desirable in a foundation planting that the door of the house serve as the focal point or fulcrum. Balance is centered around the door. This can be demonstrated with the model by placing the balance stick so that it is balanced in front of the house with the fulcrum of the balance in front of the door. The styrofoam plants are placed on the stick in different combinations until the stick is balanced. When balanced, either symmetrical or asymmetrical balance has been achieved. Symmetrical design is achieved when the plants are identical on each side of the door when there is balance but the plants are not equal on each side of the door.

The model can also be used in explaining asymmetrical balance. By using the side of the model which has the door off-center and making the door the fulcrum, the stick is already unbalanced. More weight or plant material will have to be added to the short side of the stick. By balancing the stick, an asymmetrical type of design can be demonstrated.



A student demonstrates a model used in teaching landscape design.

AGDEX: A Filing System for Instructional Materials

HARLAN E. RIDENOUR
The Ohio State University

Harlan E. Ridenour

Harlan E. Ridenour is Director of the Ohio Agricultural Education Curriculum Materials Service, The Ohio State University. He serves as Chairman of the Professional Information Committee of the Agricultural Education Division, American Vocational Association.

Ten years ago the National Project in Agricultural Communications published the AGDEX filing system for agricultural publications. The filing system was the result of research sponsored by the National Project which was conducted in the Department of Agricultural Education at The Ohio State University. Ohio teachers and extension agents aided in field testing the filing system prior to its publication.

After the initial printing, AGDEX has been distributed by the Iowa State University Press. The present supply will be exhausted in a few months and the question has been raised as to whether or not its publication should be continued.

Values of AGDEX

The question of the desirability of reprinting AGDEX was considered by the Professional Information Committee of the Agricultural Education Division, American Vocational Association, in December 1968. The Committee recognized the value of having a commonly used filing system for curriculum materials. The broadening of the agricultural education program in recent years has resulted in teachers receiving increasing amounts of instructional materials. These materials must be examined by the teacher and those that support his program filed in such a way that the information can be retrieved when needed. These teaching materials are in the form of teaching guides, course outlines, research bulletins, extension bulletins, commercial publications, and audio-visual materials. The AGDEX filing system has proven to be highly effective by those who have used the system.

A recent survey shows that AGDEX is the only filing system used in more than one state. The survey revealed that sixteen states recommend the use of AGDEX while eight others recommended a locally developed system.

Recommendation

The Professional Information Committee recommends that states not now using the AGDEX filing system restudy the system and consider whether or not to recommend its adoption by their teachers. If the system were more universally used, materials could be precoded by publishers for the AGDEX system. This would facilitate a free exchange of materials among states and save much time of teachers in filing materials. To encourage this development, the Agricultural Education Division of the American Vocational Association adopted the resolution accompanying this article which recommends the adoption of the AGDEX system.

The AGDEX filing system is simple, extremely flexible, and can be adapted to many situations. It consists of a filing guide and a set of gummed labels for file folders or bulletin boxes. No card indexing system is required. Materials can be quickly classified and filed. They are just as easy to find when needed.

Resolution
Adoption of the Uniform AGDEX Filing System

WHEREAS, a uniform filing system, called AGDEX, was developed through a grant from the National Project in Agricultural Communications as a result of a request from the National Vocational Agriculture Teachers Association and Agricultural Education Division of the American Vocational Association.

WHEREAS, the AGDEX filing system provides teachers of vocational agriculture and other users of professional and technical information with a practical and flexible filing system.

WHEREAS, the use of the AGDEX filing system enhances the use of professional and technical information and saves the user's time in filing and retrieving information.

WHEREAS, the extensive use of the AGDEX filing system would enhance the exchange of professional and technical information among the states and other agencies using the system.

WHEREAS, a 1968 survey of state supervisors in agricultural education indicated that the use of AGDEX by teachers of vocational agriculture is expanding and that AGDEX is the most widely used filing system.

BE IT RESOLVED, that the Agricultural Education Division of the AVA encourage the adoption of the AGDEX filing system by states not now using the system.

BE IT FURTHER RESOLVED, that each of the regional seminar planning committees be encouraged to schedule a workshop concerning the advantages and the use of the AGDEX filing system.

BE IT FURTHER RESOLVED, that each of the states not now using the AGDEX filing system, be encouraged to adopt the system and to conduct workshops with their teachers concerning the use of the system.

BOOK REVIEWS

GERALD R. FULLER, Special Editor
University of Vermont

APPLYING FOR A JOB by Patricia M. Rath, Ralph E. Mason, and Lloyd J. Phipps. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1968. $2.50.

This is a set of self-study cards for students studying how to apply for a job. The questions are on the front of the card with the correct answer on the reverse side. The questions are not designed as a test but as aids to help the student learn with a minimum of teacher help some of the skills, knowledges, and attitudes necessary for obtaining a job. The questions cover many of the important facts on which employers base hiring decisions. They are facts that should be known and used by practically all job applicants.

The authors have an excellent background for this subject. Dr. Mason has been very active in contributing to the literature in the field of distributive education. Dr. Phipps has long been an active writer in agricultural education.

The self-study kit would be particularly effective for use with high school and junior college students. It would be of value for all vocational students, who are preparing for the world of work.

James P. Clouse
Purdue University

POWER TECHNOLOGY by George E. Stephenson. Albany, New York: Delmar Publishers, Inc., 1968, 296 pp. $6.60.

This book represents a major revision of the text *Power Mechanics* which was published in 1963. Five new units have been added and two existing units have been extensively rewritten. The sections in the text are Introduction, Internal Combustion Engines, External Combustion Engines, Electrical Energy, Transmission of Power, Atomic Energy, Space Age Power, and Your Future in Power.

The text begins with man's efforts to harness energy and progresses through the small gas engine into other internal combustion engines, electrical, atomic, and space age power. Illustrations are numerous and there are questions at the end of each chapter to guide discussion. A list of films and filmstrips to be used with the text are included in the appendix of the text. An instructors guide of 46 pages has been prepared to assist the instructor in using the materials found in the text. Two sets of transparencies are also available.

Although the text was written for industrial education, the book is well suited to teaching power mechanics in agriculture. The material is presented in a logical sequence and is well written. The text would be suitable for high school classes as well as area vocational and other post secondary schools.

Curtis R. Weston
University of Missouri

THE LAND RENEWED by William R. Van Dersal, New York: Henry Z. Walrk, Inc., 1968. 160 pp. $6.00.

This book is a revised edition of one that was published in 1946. It is a nontechnical overview of all phases of soil conservation. Soil conservation, as a subject, is divided into 67 sub-topics such as In the Beginning, Primeval Forests of the East, Topsoil, Floods, Soil Surveys, Terraces, Range Land, Land for Suburbs, and Stream Banks. Each topic is treated with one page of discussion and one full-page picture. In effect, the book is a brief word and picture story of the origin, waste, current use and conservation of the land.

The author "has been with the Soil Conservation Service of the United States Department of Agriculture for many years, and he writes with the knowledge and experience of an expert." The book appears to be directed toward an audience of junior high school age and older. It is designed to develop a general understanding of and a feeling of concern for the wise use of land. Its main use would be for personal reading. It is well written and beautifully illustrated.

A. H. Krebs
Virginia Polytechnic Institute

Special Editor for Pictures

Robert W. Walker

Robert W. Walker, Assistant Professor of Agricultural Education at the University of Illinois, begins work as Special Editor for Pictures with this issue. Dr. Walker received the B.S. degree in agricultural education from The Pennsylvania State University in 1949. He taught vocational agriculture at Hollidaysburg, Pennsylvania for twelve years. Prior to his appointment at the University of Illinois in 1966, he served as Coordinator of Curriculum and Research in Vocational Education at the Hollidaysburg Area High School.

Dr. Walker received the Master of Science and Doctor of Education degrees from The Pennsylvania State University. His doctoral research involved the development of an Agricultural Interest Inventory that is used to identify prospective agricultural occupations students. At the University of Illinois he teaches graduate and undergraduate courses in agricultural education, advises graduate and undergraduate students, and directs a curriculum research project.

Research in Agricultural Education:
STUDIES COMPLETED IN 1967-68

DAVID F. SHONTZ
University of Rhode Island

The 200 research studies completed in 1968 provide evidence that agricultural educators are striving to meet the challenge of change through investigations involving a variety of significant problems. Intelligent application of pertinent research is one of the most important ways to bring about improvements in agricultural education.

Abstracts of studies were compiled by the Research Committee of the Agricultural Education Division of the American Vocational Association. A limited number of copies of the studies reported in 1967-68 may be obtained from: R. A. Baker, Auburn University, Southern Region; J. T. Horner, University of Nebraska, Central Region; C. O. Loreen, Washington State University, Pacific Region; and D. F. Shontz, University of Rhode Island, North Atlantic Region.

The abstracts briefly state the purpose, method, and findings of research including information on where to obtain the thesis or published report. Doctoral theses may be purchased on microfilm; master's theses are available through inter-library loan; and staff study reports may be requested from the respective institutions.

In classifying the titles reported in 1967-68, eleven major categories were utilized. The largest number of studies dealt with student personnel services, administration and supervision, and a continuing emphasis on student occupational opportunities and educational needs. Other areas receiving considerable attention included teacher education, instructional materials and devices, and evaluation.

David F. Shontz

This compilation of research in agricultural education is a project of the Research Committee of the Agricultural Education Division, American Vocational Association. David F. Shontz, the representative of the North Atlantic Region on the Research Committee, is Associate Professor of Agricultural Education, University of Rhode Island.

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(Continued on next page)

SUMMARIES OF STUDIES IN AGRICULTURAL EDUCATION, 1963-1965

Abstracts of 150 studies completed in agricultural education during 1963-1964 and 1964-1965 were published recently under the title, *Summaries of Studies in Agricultural Education, 1963-1965*. The abstracts were compiled by the Research Committee of the Agricultural Education Division of the American Vocational Association and published by the American Association of Teacher Educators in Agriculture.

Copies of the publication are available at $3.00 each from Interstate Printers and Publishers, Danville, Illinois.

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(Continued from page 251)

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(Continued on next page)

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(Continued from page 253)

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News of NVATA

JAMES WALL
Executive Secretary

The Twentieth Annual NVATA Convention is now history and from the favorable reports received it will go into the record books as a highly successful event. Thanks to all who helped in planning and attending to the many details that contribute to a smooth running operation. Following are some convention highlights:

—William Smith, 169 Milltown Road, East Brunswick, New Jersey 08816, was elected President. Mr. Smith is the retiring Region VI Vice President.

—Howard Teal, Gorge Road, Boonville, New York 13309, was named as Vice President for Region VI for the next three years.

—Fred Beckman, P. O. Box 30, Weiser, Idaho 83672, was elected to a three year term as Vice President for Region I. He succeeds Fred Hansen of California.

—Sam Stenzel, 1455 N. Front Street, Russell, Kansas 67665, was elected to a one-year term as treasurer of NVATA.

—Total NVATA registration, including 131 wives and 43 guests, was 722.

—Eighteen teachers attended the Convention with all expenses paid by companies sponsoring various NVATA Awards.

—The following resolutions were adopted:

- A Program of Action to Re-Establish a Division of Agricultural Education Within The United States Office of Education. (Calls for an investigation by NVATA.)
- National Judging Contest Committee. (Asks for teacher Representation.)
- Keep "VOCATIONAL" in the descriptive terminology for Vocational Agriculture.
- National Association of State Departments of Agriculture. (Extends thanks for their resolution regarding USOE.)
- Election of AVA Division Vice President (Recommends election by Divisions rather than by the AVA House of Delegates.)
- FFA Membership. (Recommends girls be accepted as members.)
- Proposed 1969 AVA Convention Format. (Opposes new format.)

A special citation was presented to Congressman Roman C. Pucinski of Illinois, sponsor of vocational legislation and a strong supporter of the profession. Others receiving citations were: C. C. Scarborough of North Carolina, Ernest DeAlton of North Dakota, J. C. Atherton of Louisiana, George Hurt of Texas, L. C. Dalton of New Mexico, and Sam Thompson, High School Principal of Dumas, Texas.

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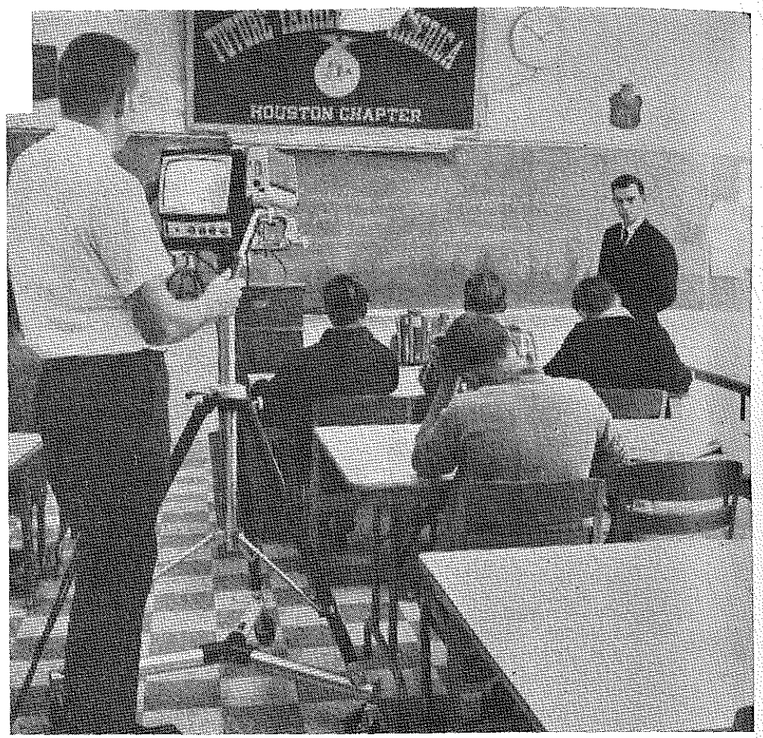
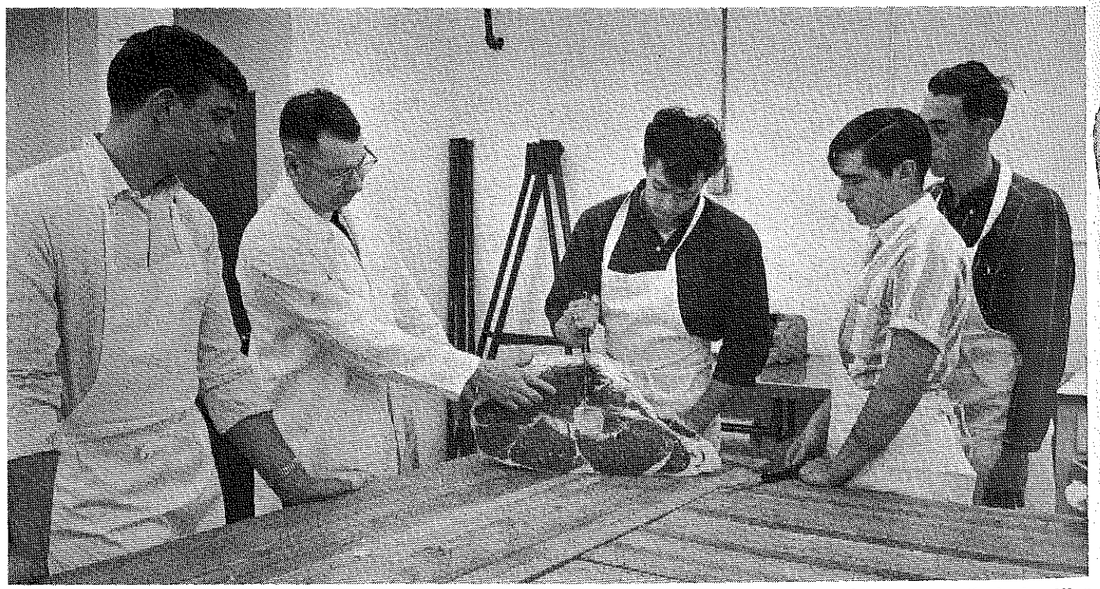
Stories in Pictures

ROBERT W. WALKER
University of Illinois



The video tape recorder is used to record and play back classroom presentations of student teachers at the University of Missouri. (Photo by Gene M. Love)



Students at the Agricutural and Technical College, Cobleskill, New York, receive instruction in the proper method of cutting beef. (Photo by Howard Sidney)

AGRICULTURAL EDUCATION

Agricultural Education

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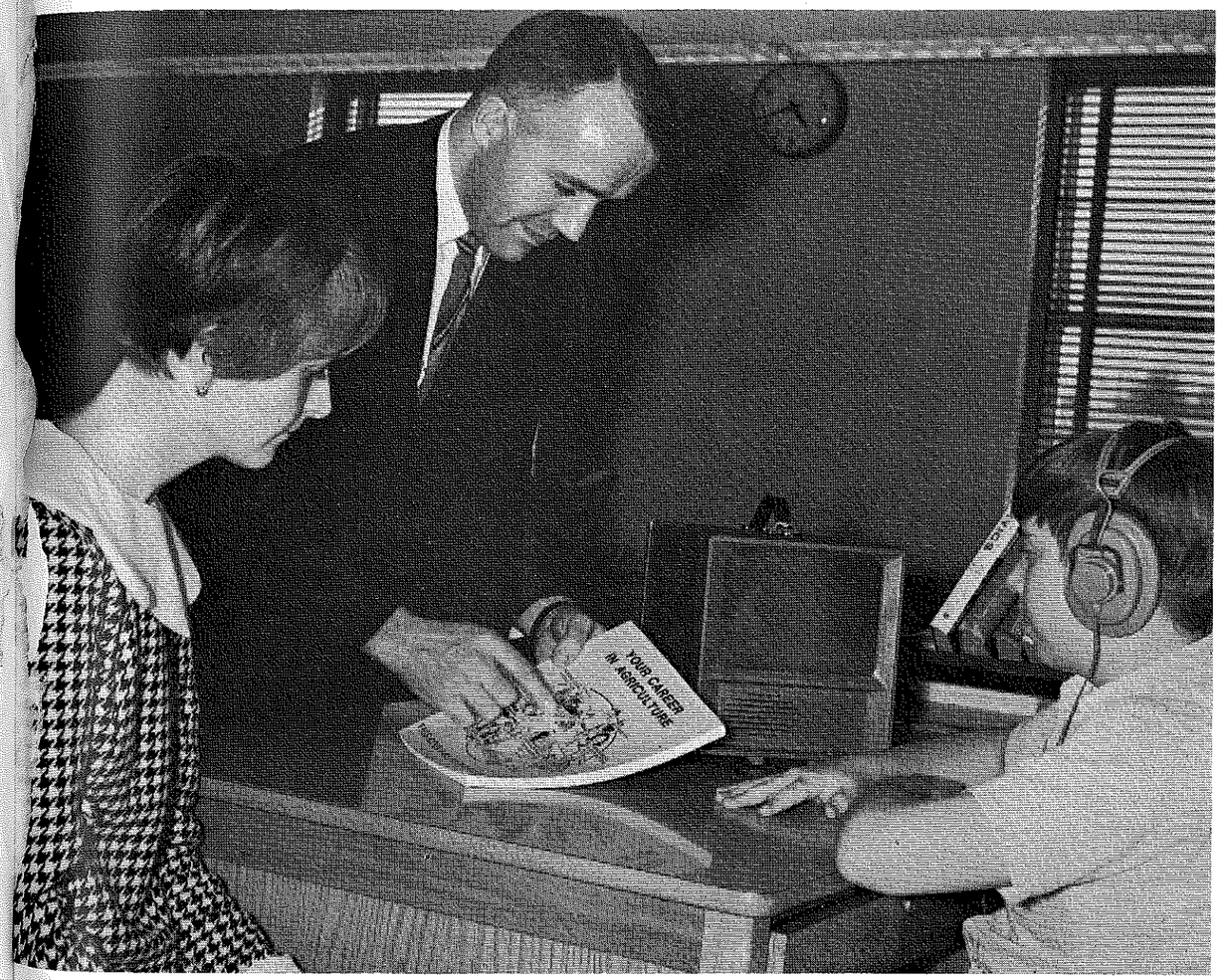

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