


AGRICULTURAL EDUCATION

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DR. FLOYD G. MCCORMICK
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COLLEGE OF AGR.
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AGRICULTURAL eDUCATION

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This month's cover photos show that we've come a long way in agricultural mechanics. The top photo is one of the early shops though we are not sure where it is located. But the forge and anvil gives its age. The middle photo is more modern showing gas welding, taken about the early 1950's. The lower shot is of a modern shop where thousands of vocational agriculture students are learning skills that will help prepare them for production agriculture or for agribusiness.

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Alan W. Myers

KEEPING THE WHEELS TURNING

By Alan W. Myers, Asst. Prof.
SUNY Agricultural and Technical College
Alfred, N.Y.

YESTERDAY AND TODAY

Twenty-five years ago, when many of today's "top mechanics" were trained, most tractors and machinery were very simple. Tractors were primarily nothing more than a relatively simple engine and sliding gear transmission, with some tires and a few lights hung on them. Many of them had no hydraulic system of any kind. Almost all tractors could then be purchased for well under \$10,000.

Today's tractors and implements have become extremely complex. Most tractors have highly sophisticated diesel engines. Very complex compound transmissions are the order of the day. Almost all tractors have hydraulic systems that include rock-shafts with draft control, power steering, power brakes, hydraulic transmission controls and multiple remote cylinders. Cabs with air conditioning are now standard on some tractors. The tremendous size of many of today's tractors requires specialized tools, just so a man can work on them safely.

Now, a tractor represents a tremendous investment to the farmer. The cost of better than half of the tractors sold today is well over \$10,000. One day of downtime, on a large tractor, can cost an operator thousands of dollars in lost production. Thus, a farmer cannot afford any more than the absolute minimum of downtime on a tractor.

Machinery has also tremendously increased in size, cost and complexity. The farmer cannot afford poor service and long downtimes on his machinery, any more than he can on his tractors.

SERVICE TECHNICIANS

What type of service personnel does the Agricultural power and machinery industry need? It needs many more good "service technicians." According to my definition, a "service technician" is a man who has the proper tools and training necessary to properly diagnose the cause of a problem on a machine, through the use of good trouble shooting techniques prior to repairing the machine. He only replaces those parts

which are truly needed to solve the problem. His work is done and leaves the shop in the minimum possible amount of time. He never has a machine returned to the shop, because the problem was not solved. If he sets up and predelivers a machine, no one has to go out to the farm and readjust it soon after it is delivered.

How will this industry obtain such "service technicians"? The answer, of course, is through a good education. However, potential service employees must first see that they will be adequately compensated for their educational efforts. As educators, we must take this message to the industry. Dealers must be willing to differentiate between their "service technicians" and their "mechanics" and to show it in the men's paychecks. "Service technicians" must be adequately compensated to encourage others to make the sacrifices necessary to increase their number.

BENEFITS

In many areas of the country, the good "service technicians" are continually siphoned off to other industries, which are willing to pay these men commensurate with their abilities. We must convince dealers and farmers that paying such men well will benefit both of them. Such a man, with the proper tools, can easily decrease the average time spent on a job to less than one-half of that spent by a "remove and replace" type of mechanic. If a dealer raises his shop rate by 50%, he can pay his service personnel 50% more and still have some extra money left to buy specialized tools. In this situation, both the dealer and the employee will make more.

The farmer will also benefit. If the work gets done in one-half the time, at a shop rate that is 50% higher, he will save 25% of the cost under the old system. Not only that, but his downtime will decrease, so that his crop losses will be much less at those critical times of the year. Thus, the dealer will keep another satisfied customer.

(Concluded on next page)

Today, the Agricultural power and machinery industry finds itself beset with the same basic deficiency with which all mechanical equipment industries find themselves beset. That deficiency is the lack of adequately trained service technicians.

PARTS CHANGERS

There are many so-called "mechanics" working in the industry. Far too many of these "mechanics" are actually no more than parts changers. A parts changer is the man who makes no diagnosis of the cause of a problem before he begins to repair a machine. He just begins a repair by changing the first part that comes to mind. If that part doesn't solve the problem, he changes another and another and so on, until he accidentally hits upon the one that is the cause of the problem. I am sure that almost everyone can name at least one parts changer in a local dealership.

"Mechanics," such as the parts changer described above, cannot be afforded by anyone. Such men cost the customer much more in terms of both parts and labor. They cost the dealer lost customers due to customer dissatisfaction. Most important, they hurt everyone by wasting our dwindling supplies of energy and other natural resources.

EDUCATION

Assuming that the incentive for education has been established, what must we educators supply? We must supply programs that do *not* just train students to repair certain machines or parts of machines, without the benefit of understanding why the repair is needed. Such training only leads to another generation of parts changer "mechanics."

A good trouble shooting "service technician" must understand the principles of operation which are basic to all mechanical devices. Before any person can truly understand the operating principles of such things as planetary transmissions, hydraulics, air conditioning, electrical systems, and internal combustion engines, he must first have a good scientific background. Such a background would include Algebra, Geometry, Trigonometry, Chemistry and Physics.

Unfortunately, there has been a trend in education, in recent years, to provide technical education to students in high school without the benefit of a scientific background. In fact, in some schools, scheduling is deliberately arranged so that students in technical programs can-

not take the scientific courses. These students should at least have an *opportunity* to take such courses. If not they will not have the background necessary to adjust to the tremendous changes we are going to see in Agricultural power and machinery in the next ten or fifteen years. Decreasing energy sources and increasing demand for food will make significant changes necessary in Agricultural mechanization.

We, as educators, must convince our guidance counselors, school administrators, and state education departments that *all* Agricultural programs are scientifically based technical programs. We must show them that our students must at least have access to basic scientific courses. Also, we must convince them that Agricultural education is *not* the place for students that cannot make it anyplace else, but that it is the place for students who are really interested in seeing that everyone has enough to eat in a significantly changed world in the near future.

UPGRADE TRAINING

Finally, what can we do with all of those "parts changers" who are now

employed in the power and machinery industry? We are severely in need of programs to upgrade the skills of such men, so that they don't become displaced and contribute to the further growth of our disgraceful national welfare problem.

The most difficult part of this problem is not in setting up programs that will help these people. It is to convince them to take advantage of such programs. Many of these mechanics have had poor educational experiences previously. Bad memories cause them to resist any further schooling. Others foolishly refuse to believe that they need any further training. Some are afraid to go back to school, in the belief that they have forgotten how to learn. Those who can find solutions to these attitudinal problems will benefit all of us.

Let us *all* work together to upgrade the service personnel in our industry. Let us give our students what they really need for a successful future, not what they think they need. They don't have enough work experience to know what they will really need in the future.

From the Book Review Editor's Desk . . .

BOOKS TO BE REVIEWED

THE NATURE AND PROPERTIES OF SOILS; By N. C. Brady, MacMillan Publishing Co., Inc. (1974)

NATURAL RESOURCE CONSERVATION: AN ECOLOGICAL APPROACH; By O. S. Owen, MacMillan Publishing Co., Inc. (1975)

FUNDAMENTALS OF APPLIED ENTOMOLOGY; By R. E. Pfadt, MacMillan (1971)

PRINCIPLES OF FIELD CROP PRODUCTION; By J. H. Martin, W. H. Leonard & D. L. Stamp, MacMillan Publishing Co., Inc. (1976)

SOIL FERTILITY AND FERTILIZERS; By S. L. Tisdale & W. L. Nelson, MacMillan Publishing Co., Inc. (1975)

INTRODUCTION TO FOREST GENETICS; By J. W. Wright, Academic Press (1976)

GRAPE GROWING; By R. J. Weaver, John Wiley & Sons (1976)

DAIRY CATTLE JUDGING TECHNIQUES; By G. W. Trimmerger, Prentice-Hall, Inc. (1977)

APPLIED CLIMATOLOGY; By J. F. Griffiths, Oxford University Press (1976)

WINNING FFA SPEECHES; By R. S. Brewer, Ph.D. & D. B. Curtis, Ph.D., The Interstate (1976)

FUNDAMENTALS OF MACHINE OPERATION: TILLAGE; By F. Buckingham, John Deere Service Publications (1976)

ADVANCES IN AGRONOMY; By N. C. Brady, Academic Press (1976)

PRINCIPLES OF SEED SCIENCE AND TECHNOLOGY; By L. O. Copeland, Burgess Publishing Co. (1976)

DYNAMICS OF COMMODITY PRODUCTION CYCLES; By D. L. Meadows, Wright-Allen Press, Inc. (1970)

THE FARM CREDIT SYSTEM; By W. G. Hoag, The Interstate (no date given)

COWBOY ECONOMICS; By H. L. Oppenheimer, The Interstate (1976)

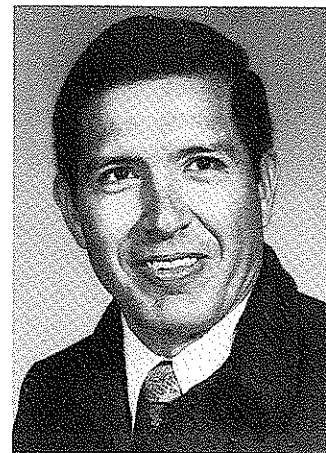
LABORATORY MANUAL OF CROP SCIENCE; By R. P. Waldren & S. W. Ehler, Burgess Publishing Co. (1976)

If you feel qualified to review one of these books and desire to do so, write the Book Review Editor and he will send the book for review. Once reviewed, the book comes the property of the reviewer.—John Hillison, Book Review Editor, Ag. Educ. Program, Virginia Polytechnic Institute and S. U., Blacksburg, Virginia 24061.

AGRICULTURAL MECHANICS

● A STIMULUS TO VOCATIONAL AGRICULTURE

*Isaias Almazan, Jr.
Vocational Agriculture Instructor
Stroman High School
Victoria, Texas*



Isaias Almazan, Jr.

When most people hear the term "mechanics" they immediately imagine roaring engines and grimy garages. As we know, this is not an appropriate analysis of what mechanics in the study of agriculture really designates. Being educators in the field of agriculture we are well aware that mechanics is vitally important to the overall program as it enables students to blend theory with practical application to achieve workable skills.

PARTICIPATION

Of all the areas in the curriculum of vocational agriculture I feel that mechanics is the key to student participation.

● A vast majority of our students find the farm shop stimulating and become more enthused and involved when they can actually perform a job and see results. Few students will go home and tell of their experiences with the questions at the end of chapter nine or the 55-minute lecture on animal nutrition. However, their parents are quick to mention during home visits or open house how little Jimmy came home excited about his shop project.

We are fortunate to be in a position to expose youth to the opportunities for continued achievements. Through the study of agricultural mechanics or farm shop, students are able to discover their mechanical aptitudes and also develop a sense of satisfaction that comes with the experience of personal accomplishments. Farm shop practices will be beneficial in everyday do-it-yourself projects even to those students who pursue a career outside the field of agriculture. Future projects around the home will be expedited by an introduction to the many facets of agricultural mechanics such as carpentry, cabinet making, hot and cold metal work, concrete and masonry work, electrification, plumbing, painting, arc welding, oxy-acetylene welding and cutting, and small engine repairs. The extent to which each area is covered depends on the equipment and facilities available as well as the instructor's knowledge.

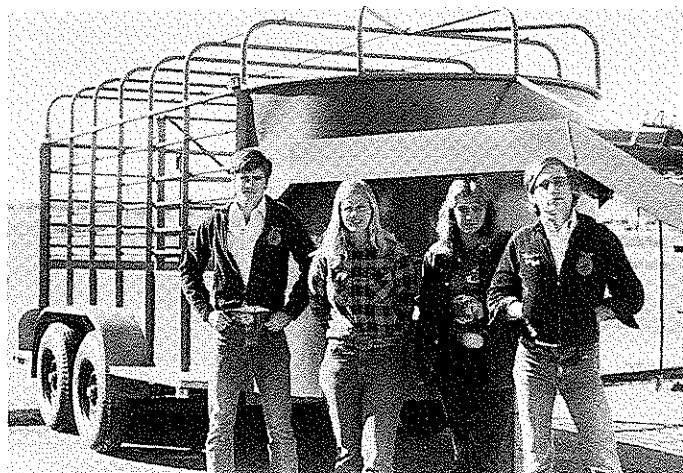
Since we are required to be knowledgeable in a variety of subjects it is inevitable that we will be deficient in some of them. Nevertheless, we are obligated to provide a comprehensive agricultural mechanics program and our deficiencies ● can be minimized if we are flexible and explore all available resources. There is often an untapped supply of knowledge and experience in the local community waiting to assist in the training of young people.

PROJECTS

Vocational agriculture students at Victoria-Stroman High School have an opportunity to construct a personal project of their choice. In addition, they undertake a chapter project which gives them the experience of working together and develops a sense of cohesiveness and group pride. This can be exemplified by the construction of redwood benches around the school, the planting of shrubs in planter boxes built by the students, the placing of decorated trash barrels throughout the campus and the planting of trees in an effort to beautify the surroundings. These projects were financed by the local FFA chapter and the upkeep is also the responsibility of the students.

Another group project which has recently been completed was the construction of an 8 by 16 foot gooseneck cattle trailer. The project was a major task which proved to be a success due to the cooperative efforts of students who were willing to sacrifice their free time before and after school, at night and on weekends. This project was also financed by the chapter which obtains its funds through the sale of candy and chips between class periods and an annual citrus fruit sale during Christmas.

(Concluded on page 215)



This gooseneck trailer was built by Stroman Vo-Ag students as a chapter project. The 8' x 16' cattle trailer will be sold and the proceeds will be used to build a smaller trailer for chapter use.



Marion L. Kimmons

"Chipping" Dollars From Your Agricultural Mechanics Budget

Budget stretchers and time savers for an agricultural mechanics program are always a necessity. This is particularly true at the present time due to inflated prices of all consumable materials. Most schools across the nation have had to cut back programs due to monetary deficiencies. However, even with a reduced budget, vocational agriculture instructors should not deprive their students of the educational value of an adequate agricultural mechanics program.

One way to accomplish this in the area of agricultural construction would be to incorporate several skills into the making of one inexpensive but usable item. When a student constructs an item to be taken home, interest and quality of workmanship will tend to be higher. One example of a usable, take-home item would be the welding chipping hammer.

In construction of the welding chipping hammer shown in the drawing, skills that could be incorporated would include: blueprint reading, selection of metals, use of hot and cold metals, and proper finishing of an article.

When the assignment is made to the class, a logical sequence would be to start with blueprint reading. Included would be recognizing terms, studying measurements, checking the bill of materials, and noting the correct sequence of construction procedures.

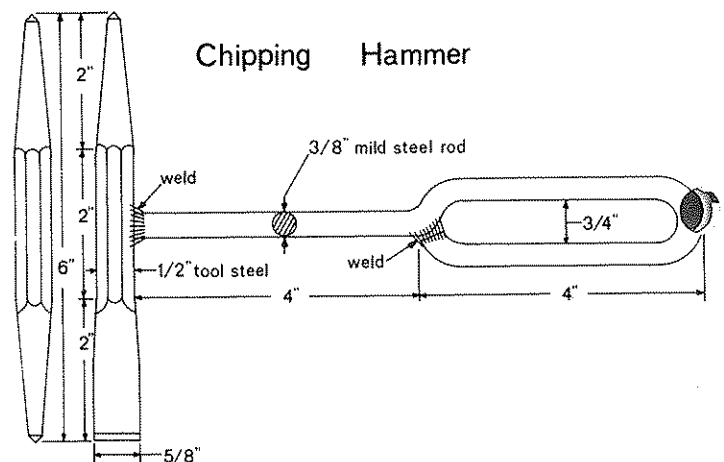
The next step would be the selection of proper materials, since the handle would be constructed of low carbon steel, while the chipping head would be of medium or high carbon steel suitable for chisels and punches.

Emphasis should be placed upon working procedures of metals. The instructor could explain the processes associated with different types of metals which would include forging, shaping, annealing, and welding. Accurate measurements must be stressed. Learning how to sharpen punches and cold chisels are desirable skills. The welding chipping hammer furnishes the opportunity for this learning.

A project is not completed until properly treated, whether made of metal or wood. The student must learn the proper way to finish the article, not only for lasting properties, but also for appearance of the item. Weld joints should be treated to prevent oxidation and then painted the desired color.

The approach of this budget stretching idea lends itself to the skills method of teaching; however, it is actual construction of a usable product and as such, student progress is easily evaluated. Proof of skills learned is visible in the product.

Marion, L. Kimmons, Assoc. Professor
Agricultural Engineering Department
South Dakota State University
Brookings, South Dakota



BILL OF MATERIALS:

- 1 pc 1/2" Tool Steel 5" long
- 1 pc 3/8" Mild Steel 13" long

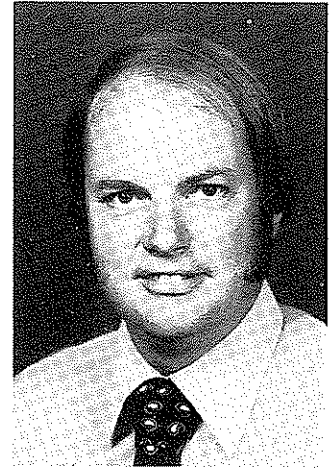
CONSTRUCTION PROCEDURE:

1. Mark and cut out all materials
2. Heat and shape tool steel
3. Heat and anneal tool steel
4. Shape handle using forge or oxy-acetylene torch
5. After tool steel has cooled, reheat in forge and temper
6. Make welds on handle
7. Treat weld joints and paint
8. Hand in for grading

SUGGESTIONS:

1. Make the chisel end of the hammer first
2. Tack weld handle and check for squareness
3. Temper
4. Finish sharpening on an emery

● Ag Mechanics Will Keep Your Department Accountable



by
David L. Bothwell
Mankato High School
Mankato, KS

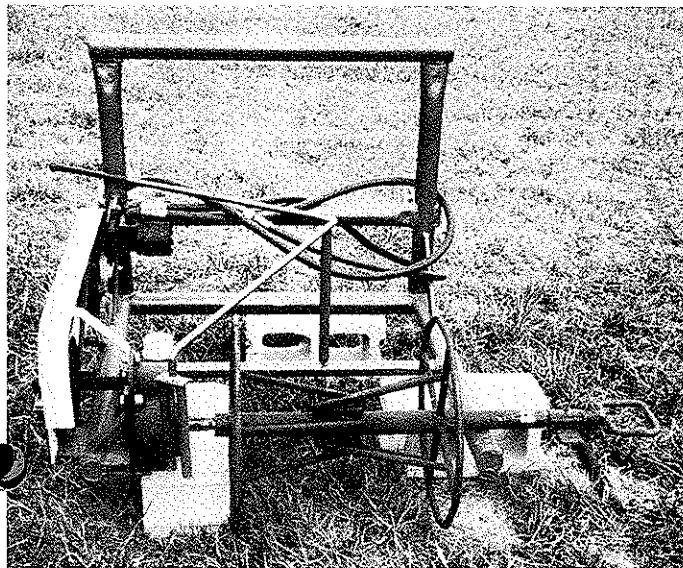
David L. Bothwell

Agricultural mechanics is an integral part of the vocational agriculture program in secondary schools. Higher prices for machinery and repairs are increasing the overhead for agriculture production as well as for agribusiness. The overhead can be reduced by several steps if the operator, manager, and/or owner have a sound background in agriculture mechanics. The advantages of this type of background are as follows:

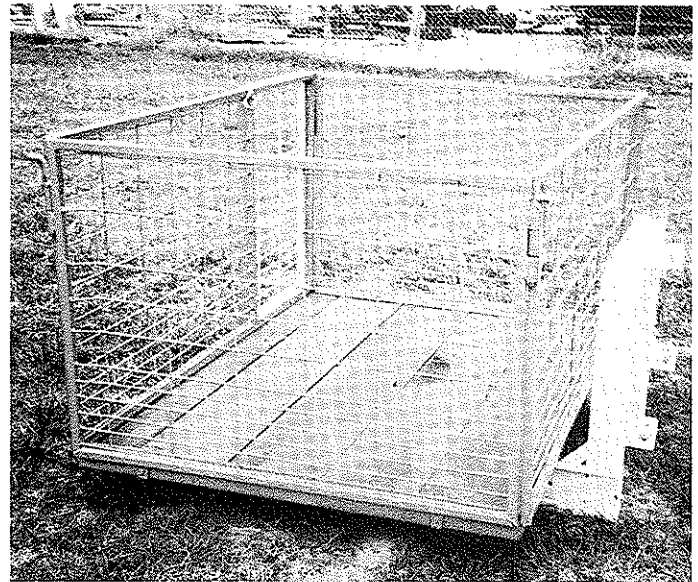
- a. The manager with greater ag mechanics knowledge can make a practical decision about the extent of repairs needed and compare this with the cost of trading for a new machine.
- b. A maintenance program can be used which will extend the life of a machine.
- c. Alterations or adaptations can be made to old and new machines which will increase the speed and efficiency of a machine.
- d. Off-season time can be used to make repairs or alterations on equipment and buildings.

● To make the program useful and to keep the students' interest in this important area we should try to improve our ag mechanics courses to fulfill the need for more knowledge in this area. Too many times agricultural mechanics is taught by teachers who let their students "go to shop" a certain number of days each week. There may be little consideration given as to whether the student is learning any new skills or whether he is building his tenth gate and repeating the same skills with little challenge.

Many skills are involved in this hydraulic powered wire winder which placed fifth at the Kansas State Fair.



A three point utility carrier can be a very labor saving project and allows each student to vary the size and unique features to fit his own needs.



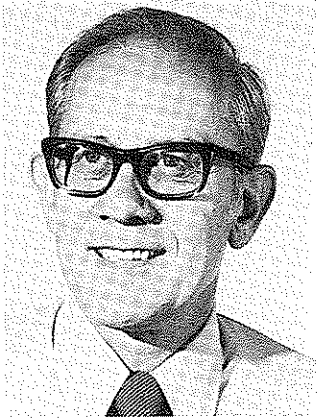
APPLYING SKILLS

Many teachers plan to teach skills in each mechanics area. But the skills may not be applied to a local problem. Too often we try to cram all skills for agricultural mechanics into the first year of vocational agriculture and we teach no new skills during the following years. Students are just told to build a project.

I feel the best approach is one that includes learning the skill and then applying it in a useful agricultural project. This project needs to be planned with the student, teacher, and the parent. The plans should include size, cost, unique features, but should have room for changes. The project does not need to be a large showy piece of machinery or a building. Each student's project should be fitted to his needs and based on his skills.

To teach skills, the sequence should be planned so that in each year (or grading period) new areas of farm mechanics are covered and some earlier skills are completed. Some farm mechanics skills will require more practice and time than others. For example, drill bit sharpening needs more practice than understanding tire pressure and problems.

(Concluded on page 205)



Clinton O. Jacobs

GROUND FAULT A HEALTH HAZARD

by

C. O. Jacobs

University of Arizona

In the distribution of domestic electric energy the terms "ground fault" and "circuit fault" are often used synonymously, when in effect, the conditions they describe are very different. A "circuit fault" exists when two (or more) circuit wires are involved. When this condition occurs, a short circuit occurs and a circuit breaker trips or fuse blows to interrupt the flow of energy and protect the circuit from damage. A "ground fault" develops when a current carrying circuit conductor is provided a path for electric energy to pass directly through a fault (resistance) to ground.

A ground fault is especially hazardous because the resistance through which the current is flowing to ground may not cause the circuit breaker or fuse to interrupt the flow yet be sufficient to cause electrocution!

Ground faults are most often identified with portable electric household appliances and shop tools. The health hazard occurs when a person makes contact with defective equipment and a good ground. If the flow of current is over 10 milliamperes (mA) through the individual, electrocution may occur. The maximum current which a person can receive and still voluntarily react to "let go" is 5 mA. The current flow required by a 7½ watt Christmas tree bulb is approximately 60 mA—enough to kill a healthy person in only one second!

EQUIPMENT GROUNDING

The three-wire equipment grounded system is common place on newer installations. Nevertheless, equipment grounding, fuses and circuit breakers cannot protect people from shock. When the ground fault resistance is high, the three-wire equipment ground offers little protection from dangerous electric shock. Only when the current flow is sufficiently high will it cause the circuit to be interrupted.

G.F.C.I.

Since 1971, the National Electric Code (NEC), Section 680-4f has identified the use of a mechanical device known as a Ground Fault Circuit Interrupter (G.F.C.I.) to protect 15 and 20 ampere 120 volt circuits from ground fault condition. Effective January 1973, the N.E.C. required that outdoor 120 volt receptacles on new occupancy construction be protected by a G.F.C.I. In the 1975 code, the use of the G.F.C.I. was extended to the bathroom outlets and open carports or enclosures used as work areas.

Ground Fault Circuit Interrupters are designed to disconnect the electric power to a fault which is in excess of 5 mA. The device is designed to detect an imbalance of current flow between the "hot" and "neutral" conductors of a single phase 120 volt circuit. This design makes it possible to use either an appliance with grounded or ungrounded male plug and the interrupter will perform its function of preventing excessive ground fault circuit conditions.

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PHOTO 1
Patch cords with varying degrees of resistance for plugging into drill handle.

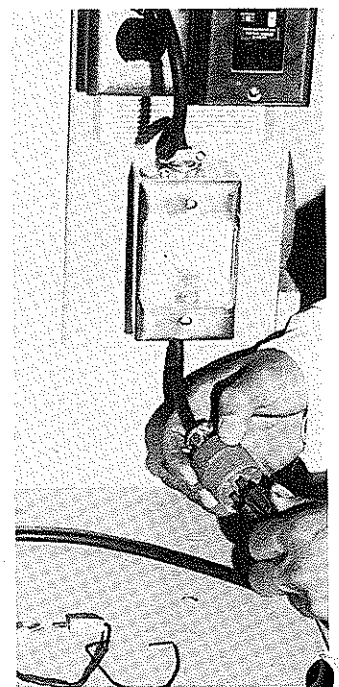


PHOTO 2
Operating the drill through the milliammeter.

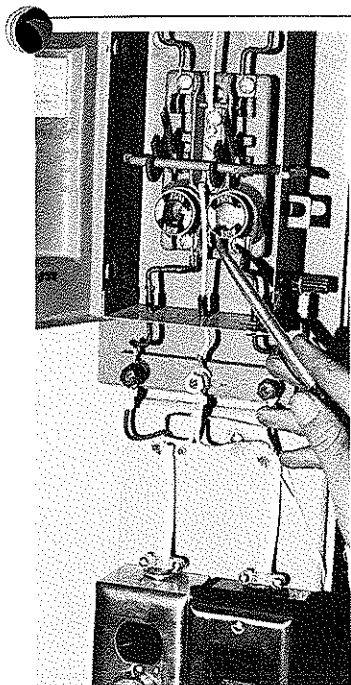


PHOTO 3
A fuse "blows" when a circuit fault to the equipment ground occurs.

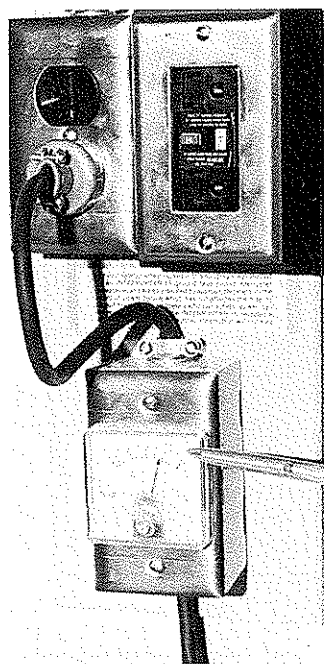


PHOTO 4
A ground fault of 7mA does not cause the fuse to blow.

DEMONSTRATION MODEL

Following the format that was developed by Bear and Espenschied* an electrical panel was constructed by the author as an attachment to the electric power demonstration board used in this state by teachers of vocational agriculture. Equipment for the demonstration consists of a standard 15 amp/120 volt duplex equipment ground outlet, a duplex outlet with built-in G.F.C.I., a 0-10 milliammeter, and a metal cased 1/4" electric hand drill. The drill is equipped with two pin size banana plugs, one of which is connected to the hot lead inside the handle of the drill. The other plug is grounded to the handle. This permits patch cords which offer varying degrees of fault resistance to ground to be plugged into the drill, Photo 1. The drill can be operated through the milliammeter or directly through the outlet receptacles as illustrated in Photo 2.

The first demonstration uses a patch cord which develops a very low fault resistance in the drill. The power cord of the drill is plugged into the standard duplex receptacle and the switch on the main entrance panel closed to operate the drill. The circuit fuse blows, Photo 3, because the fault is a direct circuit fault to the equipment grounding conductor.

The second demonstration involves the use of a 17K resistor included in the patch cord to create a high resistance. The drill is operated through the milliammeter and the standard duplex outlet. The milliammeter, Photo 4, shows approximately 7mA ground fault condition. Even with a one (1) ampere rated fuse, the circuit is not interrupted by the

fuse blowing. For the third part of the demonstration, the drill and milliammeter is plugged into the G.F.C.I. outlet and the drill operated. The 7mA resistance establishes a circuit imbalance which is sensed by the G.F.C.I. to cause it to "trip" (Photo 5). This takes place in less than one-half second — quickly enough to allow a person holding the drill to be safely disconnected from the ground fault condition.

A 30K resistance patch cord is then inserted in the drill. This high resistance will cause approximately 4mA ground fault condition (Photo 6). When the drill is operated through the G.F.C.I. with this resistance, the drill continues to operate because the ground fault is less than the 5mA trip current the interrupter is designed to sense. Other demonstrations could be performed with the equipment. For example, the adapter plug for converting from three to two-wire could be employed to show how the G.F.C.I. also protects against ungrounded conditions.

As the N.E.C. is accepted by County Governments and with O.S.H.A. regulations being enforced, teachers of vocational agriculture will become more involved with G.F.C.I.'s for their instructional programs in Agricultural Mechanics. Certainly, teachers should give serious thought to equipping outdoor 120 volt receptacles which may operate portable electric equipment in their school shops with G.F.C.I.'s. The action taken could save a life and a possible tort liability case. Plans for constructing the G.F.C.I. Panel as described in this article may be obtained upon request from: Agricultural Education Department, University of Arizona, Tucson, AZ 85721. ◆◆◆

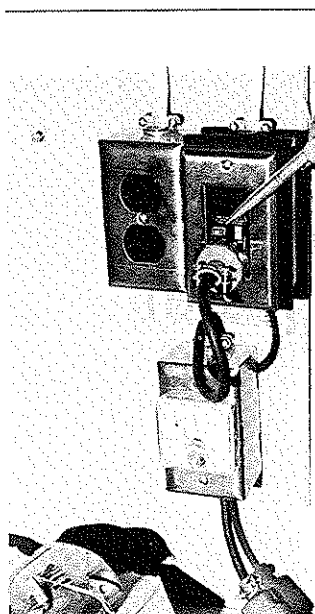


PHOTO 5
When the 7mA ground fault is operated through the G.F.C.I. the interrupter "trips" and opens the circuit.

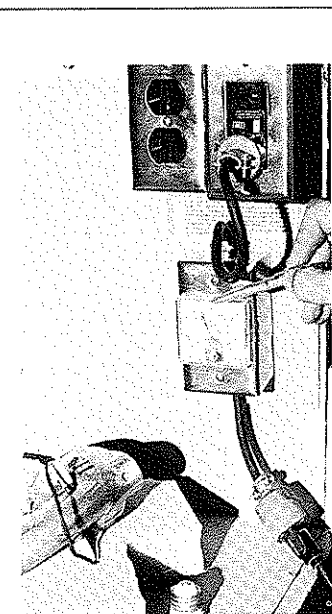


PHOTO 6
A fault of 4mA does not trip G.F.C.I.

*Bear, W. Forrest and Roland Espenschied, "Ground Fault Interrupter Instruction," *The Agricultural Education Magazine*, January 1974 Vol. 46 No. 7 p 159.

TRACTOR MECHANICS — An Individualized Competency-Based Vocational Agriculture Program

by

C. Bruce Carpenter

Curriculum Development Center, University of Kentucky
and

Maynard J. Iverson

Agricultural Teacher Education, University of Kentucky

Components of the Program

The Kentucky model CBVE program consists first, of a *catalog*² of performance objectives, criterion-referenced measures and performance guides focusing on those tasks identified by practicing tractor mechanics as essential for performing the job. The development of the tractor mechanic catalog (as well as a number of other catalogs by other vocational service areas) was coordinated by V-TECS, the Vocational Technical Education Consortium of States, a multiple state unit of the Commission on Occupational Education Institutions, Southern Association of Colleges and Schools. Major efforts of V-TECS are to eliminate duplication of effort in development of curriculum materials across state lines and to produce validated instructional materials for use in implementing competency-based vocational education programs. Practical uses of the tractor mechanic catalog include:

- planning new instructional programs
- revision of existing programs or units
- restating objectives
- writing or revising lesson plans, tests, and/or visual aids
- identifying equipment and supplies needed in a program of tractor repair
- securing the latest references and visual aids

Learning modules make up the second part (the individualized, *delivery* portion) of the program. Based upon tasks in the catalog (which were validated and properly sequenced), 96 modules were developed within 19 blocks of instruction (Table 1).

"How can I effectively teach agricultural mechanics to students who vary widely in experience and talent?" "What do I do with students who finish early or take longer to finish a lesson?" "Johnny needs and wants a job, but how can I certify him when he hasn't finished my course?" "This young man does an excellent job in the shop but he can't pass written tests—what can we do for him?" "How can I build flexibility into my shop?"

These questions are typical of those posed by teachers of agricultural mechanics who are faced with the "real-life" problems of varying student ability and experience, rigid school schedules and traditional, norm-referenced grading requirements. Faced with these problems, it is not unusual to hear them say, "Surely there must be a better way!"

The "better way" may be at hand in a new approach to teaching vocational courses such as agricultural mechanics—*competency-based*,¹ *individualized* instructional programs. Such a program has been developed in Kentucky for the occupational area, "Tractor Mechanic."

¹Competency-based vocational education does not necessarily have to be individualized. In its simplest form, CBVE is any program which specifies explicit learning objectives based on occupational analysis and then holds the student responsible for achieving his or her pre-determined objectives. The decision was made in Kentucky, however, that the optimal system would be the individualized approach. Not only is instruction personalized, but the flexibility to use this system with groups is also facilitated. The reverse, to utilize group curriculum with individuals, is not so easily accomplished.

²C. Bruce Carpenter, James D. Maddox, Elsie Kennedy and Maynard Iverson, *Catalog of Performance Objectives Criterion-Referenced Measures and Performance Guides for Tractor Mechanics* (Lexington, Kentucky, Curriculum Development Center for Vocational Education in Kentucky, 1975), 391 pages.

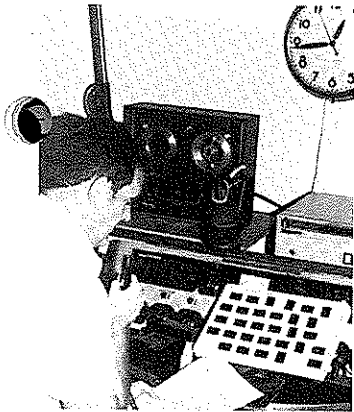
TABLE 1

Units and Modules within the Kentucky Tractor Mechanic Program

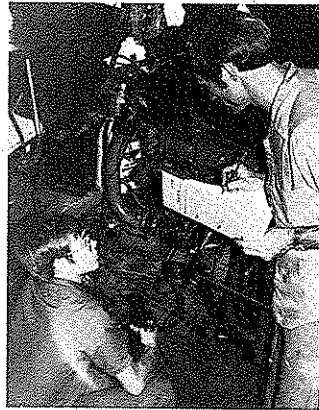
Blocks of Instruction	Number of Modules
Preparing a Tractor for Repair	2
Servicing the Storage Battery	4
Servicing the Electrical Charging Circuit	5
Servicing the Ignition System	4
Servicing the Electrical Starting System	4
Servicing the Carburetor System	7
Servicing the Diesel Fuel System	7
Servicing the Cooling System	7
Servicing the Hydraulic System	8
Servicing Power Drives	5
Servicing Tractor Clutches	6
Servicing the Power Train	4
Servicing Differentials	5
Servicing the Final Drive	5
Servicing Tractor Running Gear	4
Servicing Valves	3
Overhauling the Tractor Engine	10
Servicing the Lubrication System	4
Painting a Tractor	2
Total	96



Slide-tape presentations are an important component of the Kentucky Individualized CBVE program. A student is pictured viewing the slides and listening to the tape which accompany a learning module.



Kentucky teachers serving as development consultants had the added task of making up their own slide-tape audio-visual aids to go with selected modules. Eddie Carney, Bardstown Vo-Ag teacher, is shown using the facilities of a local radio station to record his tape presentation.

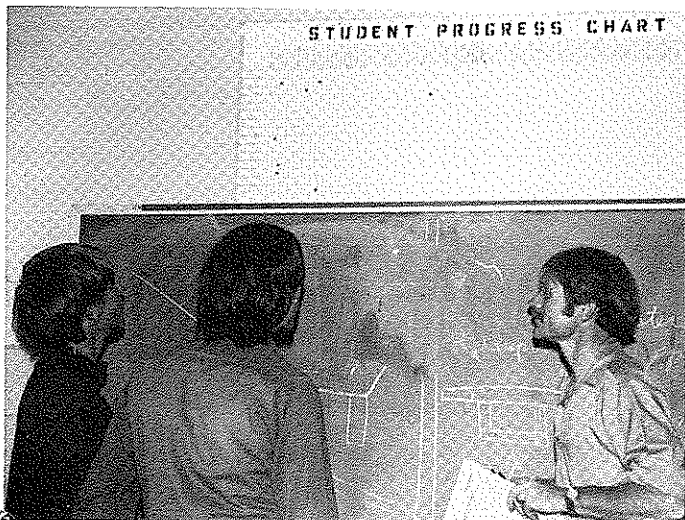


An important part of the program is the check out of student competency. Frank Rowland, Vo-Ag Instructor at Barren County High School, Glasgow, Kentucky, is pictured testing a student's ability to properly time a gasoline tractor engine.

Four experienced teachers of agricultural mechanics developed the modules, with assistance from curriculum and media specialists, state staff members, editors, clerical people and consultants from industry.

Each module contains the following elements:

- Introduction (orients the student to what he or she is to learn)
- Directions (explains procedures and prerequisites for completing the modules)
- Objectives (goals stated in performance terms, directly from the catalog; the student is held responsible for reaching a certain level of achievement)
- Learning Activities (a variety of experiences to aid the student in achieving the objective)
- Instruction Sheets (specific information on the objectives which are not found in the references)
- Self-Checks (self-administered tests which allow feedback to the student as to how he or she is progressing)



Everyone enjoys the sense of accomplishment of seeing the stars go behind their name when a module has been completed. Two students look on as Frank Rowland, Vo-Ag Instructor at Barren County High School, explains the procedure for completing the program.

- Check-Out Activities (situations—expressed as criterion-referenced measures from the catalog—for testing to determine if the student has accomplished the objective)
- Instructor's Final Checklist (lists items which the instructor must evaluate in order to verify student competence)

Validation Through Field Testing

During the 1975-76 school year, the 96 tractor mechanic modules were field tested at two representative schools in Kentucky. A number of observations resulted from this one-year trial test of the materials:

1. Teachers and students enjoy the more relaxed pace of learning, yet *are* challenged to work up to their potential.
2. Teachers are freed from lecture/demonstration which allows more time for trouble-shooting learning problems, testing for competency, and making available needed learning resources.
3. Adequate facilities—shop space, study carrels, tools and equipment, supplies, references and audio visuals—are vital to the program's success.
4. Students can and do progress at their own speed, and *are employable at different levels* during the course of the program.
5. Students who have great difficulty achieving on cognitive written tests are able to succeed by proving their competence in actually performing the task. In fact, the system provides for recycling so that no one must fail. Some may, however, exit before completing all tasks.
6. Employers *are interested* in hiring students whose competency as a tractor mechanic can be certified.

Conclusion

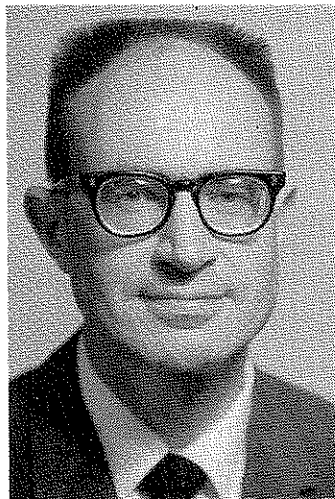
Agricultural/agribusiness education in Kentucky is moving ahead in support of the individualized, competency-based system of personalized instruction in agricultural mechanics. Properly implemented in local programs, and under the guidance of a versatile, enthusiastic teacher, this program has great potential for better serving the needs of students, teachers, and industry. ◆◆◆



Study carrels provide a measure of privacy for students to work individually on their modules.



A well equipped, efficiently operated tool room is a must for an individualized CBTE program. Agriculture students at Barren County High School take turns operating the tool room.



David G. Craig

VOCATIONAL AGRICULTURE TEACHER SHORTAGE CONTINUES

by
David G. Craig
Associate Professor
University of Tennessee, Knoxville

A shortage of vocational agriculture teachers continues to exist on a national basis. The shortage has occurred for at least a ten-year period. *A National Study of the Supply and Demand for Teachers of Vocational Agriculture in 1976* suggests some reasons for this short supply (see Table I).

First, the total number of teaching positions continues to rise at about a five percent rate per year. This includes an increase of 499 new positions from 1975. Second, the record number of new college graduates entering teaching (1,043) is not enough to fill regular turnover in vo-ag teaching jobs and the additional, newly created positions. Third, the regular turnover was steady at 10.1 percent in 1976. A fourth reason is that only slightly more than 60 percent of the graduates in agricultural education enter the teaching profession (see Table II). In addition to these facts, Table I also indicates increases in teachers needed but not available, increases in teachers with temporary or emergency certificates and increases in departments that cannot operate because of the teacher shortage.

(Continued on next page)

Note: The tabulated data below is from a partial and preliminary report of the study given at AVA in Houston, Texas, December 7, 1976.

TABLE I
NUMBER OF TEACHING POSITIONS IN
VOCATIONAL AGRICULTURE IN
THE UNITED STATES IN 1976

Item	Number
1. Total positions as of 6/30/76	12,482*1
2. New graduates entering teaching during the 1975-76 school year	1,043 ²
3. New positions added during 1975-76 school year	499 ³
4. Number of newly qualified teachers still available 9/1/76	66 ⁴
5. Teachers needed but unavailable 9/1/76	214 ⁵
6. Teachers with temporary or emergency certificates	554 ⁶
7. Departments which will not operate in 1975-76 because of the teacher shortage	131 ⁷

*Does not include 1,376 positions in technical institutions and community colleges (an increase of 232 from last year).

¹An increase of 375 over last year; and 880 increase from 1974.

²An increase of 44 over the 1975 figure; an increase of 100 from 1974.

³An increase of 33 from last year.

⁴An increase of 4 over the 1975 figure; up 39 from 1974.

⁵An increase of 30 from 1975; up 122 from 1974.

⁶A decrease of 61 from last year; a 112 increase from 1974.

⁷An increase of 53 from last year; up 25 from 1974.

TABLE II
PERCENTAGES OF AGRICULTURAL EDUCATION GRADUATES
ENTERING VARIOUS OCCUPATIONS

Occupation	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Total Number Qualified	1038	1151	1233	1314	1566	1700	1743	1759	1713	1623	1660	1697
Total Number Placed in Vo-Ag	671	701	742	809	891	866	864	964	966	943	999	1043
Teaching Vocational Agriculture	64.6	61.4	60.2	61.6	56.9	51.0	49.6	54.8	56.3	58.1	60.2	61.5
Other Work	4.7	8.2	7.2	7.8	7.6	11.0	11.0	11.0	13.7	10.8	9.9	11.0
Graduate Work	9.2	10.0	12.4	7.8	9.3	9.0	9.1	7.9	7.6	8.9	9.8	8.8
Farming	3.0	2.6	3.3	3.0	3.7	4.9	7.1	7.7	9.3	9.2	8.2	8.2
Farm Sales, Service or Supply	5.6	5.4	3.2	2.0	2.7	4.1	5.1	6.3	6.8	7.8	7.5	6.3
Teaching Other Subjects	6.2	5.4	8.2	7.5	11.4	7.3	6.1	6.6	4.1	4.1	3.3	2.5
In Armed Forces	6.7	7.0	5.5	10.3	8.4	12.7	12.0	5.0	2.2	1.1	1.1	1.7

CONTINUED VOCATIONAL AGRICULTURE TEACHER SHORTAGE . . .

A 12-YEAR STUDY

The Vo-Ag Teacher Supply/Demand Study mentioned above was initiated by Dr. Ralph J. Woodin at The Ohio State University in 1965. The study has been continued by the author of this article since Dr. Woodin's retirement in 1974. Each year data is collected in August by mailed questionnaire concerning teacher demand/supply facts from 50 states and Puerto Rico and more than 80 institutions that prepare vo-ag teachers. When data is collected, tabulated and summarized, a final report is published (see title above) and circulated, to participating agricultural educators in the 50 states and teacher preparation institutions.

The major purpose of the study is to identify national changes and trends in vo-ag teacher demand and supply. The study provides objective data from every state that can be used by agricultural education leaders to identify and compare trends in the vocational agriculture profession. The major use of the data in this study has been to stimulate recruitment efforts. In addition, information is provided for planning and evaluating programs, as well as for public relations. This relatively low cost study is financed by the Agricultural Education Division of the American Vocational Association.

PLACEMENT OF GRADUATES

In 1976, 1,697 young men and women were qualified through colleges and universities to teach vocational agriculture (see Table II). This was the fourth highest number during the 12-year history of the study. As indicated above, the largest number of graduates (1,043) were placed in vo-ag teaching last year. This number is 61.5 percent of those qualified or the third highest placement rate in 12 years. The table also shows trends and percentages of placement in other occupations.

TYPES OF TEACHING POSITIONS

There has been considerable stability in the numbers and trends of types of vo-ag teaching positions. There have been slight trends toward multiple teacher departments and specialized programs in recent years. In terms of *kind of students*, slightly more than 50 percent of the teachers teach both high school and adult level classes (see Table III). As to *kind of school*, almost 90 percent of the teachers lead vo-ag programs in general or comprehensive high schools. It is evident that by *size of staff*, more than 51 percent of the teachers work in multiple teacher departments. Relative to *kind of programs*, approximately one-third of the teachers are in full-time production agriculture programs, while almost 52 percent teach production and specialized classes in agriculture. About 15 percent of the teachers teach full-time in specialized classes.

TABLE III
TYPES OF TEACHING POSITIONS IN
VOCATIONAL AGRICULTURE IN 1976

<i>Type of Position</i>	<i>Number</i>	<i>Percent</i>
<i>By Kind of Students</i>		
Teachers of adult and young farmer classes only	558	4.5
Teachers of high school classes only	5,530	44.7
Teachers of both high school and out-of-school classes (adult and/or young farmer classes)	6,294	50.8
<i>By Kind of School</i>		
Teachers in general or comprehensive high schools	10,901	87.4
Teachers in area vocational schools	1,443	11.6
Teachers in vocational high schools	127	1.0
<i>By Size of Staff</i>		
Teachers in single teacher departments	6,048	48.7
Teachers in multiple teacher departments	6,382	51.3
<i>By Kind of Programs</i>		
Teachers in full-time production agriculture programs	3,890	32.8
Teachers in part-time production agriculture programs and had one or more classes in specialized programs such as Agricultural Supplies, Agricultural Mechanics, etc.	6,135	51.8
Teachers in full-time specialized programs such as Agricultural Supplies, Agricultural Products, etc.	1,820	15.4

SOME SOLUTIONS

Although vo-ag teacher supply is a national problem, some states have an over supply of teachers. Thus, one obvious solution would be to encourage graduates in over-supply-states to move to adjacent states to fill vacant positions. Another solution would be for teacher educators and state supervisors to encourage more graduates to teach vo-ag, that is, to increase the placement rate. Maybe it is a matter of communicating job openings to graduates of agricultural education programs. Other educators also share the responsibility of teacher supply in that school administrators must pay adequate salaries and provide extra fringe benefits so as to retain successful teachers. One final thought, if every vo-ag teacher would send one student to the state or area college/university to major in agricultural education once every three years, there would be no vo-ag teacher shortage. ◆◆◆

CONTINUED AG MECHANICS WILL KEEP . . .

SHOWING SKILLS

When a junior or senior constructs a high quality project such as a loading chute or swine shed or he repairs a tractor, or he sets up his own repair shop, there is quite visible evidence of good teaching and the project makes an excellent show-window for the vocational agriculture department.

Much criticism has been thoughtfully passed on suggesting that the time used to construct projects for "showing off" is not very well spent and that many other skills could be covered during this time. I contend that the two approaches

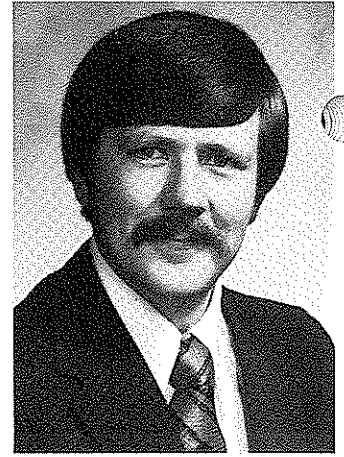
should be used together today in a modern vocational agriculture department to meet the needs of the times. The skill areas covered and the teaching that can be done from a piece of machinery to be repaired offer more learning than do most films and transparencies. The pride of constructing a project that works and looks better than a new one has strengthened the confidence of many vocational agriculture students as well as their parents and the patrons of the school district. ◆◆◆



Herbert Hansen

Agricultural Mechanics For Horticulture Students

by
Herbert E. Hansen
Agricultural Engineering Department
Oregon State University
and
John D. Oades
Agricultural Education Department
Oregon State University



John D. Oades

The move towards offering specialized programs in vocational agriculture has allowed ornamental horticulture to gain prominence and popularity across the nation. At least 56 occupations have been identified in the ornamental horticulture field. In Oregon, over 40% of the vocational agriculture departments have a greenhouse as part of their facilities.

Some of the ornamental horticulture courses are offered as an option for the vocational agriculture students as they move beyond the basic core, whereas, others are specialized and offered to students who have had no background in vocational agriculture until perhaps their junior year. This article is specifically aimed at this latter group where perhaps a majority of the students have had no agricultural mechanics.

What do we offer these students who will soon enter into occupations in ornamental horticulture? Do we give them only courses in plant propagation, greenhouse management, nursery management, landscaping, etc.? What about ag mechanics? Perhaps it is appropriate to again examine the competencies needed in horticultural occupations and see if there are those that can be classified as ag mechanics.

In his study, "A Curricular Model in Ornamental Horticulture in Oregon," Loewen³ identified 15 ag mechanics skills needed by ornamental horticulture graduates. These include skills in land measurement and surveying, concrete and wood construction, plumbing, welding, electricity and electrical controls, small and large power equipment and sprinkler systems.

Coyes¹, in his reference, listed 40 understandings and abilities which should be included in an ornamental horticulture mechanics program. These were mostly in the wood and concrete construction areas with some emphasis on plumbing, irrigation, electricity, small engines and gardening equipment.

In his book, "Ornamental Horticulture," Hemp² identified several ag mechanics skill areas which need to be taught but did not separate them from the units of turf management, plant propagation, etc.

It is the authors' opinion that the ag mechanics areas need to be more



Student at Portland, Oregon's Operation Green Thumb prepares to move his garden tractor to the field to operate the rototiller.

clearly identified and the skills organized and taught in units identified in the curriculum. The ag mechanics portion should comprise 20-25 percent of the instructional time in the two-year program, and be taught in a shop setting. Following are some suggestions for mechanics skills to be included in an ornamental horticulture program:

CARPENTRY CONSTRUCTION

1. Select and order lumber, calculate bills of materials.
2. Measure, mark, cut and work lumber.
3. Lay out and assemble small wood projects such as cold frames, seed flats, planter boxes, benches, steps, etc.
4. Lay out, cut and assemble sills, joists, plates, studs, rafters, and other building parts.
5. Lay out and build fences.
6. Select and apply fiberglass and plastic building materials.
7. Cut, fit and install glass.
8. Select and apply paints and preservatives.

CONCRETE CONSTRUCTION

1. Prepare the site and construct concrete forms.
2. Calculate volume and order ready-mix concrete.
3. Calculate materials needed and machine mix concrete.
4. Install concrete reinforcing bars and fabric.
5. Place, finish and cure concrete slabs and structures.
6. Cast and set patio blocks and stepping stones.
7. Color concrete.

(Concluded on next page)

PLUMBING AND IRRIGATION

1. Select and order materials for plumbing and irrigation.
2. Cut, fit and join plastic, copper and steel pipe.
3. Lay out and install sprinkler, mist and drip irrigation systems.
4. Install drainage tile and pipe.



Two students at Operation Green Thumb assemble plastic pipe for a sprinkler irrigation system.

SMALL POWER EQUIPMENT

(Garden tractors, tillers, mowers, etc.)

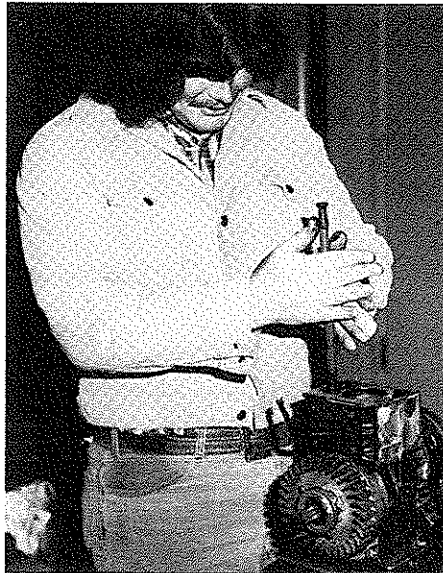
1. Safely operate small power equipment.
2. Adjust and maintain small power equipment.
3. Calibrate seeders and fertilizer applicators.
4. Calibrate sprayers.

SURVEYING

1. Measure and calculate land areas.
2. Using a builder's level, determine elevations, slopes and profiles.
3. Use a builder's level to lay out, square and level a patio or structure.

SMALL GAS ENGINES

1. Maintain and do routine service on small gas engines.
2. Adjust and repair ignition systems.
3. Adjust and repair carburetors.
4. Trouble shoot and repair compression systems.



A student at Operation Green Thumb, Portland, Oregon, laps a valve on a small gas engine.

LARGE POWER EQUIPMENT

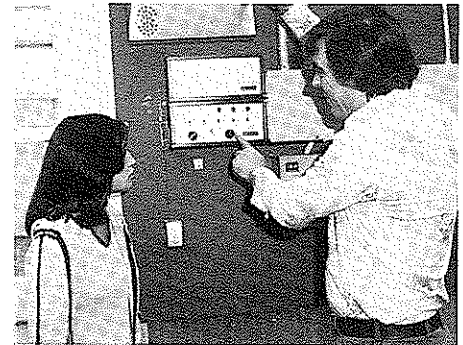
(Tractors, trenchers, etc.)

1. Safely operate large power equipment.
2. Maintain and do routine service on large power equipment.

ELECTRICITY AND CONTROLS

1. Select and order materials for simple wiring and outlet circuits.
2. Wire simple lighting and outlet circuits.

3. Adjust electrical controls, including time clocks, thermostats and humidistats.



Bill McDonald, Vocational Agriculture Instructor at Operation Green Thumb, Portland, Oregon, shows a student how to operate the electrical controls in a greenhouse.

Some of the authors reviewed included block and brick laying, simple welding and wiring of electrical controls as competencies to be included, but it would appear that these ought to be taught only where adequate time is left after teaching the other more commonly needed skills. A review of these competencies should be made by the local advisory committee to select those that are applicable to the local student's needs. Agricultural mechanics has always been a major part of our traditional vocational agriculture programs and needs to be included for those preparing for off-farm occupations as well. ◆◆◆

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- 1Coyes, Frank. *A Course of Study for Agricultural Mechanics*. San Luis Obispo, California. Vocational Educational Productions, 1970.
- 2Hemp, Paul E. *Ornamental Horticulture Source Units for Vocational Teachers*. Danville, Illinois. The Interstate Printers and Publishers, Inc. 1967.
- 3Loewen, Curtis E. *A Curricular Model in Ornamental Horticulture for Vocational Agriculture in Oregon*. Unpublished M.S. Thesis. Corvallis, Oregon. Library, Oregon State University, 1970.

COMING ISSUES COMING ISSUES COMING ISSUES

COMING ISSUES

COMING ISSUES

APRIL — Supervised Experience Programs — Learning by Doing

MAY — Agricultural Products — Preparing Agricultural Processors

JUNE — Camping and Summer Activities

JULY — Facilities — Planning, Maintenance and Improvement

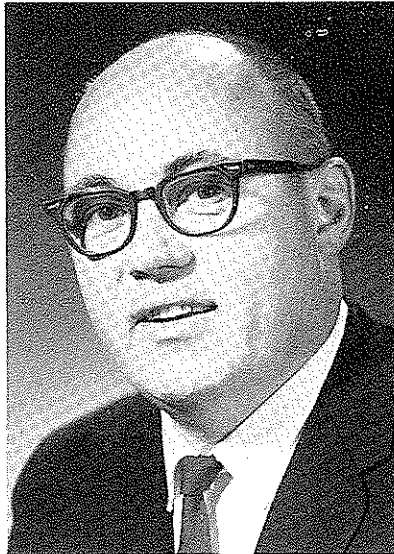
AUGUST — In-service Education and Teacher Conferences

SEPTEMBER — Fairs, Shows and Contests — Competition, Practice and Motivation

OCTOBER — Preparation for Agricultural Resources and Forestry Occupations

NOVEMBER — Multiple Teacher Programs — Patterns and Priorities

DECEMBER — Ornamental Horticulture Occupations — A Growing Field



W. Forrest Bear

Inventorizing And Ordering Ag Mechanics Shop Supplies

by
W. Forrest Bear, Professor
Department of Vocational and Technical Education
Agricultural Education and Agricultural Engineering
University of Minnesota
St. Paul, Minnesota

Inventory, ordering, and storing supplies needed to conduct an agricultural mechanics instructional program is a laborious but essential task. Many suggestions can be offered on how to perform the job and make it more pleasant but routine 'leg work' is necessary to perform the task.

CURRICULUM AND PROJECTS

What courses are going to be taught is the first question to be answered. Many shop teachers have the responsibility for one or two courses but the vocational agriculture teacher will frequently have 4 to 8 offerings per year. Not all of these will be agricultural mechanics classes but the same principles will be involved. After the curriculum course requirements have been determined the next step is to select the projects to be constructed. The instructor who has specific required projects or activities for students to complete can now define the materials needed. The instructor who permits the construction of approved projects doesn't know exactly what must be stocked. He will require that each student bring *all supplies* needed but the instructor still must have an inventory of many items, without a great quantity of each, to satisfy the request for those 'forgotten items'.

INVENTORY CARD

Regardless of the type of projects constructed, an inventorying system is needed. The following inventory system can be developed on file cards or on regular notebook pages. Each expendable item purchased for use in teaching demonstrations, project construction or utilization by students should be recorded on cards or a record sheet and filed in alphabetical order. For greater ease and continuity of the

ELECTRODES, MILD STEEL E6011—1/8"							
Year	Close Inv.	Quantity Desired	Quantity Ordered	Est. Cost	Est. Total	Actual Unit Cost	Source
1974	150	500 lb.	350	45¢/lb.	\$157.50	\$.43/lb.	"A"
1975	100	400 lb.	300	42¢/lb.	126.00	.40/lb.	"B"
1976	50	450 lb.	400	48¢/lb.	216.00	?	?

record, each item should have its own card or sheet. The example to the left illustrates the mechanics of the system. With this record the consumption for the previous year can be determined and the decision can be made for increased or decreased purchases based on projects being constructed and proposed instructional programs. When an item is no longer stocked the inventory record can be removed from the active file.

The instructor must keep on top of these records but each class has several students with an abundance of energy and a desire to help. The inventorizing can be completed by students in March or April and will provide adequate time for submitting orders to the school administration for the June and July order placement.

CONSOLIDATE ORDERS

Many schools have purchasing agents to complete the task of ordering supplies. Most commercial firms are not fussy about receiving several orders from the same school, however, in some cases the school can save money if orders are consolidated. Electrodes are a typical example. Price reductions are offered at 250 lbs., 499 lbs., 999 lbs., and 5000 lbs. by some firms. The following master inventory record could be kept by the purchasing agent or a teacher who has been assigned the responsibility.

ELECTRODES, MILD STEEL E6011—1/8"									
Year	Vo. Ag.	Ind. Ed.	Metal Shop	Maint. Dept.	Total	Est. Cost	Est. Total.	Unit Cost	Source
1974	350	100	100	50	600 lb.	.45¢/lb.	\$270.00	\$.43/lb.	"A"
1975	300	100	100	50	550 lb.	.42¢/lb.	231.00	.40/lb.	"B"

After the supplies have been received the orders can be broken down and each instructor will get his share of the order. He will also need to know the prices and source of information to keep his records up-to-date.

This inventory record system can not remove all the work involved with ordering supplies but it will remove some of the drudgery and will provide a better system than is employed in many schools.

Mechanized Agriculture—1980

by
Douglas Flesher
Butte College
Oroville, CA

What type of curriculum will you be offering in Mechanized Agriculture in the 1980's? Will it fill your students' needs at that time? In order to begin to answer these questions, let us take a look at the equipment you might expect to find on the average farm ten years from now.

The state of mechanized agriculture has evolved over the past several years at a pace unequalled in history. Based on Nebraska test information, the average size of farm tractors has quadrupled since 1940, with a rapid trend upward over the past ten years. The next ten years will see a trend towards higher horsepower on two and four wheel units. Greater use of the single pass operation concept involving primary and secondary tillage, weed control, fertilizing and planting, all at the same time, will be common for many crops.

PAST, PRESENT, FUTURE

Ten years ago, tractor cabs were a rarity. Today the majority of large tractors are equipped with cabs; they have become almost standard equipment on combines. These operator units have resulted in great progress toward noise reduction, operator comfort and safety. Each of these concerns will receive continuing attention in the future.

As equipment becomes larger and more complex, remote monitoring of performance will be increasing. This is done chiefly through the use of electronic devices.

Various researchers have made some progress on automatic guidance of tractors during the past ten years. This will progress slowly but some forms of semi-automatic guidance may materialize in the next ten years.

Large driverless, self-monitoring complex trains of machinery will be moving across our fields. This is the type of machinery that will face the mechanized agriculturalist in the latter part of this century.

Yes, agricultural electronics, air conditioning, hydraulics, computers, and "tape-operated" units will be the machines of the future.

Those people who will be students in our educational programs during the next ten years, are the individuals who will be managing the agriculture industry at the turn of the century.

CURRICULUM

This author conducted an individual study recently to identify the future of agriculture mechanization. During this study, I asked the following question to people at all levels within our industry: "What type of curricula should we be prepared to offer by the 1980's for those who will be working in mechanized agriculture in the years ahead?"

Their answers seem to point towards electronics, air conditioning, hydraulics, computer sciences, and related classes of the type which are not commonly found in today's mechanized agriculture curricula.

When asked, "What type of preparation would you expect in an employee?", one equipment dealer answered, "Basic Trainable Man." His answer summarizes the general employer or manager's opinion. This person should have a general knowledge of basic mechanics; e.g., use of tools, engine and power train systems, farm machinery — its application and operation, an understanding of electronic components, fluid power systems, and their use, plus communicative skills in report writing and an acquaintance with the vocabulary of the industry.

A typical two year technical or community college course outline for mechanized agriculture might look like this in the future:

Freshman Year: (Certificate of Achievement)

Fall Quarter
Plant Science Class
Agricultural Mathematics
Power Mechanics—Tractor Operation
Welding
Power Mechanics—Internal Combustion
Winter Quarter
Applied Physical Science



Douglas Flesher

Farm Machinery
Basic Hydraulics
Power Mechanics—Power Transmission
English—Technical Communication
Spring Quarter
Farm Machinery—Field Operation
Fundamentals of Electricity
Advanced Hydraulics
Air Conditioning—Mobile Units
Elements of Agricultural Business
Sophomore Year: (Associate Degree)
Fall Quarter
Record Keeping
Theory and Application of Semiconductor Devices
Career Work Experience—Agriculture
General Education Requirements
Winter Quarter
Agricultural Equipment Management
Electronic System Analysis
Salesmanship
Introduction to Physics (Non-Calculus)
General Education requirements
Spring Quarter
Agricultural Engineering—Equipment Design and Fabrication
Agricultural Service Management
General Education—Requirement and Electives

Looking into the future is a hazardous job, and we can only touch on it in generalities. However, if we expect to keep our mechanized agricultural programs up to date in servicing the needs of the industry, it is a must that we try to forecast the future. ◆◆◆

BUILDING TO MEET COMMUNITY NEEDS

*Chester Booth
Vo. Ag. Teacher
Whitney, Texas*

The needs of the Whitney community have encouraged the building of many items by the local Vo. Ag. students. Students or other individuals come up with projects based on needs. They are asked to put as much of their idea as possible into a drawing with dimensions. The drawing is revised as needed, material secured and the item built. Salvage materials are used when economically feasible.

The past three years many items have been built in our Vo. Ag. shop at considerable savings to students, the school and the community.

FUND RAISING PROJECTS

Our FFA chapter sells garbage can holders as a fund raising project and to improve the appearance of our city. Circles made from pipe or rod are used in this holder. Two years ago we were forming these circles one at a time. This was a slow process so we designed and built a simple roller using a discarded automobile spindle and wheel. We can now roll a 40' length of small pipe or rod into seven 20" diameter circles. The circles are then cut with a reciprocal hack saw to give us seven perfect circles all the same size. These circles are then welded together for garbage can holders.

The most useful item built for our shop is a machine designed to roll various diameters of pipe circles. This machine helps to build items more economically. We use these circles for building round hay feeders, round picnic table tops, round nose trailers and fireplace log loops. Other applications for the roller are being found weekly.

SCHOOL PROJECTS

The school superintendent came to our Vo. Ag. III class expressing a need for a bus shed to house seven buses. The class studied various building designs and finally designed an all-steel building 45' x 90'.

The students used these skills in this building project: Design, figuring bills of materials, differential leveling, measuring and lay out, digging pier holes,

mixing and pouring concrete, cutting and welding trusses from 2" I.D. pipe, welding trusses to posts, adding steel purlins, spray painting and attaching sheet metal with self drilling screws. These same skills are practical for constructing agricultural buildings.

A very useful and labor saving device is our 12 volt battery powered winch. Our students employed many mechanical skills building the winch. They determined gear reductions and decided to use a worm gear to provide positive braking action. The students studied electrical workings of an automotive starter motor as this was the type motor used to power the winch. The motor was wired to operate forward and reverse. Two solenoids and push buttons were wired to enable the operator to control the winch from a remote area. When the students completed the winch it was mounted on the back of a truck. This winch has many practical applications in lifting and pulling and saves the individual time and possible back injury. Skills such as cutting, welding, proper bracing and electrical wiring were practiced.

Items completed this year or presently under construction in our shop are an 18' convertible gooseneck trailer, a 20' flat bed gooseneck trailer, a two wheel trailer for hauling large round hay bales, a rectangular pipe and wood picnic table, a round all metal picnic table with swivel seats, two gates, feeder panels for feeding large hay bales, an A frame motor hoist, and repair of many other items.

Many of our shop projects are entered in the Heart O' Texas Ag. Mechanics project show each year. Whitney FFA placed first in this competition the last four years. This year our chapter won five of the seven categories in the show which has over 100 projects entered each year. Our students do a better job hoping their project will be selected for competition.

At present our department is cooperating with the city park planning group in designing playground equipment for a proposed city park.

ITEMS BUILT

Included is a list of some of the items built in our vocational agriculture shop that are now filling needs of the local area.

- a gooseneck stock trailer
- a livestock trimming table
- a portable welder trailer
- feed troughs
- a livestock working chute
- a 45' x 90' bus shed for school
- round feeders for large hay bales
- metal pickup tool boxes
- pickup racks
- pickup air-tank bumpers
- light poles for rodeo arena
- sheep trimming table
- garbage can holders—20-30 per year
- electric fence wire roller
- large hay bale haulers
- yard swings
- spiral staircase
- small yard trailer
- gates — all lengths
- step ladders
- 3-point tractor sprayers
- 3-point forklift
- corral panels
- electric winch and gin poles for truck
- various shop equipment
- various wood shop projects
- backstop for little league field

DATES AND EVENTS

NACTA Meets at Penn State

The National Association of Colleges and Teachers of Agriculture will hold its annual conference June 13-15, 1977. The meeting will be held on the campus of The Pennsylvania State University at University Park, PA. The theme of this year's conference is "Effective Teaching in Agriculture: By All Means."

For information on this meeting, write to Dr. Robert E. Swope, 217 Agricultural Administration Building, University Park, PA 16802.

Leader in Agricultural Education:

WILLIAM H. LANCELOT

by
Alan A. Kahler*



"The true role of good teachers is revealed by our own experience. We are ourselves different because we have had such teachers. In some way they reached into our lives, changing our interests, purposes and goals, our attitudes and feelings, our philosophy of life, our understanding of its problems, and our habits, abilities, and skills. They taught us to think straight and far, to avoid mistakes, and to plan our own lives successfully. Indeed, most of us will agree that the deepest currents of our lives have been turned and strengthened by our really good teachers; and most of us know full well which ones exercised this fateful, yet beneficial influence over us." These words, written by William H. Lancelot in his book entitled *Permanent Learning*, sample his thoughts about teaching that inspired those whom he taught and worked with during his tenure in education and those who have since been stimulated to excellence in teaching by his writings.

William H. Lancelot was born on June 18, 1874 in Clayton County, Iowa. He was married in 1899 to Della Crawford at Lineville, Iowa.

He was active in public education in Iowa and the nation for some 59 years. He began his career in public education in 1895 as superintendent of schools at Gray, Iowa. He continued in this role for eleven years, serving the Lineville, Iowa school district from 1898 to 1903 and the Ackley, Iowa school district from 1903 to 1906.

In 1914, he was appointed instructor of chemistry at Iowa State University and in 1919 received the Bachelor of Science degree with a major in Agricultural Education at this institution. He did graduate work at Iowa State University, Columbia University, and the University of Chicago. He received the honorary Doctor of Education degree from Miami University in 1932. He became Assistant Professor of Vocational Education in 1919 and Associate Professor in 1920. In 1923, he was promoted to Professor and became Head of the Department of Vocational Education, a position he held until 1936.

Dr. Lancelot's contributions to education were numerous and significant. He was one of the organizers of the American Vocational Association, the Iowa Vocational Association and the Iowa Association of the Future Farmers of America. He was co-author of *Soils and Plant Life* (1919), *Nature in Agriculture* (1929), and *Education-America's Magic* (1946). He was author of *Handbook of Teaching Skills* (1928) and *Permanent Learning* (1944) which were used by educators throughout the nation. His course "Methods of College Teaching" attracted students from throughout the United States.

Throughout Dr. Lancelot's tenure on the staff at Iowa State University, he had a keen interest in the improvement of teaching at all educational levels.

This interest led to his appointment, by then Iowa State University President Hughes, to chairman of the university committee on improvement of instruction. As chairman of this committee, he worked with the various colleges and departments in assisting them to better understand the teaching-learning process and improve their teaching techniques. Assisted by President Hughes, he developed a procedure for course evaluation which was adopted and used to improve the quality of instruction being provided throughout the university.

Dr. Lancelot was a member of Phi Kappa Phi, Phi Delta Kappa, Gamma Sigma Delta and numerous professional organizations in the field of education. In 1955, he was awarded the Iowa State University Faculty Citation for "long, outstanding, and inspiring service on the college staff." In 1960, he was presented the Outstanding Educator Award by Beta Kappa Chapter of Phi Delta Kappa. He served on numerous state and national committees and spoke at many local, state, and national educational meetings.

He is most remembered by his students and other educators in and outside of Iowa as a master teacher. He taught by example continuously demonstrating before his students, those principles of good teaching in which he so strongly believed and professed. He believed that every teacher should possess a strong desire to render service to his or her students, the community in which he or she taught and to the state and nation.

Dr. Lancelot was one of the early promoters of the problem solving approach and method of teaching in agricultural education. He very capably expanded the then popular "project method" of teaching to include the teaching of decision-making skills and abilities using real problems students

(Concluded on page 215)



Alan A. Kahler

*Alan A. Kahler is Associate Professor of Agricultural Education at Iowa State University.

AGRICULTURAL EDUCATION RESEARCH IN PROGRESS

What topics are now being researched in agricultural education? In which state is a given topic being researched? Where can information be obtained about a topic of interest?

Each year the Research Committee of the Agricultural Education Division of the American Vocational Association reports studies in progress. In 1976, input was received by the Research Committee from fifteen states reporting 91 research and development activities in progress. Included were titles of 33 staff studies, 31 Masters' papers, and 27 doctoral dissertations. Studies are reported alphabetically by state. Readers desiring further information should contact the persons named as the principal investigators.

Agricultural educators desiring to examine abstracts of completed research may now find them on microfiche in the ERIC system. Table 1 provides the order numbers for regional summaries completed from 1968 to 1974. Table 1 also shows the order number for the 1974-75 national compilation as ED 114 635.

Research and development activities completed and in progress as of July 1 each year are collected. Persons desiring to input materials for the next compilation should submit them to Alfred Mannebach at the University of Connecticut, Storrs, Conn. 06268.

Arizona

- Cobb, Gareth. "The Attitudes and Perceptions of Selected Groups Towards Occupations in Agricultural Mechanics." Masters Study. University of Arizona, Tucson.
- Etlng, Arlen. "Survey of Graduate Programs in Cooperative Extension Education." Staff Study. University of Arizona, Tucson.
- Jacobs, C. O. "Model/Unit Instruction Concept for Teaching Operating Principles of Electric Motors." Staff Study. University of Arizona, Tucson.
- McCormick, Floyd G. "Development and Evaluation of Instructional Units for Teaching Inductively Principles of Agricultural Science." Staff Study. University of Arizona, Tucson.
- Miller, Glen. "An Evaluation of the National Agricultural Mechanics Contest." Masters Study. University of Arizona, Tucson.

by

J. David McCracken
Associate Professor
The Ohio State University

Florida

- Akinyemi, Kehinde. "The Professional Status of Florida Agricultural and Mechanical University Graduates in Agricultural Education." M.S. Thesis, Florida Agricultural and Mechanical University, Tallahassee.

Illinois

- Purcell, Arthur D. "A Study of Factors Affecting the Establishment of Young Farmer Programs in Illinois." Ed. D. Thesis. University of Illinois, Urbana.

Indiana

- Hamilton, W. H. & Howell, D. L. "The 1976 Summer Apprenticeship Program." Staff Study, State Board of Vocational and Technical Education and Purdue University, West Lafayette.
- Hamilton, W. H. & Howell, D. L. "Vocational Agriculture Involvement in Pesticide Applicator Training." Staff Study, Environment Protection Agency and Purdue University, West Lafayette.

Iowa

- Appleget, James A. "Perceived Importance of Instructor Supervised Farming Program Visits in Iowa Vocational Agriculture Programs." M.S. Thesis, Iowa State University, Ames.
- Byler, Bennie L. "Professional In-Service Education Needs of Postsecondary Area Vocational School Instructors of Agriculture." Staff Study, Iowa State University, Ames.
- Cole, Richard Lee. "Development of a Job Description for Vocational Agriculture Teachers in Iowa and Utah as Perceived by Selected Administrative and Instructional Personnel." Ph.D. Dissertation, Iowa State University, Ames.
- Hasselmann, Elvin E. "Factors Related to the Effectiveness of Educational Programs for Veterans in Northeast Iowa." M.S. Thesis, Iowa State University, Ames.

Haynes, Worth E. "Leadership Development and Goals Achievement Through Occupations of Alcorn University Agricultural Education Graduates." Ph.D. Dissertation, Iowa State University, Ames.

Hillyard, Landen. "Identification of the Adult Education Needs of Young Farmers in the West Liberty Community School District." M.S. Thesis, Iowa State University, Ames.

Janssen, Danny D. "Identification of Agricultural Concepts and Generalizations Taught in Elementary Schools in Iowa." M.S. Thesis, Iowa State University, Ames.

Kahler, Alan A. "Strategies for Curriculum Revision and Program Restructuring of Vocational Agriculture in Iowa." Staff Study, Iowa State University, Ames.

Kruckenber, Duane. "Evaluation of the Cooperative Experience Program in the Iowa Falls Vocational Agriculture Department." M.S. Thesis, Iowa State University, Ames.

Lindahl, Thomas. "A Survey of Professional Education Area School Instructor Qualifications in Agriculture." Ph.D. Thesis, Iowa State University, Ames.

Magill, John. "Perceptions of Selected Groups Toward the Philosophic Principle entitled, 'Interrelationships of Agriculture' in Iowa Agriculture and Agribusiness Education." M.S. Thesis, Iowa State University, Ames.

Preyer, Prince Jr. "A Study of Variables Influencing Agribusiness Teachers Adoption of Safety Education Innovations in Alabama." Ph.D. Thesis, Iowa State University, Ames.

Walters, Randy G. "Experimental Evaluation of Two Instructional Methods of Teaching Vocational Agriculture." M.S. Thesis, Iowa State University, Ames.

Wesson, Gregory. "Attitude Toward Agriculture and Agricultural Employment as Perceived by Selected Professional Workers." M.S. Thesis, Iowa State University, Ames.

Williams, David L. "A Study of the Importance of Agriculture Supervised Occupational Experience Developing Selected Abilities." Staff Study, Iowa State University, Ames.

(Continued on next page)

Wobben, Neil M. "Contributions of Adult Educational Activities to Local Iowa Vocational Agriculture Programs." M.S. Thesis, Iowa State University, Ames.

Kentucky

Baker, Bill and M. J. Iverson. "Competencies Needed in the Job Title, Farrier." Staff Study, University of Kentucky, Lexington.

Tulloch, Rodney W. "Competencies Required for Vegetable Production." Staff Study, University of Kentucky, Lexington.

Mississippi

Brown, Ronald A. "A Pilot Project to Determine Needed Competencies of Extension County 4-H Agents and to Develop a Curriculum to Provide These Competencies." Staff Study, Mississippi State University, Mississippi State.

Oren, John W. "Continuation of Career Preparation Programs for Potential Agribusinessmen, Agricultural Agency Employees, and Agriculture Teachers." Staff Study, Mississippi State University, Mississippi State.

Missouri

Kanakaraj, Doraiswamy. "Effects of Immediate and Delayed Systems of Feedback Upon Change in Teacher's Verbal Behavior." Ph.D. Dissertation, University of Missouri, Columbia.

Nolting, Gregory. "Cognitive Achievement of Traditional and Non-Traditional Students of Farm Management." Ph.D. Dissertation, University of Missouri, Columbia.

Sanders, John. "Methods of Teaching Agricultural Management in In-service Education." Ph.D. Dissertation, University of Missouri, Columbia.

Shinn, Glen C. "Facilities Guideline for Programs in Vocational Agriculture." Staff Study, University of Missouri, Columbia.

Stewart, Bob R., Glenn C. Shinn, and William B. Richardson. "Concerns About Agricultural Education as Expressed by Teachers, Supervisors, and Teacher Educators." Staff Study, University of Missouri, Columbia.

Montana

Jibaja, Henry J. "A Reporting System for Use in Gathering Management and Information Data for Peace Corps Programs." M.S. Thesis, Montana State University, Bozeman.

Nebraska

Dillon, Roy D. "Identification of Applied Biological Science Interests of 5th, 8th, and 11th Grade Students in Nebraska." Staff Study, University of Nebraska, Lincoln.

Dillon, Roy D. "Employment Opportunities and Competency Needs of Agricultural Processing Workers in Lancaster County, Nebraska." Staff Study, University of Nebraska, Lincoln.

Horner, J. T., Douglass, R. L. "Nebraska VoAg. Curriculum Study — Inventory and Modification." Staff Study, University of Nebraska, Lincoln.

New York

Berkey, Arthur L. and Drake, William E. "Competency Identification, and Materials and Program Development for Competency Based Teacher Education in Agriculture." Staff Study, Cornell University, Ithaca.

Brown, Richard B. "Technical Knowledge and Skills, and Work Attitudes and Habits needed by Teachers of Agricultural Mechanization." M.S. Thesis, Cornell University, Ithaca.

Chotesawang, Vinit. "The Technical Competencies Needed by Thai Agriculture Teachers in the Subject Matter Areas of Poultry, Swine, and Cattle." Ph.D. Dissertation, Cornell University, Ithaca.

Gabel, Douglas J. "An Instructional Unit in Using Farm Record Books." M.P.S. Project, Cornell University, Ithaca.

Jones, Richard D. "Perceptions of the FFA as an Educational Activity by Teachers and Employers." M.S. Thesis, Cornell University, Ithaca.

Wicks, Lyle W. and Berkey, Arthur L. "Needs Assessment and Development of Instructional Materials for Teachers of Agriculture." Staff Study, Cornell University, Ithaca.

Ohio

Anim, Robert K. "The System of Extension Education in Kusasi Area of

Ghana." Ph.D. Dissertation, The Ohio State University, Columbus.

Bartsch, Bruce. "An Evaluation of a Procedural Manual Designed to Assist in Developing Local Courses of Study in Vocational Agriculture." M.S. Thesis, The Ohio State University, Columbus.

Bender, Ralph E. and Edgar P. Yoder. "Development and Implementation of Internship Program in Agricultural Occupations for Present and Prospective Vocational Agriculture Teachers." Staff Study, The Ohio State University, Columbus.

Bender, Ralph E. "The 1976 Occupations of Recent Graduates of Vocational Agriculture in Ohio." Staff Study, The Ohio State University, Columbus.

Boucher, Leon W. "The Identification of a Teacher Profile Associated with Teacher Success in Vocational Agriculture." Staff Study, The Ohio State University, Columbus.

Brugler, Alan R. "The Relationship Between Academic Performance in College and the Tenure of Teachers of Vocational Agriculture." M.S. Thesis, The Ohio State University, Columbus.

Carter, David M., Pope, J. Thomas and McCracken, J. David. "Tasks Essential to Successful Performance as a Tobacco Producer." Staff Study, The Ohio State University, Columbus.

Drake, Everett J. "Basic Communications Skills Necessary for College Graduates Entering Business Management Careers in Ohio." Masters Paper, The Ohio State University, Columbus.

Erpelding, Lawrence H., Jr. "Status of Post-Secondary Education in Agriculture, Agribusiness, Natural Resources and Environmental Occupations." Staff Study, The Ohio State University, Columbus.

Flickinger, Theodore. "Crime and Law Enforcement in Ohio's State Parks." Ph.D. Dissertation, The Ohio State University, Columbus.

Geesey, Richard. "The Effect of the Type of Instructional Materials Used in Teaching Tree Identification on the Achievement of High School Vocational Agriculture Students."

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- Ph.D. Dissertation, The Ohio State University, Columbus.
- Gilliland, Robert. "Educational Methods Utilized by Cooperative Extension Service Programs in Selected High Population Counties." Ph.D. Dissertation, The Ohio State University, Columbus.
- Guiler, Gilbert S. "An Assessment of New Teachers Proficiency in the Ten Major Areas of Competency." Staff Study, The Ohio State University, Columbus.
- Guiler, Gilbert S. "Analysis and Evaluation of the In-Service Program Offered to Teachers of Vocational Agriculture in Ohio During the Past Three Years." Staff Study, The Ohio State University, Columbus.
- Hampson, Michael. "Leadership and Personal Development Competencies Needed in Agricultural Occupations as Identified by Agricultural Leaders in Ohio." M.S. Thesis, The Ohio State University, Columbus.
- Hilliker, S. Alden. "Competencies Needed by Extension 4-H Agents." Ph.D. Dissertation, The Ohio State University, Columbus.
- Houk, George W. "An Evaluation of Agribusiness, Supplies, and Service in Ohio." M.S. Thesis, The Ohio State University, Columbus.
- Householder, Larry. "Perceptions of the Role of the Local Supervisor of Vocational Agriculture." Ph.D. Dissertation, The Ohio State University, Columbus.
- Keffer, Wayne. "Job Satisfaction of Field Staff of Virginia Polytechnic Institute and State University, Extension Division." Ph.D. Dissertation, The Ohio State University, Columbus.
- King, Laretta. "The Effectiveness of Self-Instructional Learning Packages with Young Adults." Ph.D. Dissertation, The Ohio State University, Columbus.
- Knight, James A. "Reasons Teachers of Agriculture Leave the Profession." Ph.D. Dissertation, The Ohio State University, Columbus.
- Longbrake, Wayne R. "Benefits and Costs of Selected Vocational Education Programs in an Area Vocational Center." Ph.D. Dissertation, The Ohio State University, Columbus.
- Lovingood, Miles. "Agricultural Mechanics Competencies Needed by Vocational Agriculture Teachers in Farm Power and Agricultural Construction." Ph.D. Dissertation, The Ohio State University, Columbus.
- Luellen, Tom. "The Effect of Skill Sheets on the Performance of Students in Vocational Horticulture Laboratory." M.S. Thesis, The Ohio State University, Columbus.
- Manty, Dale. "Development of a Paradigm for Designing Systems of Public Communication for Coastal Resource Management Programs." Ph.D. Dissertation, The Ohio State University, Columbus.
- McCracken, J. David and Houk, George. "Evaluation and Development of Agricultural Business, Service, and Supply Programs of Vocational Agriculture in Ohio." Staff Study, The Ohio State University, Columbus.
- McCracken, J. David and Newcomb, L. H. "Analysis of Teacher Involvement in Young and Adult Farmer Education." Staff Study, The Ohio State University, Columbus.
- McCracken, J. David and Newcomb, L. H. "Evaluation of the Utilization of Instructional Units for Adult Education in Production Agriculture." Staff Study, The Ohio State University, Columbus.
- McCracken, J. David; Newcomb, L. H.; and Luellen, Thomas. "Vocational Horticulture Program Development in Ohio." Staff Study, The Ohio State University, Columbus.
- Moore, Lucinda. "Essential Competencies in Small Animal Care Occupations." M.S. Thesis, The Ohio State University, Columbus.
- Nipah, Sarah. "An Assessment of Needs and Priorities of Community Issues as Viewed by Cooperative Extension Service Clientele." Ph.D. Dissertation, The Ohio State University, Columbus.
- Replogle, Charles G. "Relationship of Reason Given for Re-enrolling or Dropping Out of 4-H by First Year Members from New and Regular Audience in Four Ohio Counties." M.S. Thesis, The Ohio State University, Columbus.
- Rohrer, John. "Impact of Recent Developments on Leadership in the GROW Area." Ph.D. Dissertation, The Ohio State University, Columbus.
- Shannon, Theodore. "The Correlation of Personal Preference and Self-Concept Scales with Demographic Data to Determine Characteristics of Vocational Non-Degree, Pre-Service, Workshop Participants." Ph.D. Dissertation, The Ohio State University, Columbus.
- Swendal, Garrett. "Summary of Ohio FFA Skills Contests Results by Type of School and District." Masters Paper, The Ohio State University, Columbus.
- Taylor, Calvin. "The Representativeness of Public Participation in the Maumee River Basin Level B Planning Processes." Ph.D. Dissertation, The Ohio State University, Columbus.
- Waddy, Paul H. "Analysis of 4-H Community Development Programs in the Cooperative Extension Service." Ph.D. Dissertation, The Ohio State University, Columbus.
- Warmbrod, J. Robert and Richard H. Wilson. "Mobility of Vocational Agriculture Teachers and Local Supervisors in the Secondary Schools of Ohio." Staff Study, The Ohio State University, Columbus.
- Wells, Richard A. "Extent of Adoption of No-tillage Method of Planting Corn in Southern Ohio." M.S. Thesis, The Ohio State University, Columbus.
- Young, Richard E. and Cunningham, Clarence J. "Extension Output Measures as Identified by Extension Clientele." Staff Study, The Ohio State University, Columbus.
- Zainuddin, Alang. "Factors Associated with Level of Participation of Members of Village Development Committee in Four Peninsular Malaysian Villages." Ph.D. Dissertation, The Ohio State University, Columbus.

Texas

- Perritte, Jerry L. "The Influence of Vocational Agriculture upon Career Awareness and Occupational Choice for Graduates of Vocational Agriculture of Nacogdoches High School." Masters Thesis, Stephen F. Austin State University, Nacogdoches.

Utah

- Hoffman, John R. "Skills Necessary for Successful Sugar Beet Production." M.S. Thesis, Utah State University, Logan.

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Thomsen, Earl R. "Occupational Opportunities and Training Needs of Youth for Seed and Feed Grain Industry Jobs in Utah." M.S. Thesis, Utah State University, Logan.

Wood, Kirk J. "Survey of Job Skills in the Beef Cattle Industry in Utah." M.S. Thesis, Utah State University, Logan.

Washington

Cockle, Fred M. "A Teacher's Guide for Use with the Washington State Record Book For High School Vocational Agriculture Students." M.S. Paper, Department of Education, Washington State University.

TABLE 1

WHERE TO FIND PREVIOUS SUMMARIES OF STUDIES IN AGRICULTURAL EDUCATION
On Microfiche in the ERIC System

Year	Regions			
	Central	North Atlantic	Pacific	Southern
1968-69	ED 036 642	-	ED 036 635	ED 038 543
1969-70	ED 047 107	ED 047 108	ED 047 110	ED 047 109
1970-71	ED 057 252	ED 061 415	ED 061 447	ED 061 446
1971-72	ED 076 800	ED 107 904	ED 078 164	ED 079 472
1972-73	ED 103 694	ED 107 903	ED 109 376 (1972-1974)	ED 110 745
1973-74	ED 110 660	ED 110 792		ED 110 746

The 1974-75 year represented the first national compilation. It may be found in the ERIC System as ED 114 635. Documents with ED numbers may be found in any complete ERIC collection of ERIC microfiche or ordered from EDRS, P.O. Box 190, Arlington, Virginia 22210.

CONTINUED AG. MECH. A STIMULUS . . .

ADULT PROGRAM

Education in agricultural mechanics in Texas is not limited to high school students. Adults are encouraged to participate in the Specialist Program which is sponsored by the cooperative efforts of the Texas Education Agency and the Agricultural Education Department of Texas A & M University. Among the programs taught by specialists throughout the state are short courses on farm shop which are Farm Electric Wiring, Farm Arc Welding, Tractor Maintenance, Oxy-acetylene Welding and Electric Motors. The benefits derived from this program by the adult com-

munity are in proportion to the enthusiasm displayed by the vocational agriculture department. The instructor(s) is responsible for requesting that the short courses be made available to the community.

I believe in agriculture. I believe in agricultural mechanics. I believe that every area of study in the agriculture curriculum is vital and each can complement the other when approached with an open and honest mind. I believe that agricultural education can and will accomplish its goal of preparing young men and women to face the challenges of tomorrow. ◆◆◆

CONTINUED LEADER . . .

were confronting as a basis for selection of course content. He believed strongly that, when using this teaching approach and method, students should be made ready to learn in order to maximize learning outcomes. Throughout his work with teachers at all levels of professional engagement, he stressed the importance of motivation and methods in motivating students to want to learn prior to teaching them.

His writings and teachings on the

problem-solving approach and method of teaching won him many followers throughout the nation. Such renowned past agricultural educators, as W. F. Stewart of Ohio State University, Sidney Sutherland of the University of California at Davis, Elton Rhode of the University of Nebraska, Carsie Hammonds of the University of Kentucky, and C. L. Angerer of Oklahoma State University, were quick to envision the potential of this concept in agricultural

education and incorporated it into their teacher education programs.

William H. Lancelot has truly left an indelible mark on agricultural education. Many of the theories he expounded about education and educational practice have contributed directly to the success of agricultural education programs throughout the country. His contributions will certainly be realized for many years to come. ◆◆

METHODS IN ADULT EDUCATION, by Barton Morgan, Glenn E. Holmes, and Clarence E. Bundy. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1976, Third Edition, 282 pp., \$9.75.

This book was formerly published in 1960 and in 1963 under the same title. The book is based upon the concept that continuing education has become a major phase of our total educational program.

The book contains 15 chapters. The introductory chapters focus on adult education in a domestic society, principles of adult education, and stimulating participation in adult education. These chapters include definitions of adult education and the needs and rationale for adult education in a

fast changing society. Each chapter has been up-dated and supplemented with material relevant to the theme of the book.

The remainder of the book focuses on methods of adult education. Included are chapters on selecting methods, choosing the type of meeting, common forms of formal or stage presentations, and an overview of discussion methods and special discussion techniques. A new chapter on sensitivity training has been included. Ways of integrating sensitivity training into adult education programs and some precautions are presented.

Chapters on demonstration methods, conducting field trips and tours, audiovisual aids and written communications in adult education are included. These chapters have been expanded, are well illustrated, and

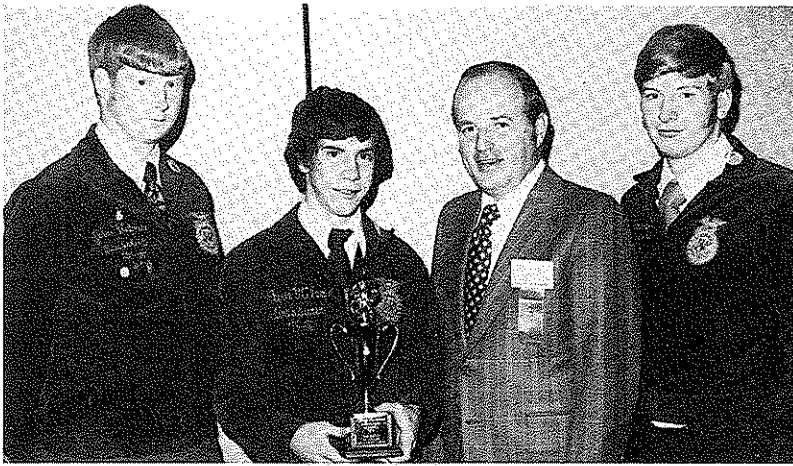
have special implications for adult education in agriculture. The chapter on evaluation has been updated to include emphasis on program objectives and the latest evaluation procedures. The book concludes with a forward look at adult education.

The authors, all of Iowa State University, are well grounded in the basic philosophy of adult education. They have revised and up-dated a popular book which has had wide acceptance in both preservice and in-service educational programs. It is written in an easy-to-read manner, it deals with specifics, and it is well adapted for use by university students and by persons engaged in or planning to engage in adult education instructional programs.

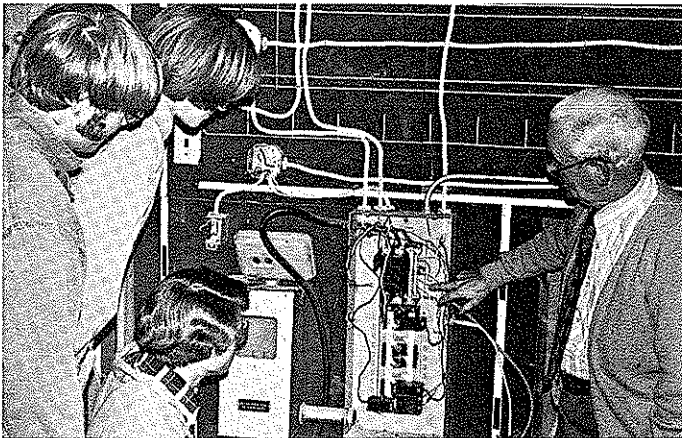
Alfred J. Mannebach
University of Connecticut
Storrs, Connecticut

STORIES IN PICTURES

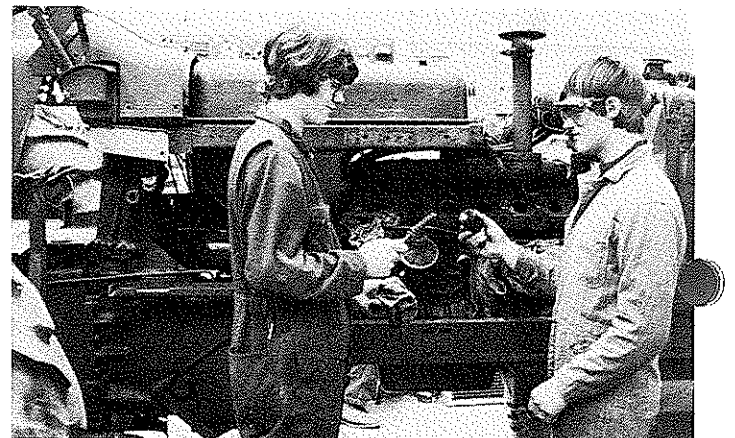
by
Paul
W.
Newlin



The Ohio State FFA Association Agricultural Mechanics team placed first out of 42 teams in competition at the 49th National FFA Convention in Kansas City, Missouri. Mr. Edward Carter, (second from right) Executive Vice President, The Firestone Tire & Rubber Company, Akron, Ohio, extends congratulations to team members (left to right) James Hefner, Lafayette, Steve Wilson, Lancaster, and Scott Wonders, Ashland. The team was coached by Mr. Thomas F. Walter, Vocational Education Instructor from Lancaster High School, Lancaster, Ohio. (Courtesy NTL.FFA CENTER)



George Halloran, teacher of agriculture at Hamilton Central School, Hamilton, N.Y., points out entry box wiring techniques to Doug Nelson, Keith Jones and Roger Roberson. (Photo Courtesy Richard Jones and Arthur Berkey, Cornell)



Agricultural Mechanization students at the Chenango County Area Occupational Center, Norwich, N.Y., cleaning fuel injector ports prior to replacing the injectors. Instructor — Mr. Arthur Ives. (Photo Courtesy Richard Jones and Arthur Berkey, Cornell)



NVATA "Outstanding Young Member Award" (Left to Right) Charles Bourg, United States Steel Corporation, Pittsburgh, Pennsylvania; Eldon H. Betz, Meridian, Idaho; Harold Helton, Altamont, Kansas; Tom Warren, Rapid City, South Dakota; James Faust, Peebles, Ohio; Cliff Ricketts, Mt. Juliet, Tennessee; Charles L. Riggs, Ijamsville, Maryland. (Photo Courtesy NVATA)



David Schenck of Spencer, Indiana and the Owen Valley Chapter receives a \$200 scholarship to attend the School of Agriculture at Purdue University. Dr. A. R. Hilst, Associate Dean of the School of Agriculture, is congratulating Dave after welcoming the over 250 high school students attending the Fourth Annual Agriculture Education Day this past fall in West Lafayette. (Photo Courtesy Joe W. Green, Purdue)