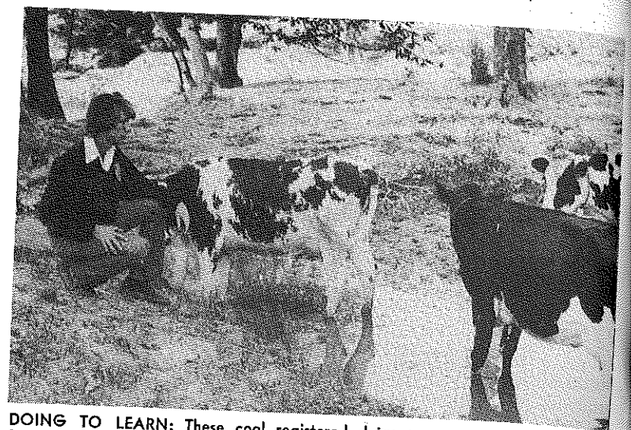
STORIES IN PICTURES

by
Joe
Sabol

HANDS ON! Margaret Piffero Noroian, North Salinas High School, Salinas, CA, demonstrates the proper techniques of training carnations for her student. The student is using the school greenhouse to conduct part of his occupational experience program. (Photo courtesy of Joe Sabol, Cal Poly, San Luis Obispo, California.)

INCENTIVES FOR OCCUPATIONAL EXPERIENCE PROGRAMS: The rewards for a beginning occupational experience program are obvious as this Louisiana vo-ag teacher and his student share the pride of owning and showing quality chickens. (Photo courtesy of Dr. Jim Atherton, Louisiana State University.)



DOING TO LEARN: These cool registered dairy cows represent part of the Supervised Occupational Experience program of Troy Wilson, Southern Regional Star Farmer for 1978. Troy is a member of the Mt. Hermon FFA Chapter, Mt. Hermon, Louisiana.

SOEP ON CAMPUS: The school grounds provide Floyd Yancy and his two horticulture students with a unique opportunity for them to "adopt" the rose garden for their practice program. This arrangement helps the students, Mr. Yancy and the Zachary High School, Zachary, Louisiana. (Photos courtesy of Dr. Jim Atherton, Louisiana State University.)

SOEP IN AGRICULTURAL MECHANICS: This equipment trailer built by Chris Cobb, Sierra High School, is part of his Occupational Experience program in custom farm machinery work. He is assisted and supervised by Mr. Stan Neal, teacher, Sierra High School, Tollhouse, California. (Photo courtesy of Joe Sabol, Cal Poly, San Luis Obispo, CA.)

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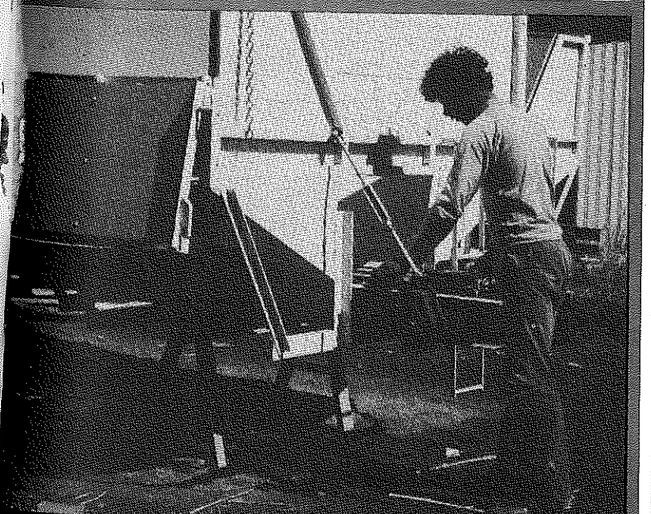

FEATURING —

PROJECT CONSTRUCTION
SKILLS, SKILLS, SKILLS?
TRACTOR MAINTENANCE
IN-SERVICE WORKSHOPS
SMALL ENGINE DYNAMOMETER
FUMES EXHAUST SYSTEM
SEEKING A JOB?
POST-SECONDARY SUMMARY
AGRICULTURAL LEADERSHIP
BLACK YOUTH REPORT
GRANDFATHER'S COLLECTION

Theme–Agricultural Mechanics–Developing Important Skills

AGRICULTURAL EDUCATION

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THEME — AGRICULTURAL MECHANICS — DEVELOPING IMPORTANT SKILLS

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COVER PHOTO

Top Photo —
Construction Skills include painting, according to Jim McLain at Wachusett Regional Vocational-Technical Center. His students put the finishing touches on the frame for expanding their OH facilities in Holden, Mass. (Photo Courtesy of Gary Bye, Pomeroy, WA and Dr. Joe Cvancara, Washington State University.)

Center Photo —
Practice makes perfect! John Marler practices his welding skills under the supervision of Mr. Fred Cockle at Colfax High School, Colfax, WA. (Photo courtesy of Fred Cockle and Dr. Joe Cvancara of Washington State University.)

Bottom Photo —
Design and fabrication are critical skills for Kevin Heinen. This potato bin truck box has a number of features to reduce potato bruising from field to storage. Kevin is a student at Connell High School, Connell, WA. (Photo courtesy of his teacher, Lyle Holt and Dr. Joe Cvancara, Washington State University.)

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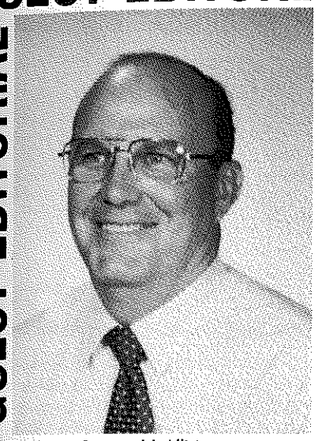
GUEST EDITORIAL

THE IMPORTANCE OF DEVELOPING SKILLS

by
George L. McAllister
Vo-Ag Teacher
Jourdanton, TX



George McAllister

OPPORTUNITIES

Due to the technological advancement of modern agriculture, the developing of skills in agricultural mechanics in our youth today is more important than ever before. Most of the young people in our schools today do not have the opportunities to learn mechanical skills at home as did the students a generation ago. In the past, family farms or family businesses apprenticed children to various jobs incorporating those skills that we teach today in our classroom. Today's parents either lack the opportunities or the time to teach the skills, and of course, many may lack "knowledgeableness." Most students, when given the opportunity, want to learn how to do all types of jobs. The opportunity must be provided for them in our schools today, and the vocational agriculture classes are the logical laboratory for this skill development.

ATTITUDES

Today we in vocational agriculture need to take advantage of the students' eagerness to learn various skills and provide opportunities for the development of such skills in agriculture mechanics classes. It is my belief that we as teachers can instill a respect for honest labor along with the skill. We can teach students how to follow instructions, and stress learning the agricultural and mechanical vocabulary, so they can communicate effectively. The application of the skill in a class sponsored project is a learning experience, and the pride and sense of accomplishment derived from a job well done is a strong motivating force.

SKILLS

Some students refine a skill after leaving school and develop it into a means of livelihood, or a rewarding hobby; but most find a sense of satisfaction knowing they can perform many of the skills related to the home, farm, or business that the average person hires someone to perform for them.

Our goal is also toward building useful citizens that can learn and master a trade in an outdoor, mechanical agricultural occupation in a very short time. Stressing basic skills and knowledge over a very broad spectrum of outdoor, mechanical skills is a primary goal. We cannot specialize in any particular trade or skill to the degree of complete mastery because of the length of time allocated to each skill. The curriculum requirements are numerous and varied due to the diverse interests in the community.

TOPICS AND PROJECTS

The areas of study taught are basic welding—arc and oxyacetylene, carpentry, tool conditioning, cold metal, concrete and masonry, plumbing, surveying, painting, fencing, ropework, small engines, sketching and drawing, tool and hardware nomenclature, shop rules and regulations, and safety. Early in my teaching career, I realized that complicated and large group projects, such as livestock trailers, did not motivate each student like simple, small, individual projects that incorporated the various basic skills necessary for large projects. Most students not familiar with a skill lacked enthusiasm for the project and observed rather than participated in the class while the teacher and more skilled students did the work. Now all students are responsible for implementing basic skills in all work areas in the shop with the teacher observing and guiding in all areas. With each student responsible for his individual project and work area, there is now more participation and individual learning.

COMPETITION

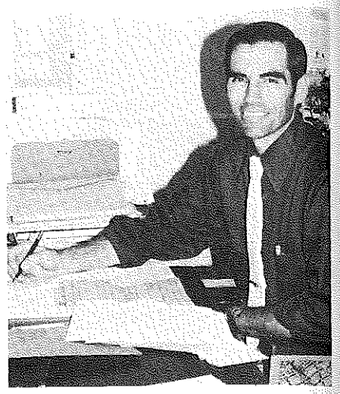
In our local county livestock show, our agriculture students and myself initiated a shop projects division, and it has grown each year. Students look forward to entering their individual entries each year as each is judged and awarded recognition. We have worked at the National Agriculture Mechanics Contest, and basic skills training has evidenced itself. Since Texas entered this contest, we have participated in the state contest every year. Students perform according to the motto of the F.F.A. which states: Learning to do, Doing to learn, Earning to live, and Living to serve.

SUMMARY

Each student should not only be made aware of the advantages and benefits each receives from the knowledge of a skill, but each should be allowed and encouraged to implement these skills in an area in which each has an interest or a need. ◆◆◆

AG MECHANICS- ARE WE USING IT EFFECTIVELY?

FROM YOUR EDITOR



James P. Key

MOTIVATING TOOL

Ag mechanics is probably one of the best tools for motivating our students in Vo-Ag. All students seem to want to "go to the shop" where they can work with their hands for a change. The shop seems to also hold unending challenges for most students to improve those ag mechanics skills and make even more complex projects. The question is, however, do we adequately use the motivating power of "the shop" and ag mechanics skills to teach that wide variety of skills required by modern farmers and ranchers or agribusinessmen?

QUESTIONS

Do we adequately organize and plan the program so our students learn skills in all five areas recommended rather than concentrating on our favorite areas? Do we adequately balance the teaching of skills with the construction of projects utilizing those skills? Do we adequately prepare our students to think and act safely, before and after they go to shop? Do we avoid the trap of "going to the shop" when we are not adequately prepared to teach in the classroom (or shop)? Do we get busy talking to someone or working with a student in our office and not adequately supervise those students working in the shop? Do we neglect to take time to organize the students into work groups with a rotating leader to take some of the supervising responsibility?

ANSWERS

I am sure we could all answer no to some of those questions some of the time. I am sure, also, we all know how much more effective we could be if we answered yes to those questions and the others we could ask which would improve our agricultural mechanics instruction. Taken together those questions might seem overwhelming, but if we answer them one at a time there are none of us who could not develop an outstanding ag-mechanics program.

SHARPER LOOK

If you liked the sharper look of the *Agricultural Education Magazine* which began with the March 1979 issue, thanks go to our friends at Lawhead Press who supplied us with slicker finished paper for that and subsequent issues. Thanks—*Ed.*

COMING ISSUES COMING

COMING ISSUES

- JUNE — Summer Opportunities — Supervision, Planning, In-Service Education, Conferences, Repairs, Other Activities?
- JULY — International Agricultural Education — Filling the World's Breadbasket
- AUGUST — The Overworked Ag Teacher — Determining Priorities
- SEPTEMBER — A New School Year — Opportunities Unlimited
- OCTOBER — Our Grassroots Community Relations — Parents, Advisory Committee, Administration, Legislators
- NOVEMBER — Adult Education in Agriculture — An Extension of Our Vo-Ag Program
- DECEMBER — Hoticultural Occupations — Learning to Beautify

ISSUES COMING

BOOK REVIEW

MODERN AGRICULTURAL MECHANICS, by T. J. Wakeman. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1977, 544 pp., $9.75.

Agricultural mechanics encompasses many varied skills in several areas. MODERN AGRICULTURE MECHANICS brings these skills into focus. Each chapter is an independent unit. This lends the reader the opportunity to fit these units into his/her varied program or operation. Each of the sixteen chapters is complimented with illustrations which fit each situation well. Safety for each unit is stressed in the beginning of each chapter. Review questions follow the material in each chapter, which is appealing to the instructor. A section preceeding chapter one is on the metric system. This section contains a brief history of the metric system and three pages of metric conversion tables.

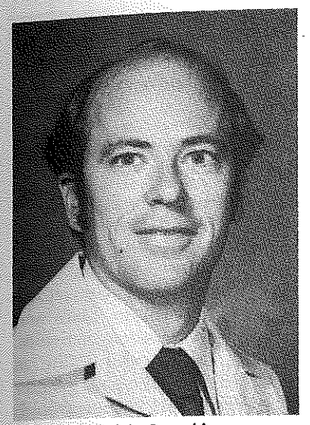
Chapter one covers sketching, drawing, and plan reading. This information offers the readers a definite edge for success in some of the other units. Chapter two helps plan and coordinate the home service center. Tool fitting is covered in chapter three. Chapter four is on metals. It is a concise but thorough chapter. Chapters five and six are hot and cold metal work. Arc and gas welding are covered in chapters seven and eight. Chapter nine is about soldering which includes sheet metal information. Chapters ten, eleven, and twelve are on woodworking. The areas covered are carpentry, woodworking with hand and portable power tools, and power tool woodworking. Chapter thirteen covers painting and preserving wood and metal. The last three chapters, plumbing, masonry and electricity, offer information practical for everyone.

The author, T.J. Wakeman, is a retired Professor of Agricultural Education - Agricultural Engineering at Virginia Polytechnic Institute and State University.

MODERN AGRICULTURAL MECHANICS can be directed to high school, junior college, and senior college students, as well as to farmers. The book is well written and easy to understand. Teachers of agricultural mechanics will find MODERN AGRICULTURAL MECHANICS a useful reference and text.

David Faulkenbery
Webster County Vocational Center
Eupora, VA

PROJECT CONSTRUCTION- STILL A VIABLE METHOD



Carl L. Reynolds

by
Carl L. Reynolds
Teacher Education
University of Wyoming

The project construction method has long been recognized as a widely accepted method for teaching agricultural mechanics skills to vo-ag students. Projects served a useful purpose on the farm or ranch and provided a practical learning activity for the student as well. In recent times, however, the project method has become more difficult to maintain in the instructional program. Some changes have created problems that seem almost insurmountable and in some instances have caused teachers of agriculture to incorporate other methods of instruction for the teaching of agricultural mechanics skills. Teachers in many cases have elected to use the "bench approach" in which students learn to perform skills on small practice pieces or equipment.

Is the project construction method still a viable teaching tool that we should be using today? A look at the merits of the project method, the problems associated with project construction, and ways of reducing the problems associated with incorporating the project method in the instructional program may provide the insight needed in answering this question.

MERITS

A major reason why the project method has been utilized so heavily is that it brings into action a large number of principles which have long been recognized as effective components of the learning process. Several of the more important principles are:

1. Student self-motivation is developed.
2. Goals are established by the student.
3. The process of task breakdown into logical steps is learned.
4. Proper work habits are developed.
5. Individualized instruction is enhanced.
6. The value of prior planning is developed.
7. Skills are acquired in organizing the work environment.
8. Problem solving skills are practiced.
9. Self-discipline is developed.
10. Students develop pride in workmanship.
11. Skills in evaluating quality of workmanship are acquired.
12. Project construction closely simulates job situations for many occupations.

PROBLEMS AND CONCERNS

Several problems and concerns have caused the teacher of agriculture more difficulty in implementing the project method successfully. One, as more urban students enroll in vocational agriculture programs, it becomes more difficult to help those students plan useful projects. Two, the increasing cost of materials make it difficult for students with limited resources to plan projects they desire to construct. Three, highly specialized technical programs make project construction a difficult method for teachers to manage in terms of time and resources. Fourth, modern facilities planning often does not provide for adequate equipment. Project construction requires a larger floor space per student and often larger equipment than would otherwise be required. Fifth, responsibility for a parent's expensive tractor or combine is often more of a liability than a teacher or school district is willing to risk. Also, construction of projects designed for over-the-road use, such as livestock trailers, presents a high level of liability to the teacher if a mechanical failure causes a serious accident. Sixth, the sophistication level of most farm machinery and equipment can require a technology that goes beyond the capability of the facilities or the teacher's expertise. Seventh, the trend toward area vocational centers, in which the student may be receiving his vocational agriculture instruction a considerable distance from home, may cause additional problems in involving students' parents in the planning of projects, obtaining materials, and providing for the additional transportation involved.

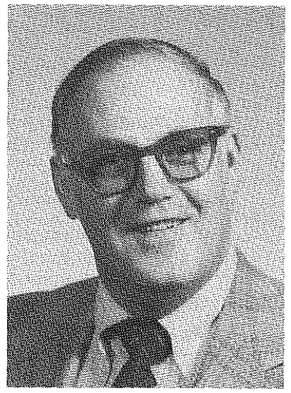
IDEAS FOR CONSIDERATION

Project construction is such an effective method for instruction in agricultural mechanics that every effort should be made to continue its use in the vocational agriculture program. Some of the following suggestions may help overcome some of the problems associated with maintaining the project construction method:

1. Maintain a file of project plans, photos, and ideas. These may be ideas of former students as well as commercially available plans.
2. Make inquiries of farmers, ranchers, and businessmen, such as implement dealers, farm equipment suppliers, and landscape firms, regarding construction and repair-type projects the vo-ag department can do for them.
3. Incorporate construction-type projects into community service activities, such as picnic tables and barbeque grills for the city park, and machinery reconditioning projects in connection with FFA chapter safety activities.
4. Develop a plan with the school to facilitate large quantity purchases of commonly used materials such as lumber and steel for resale to students.
5. Consolidate materials purchases for students' projects to obtain quantity discounts.
6. Plan for group projects that incorporate practice of several skills learned, such as tractor tuneups, combine adjustments, and sprayer calibration.

(Concluded on page 263)

SKILLS, SKILLS, or SKILLS?



Thomas A. Hoerner

by
Thomas A. Hoerner
Agr. Engr. & Ag. Ed. Depts.
Iowa State University

What agricultural mechanics skills should a vocational agriculture student be able to perform upon completing four years of vocational agriculture and agricultural mechanics? What level of competence should he or she possess? In what units of instruction in the program should these skills be taught? What agricultural mechanics projects include the skills that should be taught to high school students?

Are these some of the questions that you are facing when you begin to plan your agricultural mechanics instructional program? If you have a planned instructional program I'm certain your answer is yes. If you answered no, then you really don't have a problem, or at least you haven't recognized a problem. These are common questions asked by many instructors as they begin to plan an agricultural mechanics instructional program. These questions first arise when you begin to think through the objectives of your instructional unit or what you want your students to be able to know or do when they complete the unit. If your main objective is to have each student complete a project during an 8-week unit in carpentry then you really don't have a problem and possibly you don't have a complete or effective instructional program. Every student could complete a project, and whether they learned or developed any skills is purely coincidental. However, if your objective is to have all students be able to safely operate woodworking power tools then you do have a problem in that you must plan meaningful and effective activities and projects in order to teach the skills necessary to safely operate woodworking power tools.

The objective of this article is to discuss the importance of planning, organizing and teaching agricultural mechanics skills. In addition, I would like to discuss where, in my judgment, skills can or should be developed or included in the agricultural mechanics instructional program. Last, I will discuss some specific skills for specific units.

The complete agricultural mechanics instructional program consists of three phases of instruction, these being:

1. CLASSROOM INSTRUCTION — The phase of instruction where basic concepts, principles and understandings are taught. This phase includes the study and discussion of the subject matter, classroom exercises and student activities such as surveys, problem sheets, field trips, use of operator's manuals and numerous other learning activities. Many specific skills and abilities are taught during this phase of instruction, which for most units should be approximately one-third of the total instructional time. Note Figure 1 for an example classroom exercise on the parts and functions of the corn planter. Skills and abilities can be taught through classroom activities. Specific skills and abilities such as the ability to identify the parts and functions of the corn planter are two example abilities that could be taught with the classroom exercise illustrated.
2. REQUIRED ACTIVITIES — The required activity phase follows, or is integrated into the classroom phase. A required activity teaching specific skills might be defined as *"an activity involving no more than 2-3 individual skills or abilities, preferably one, over a short duration of time and related directly to the classroom instruction."* Required activities should:
   a) be demonstrated by the instructor,
   b) be presented on a worksheet or one-page plan form and
   c) be evaluated and used for final evaluation of the course.

(Concluded on the next page)

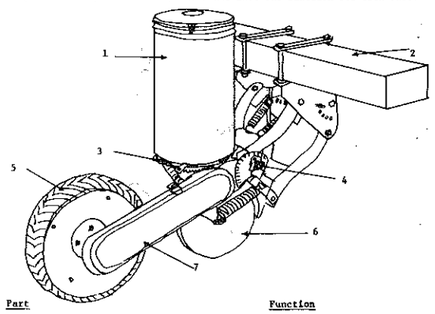
CLASSROOM EXERCISE
Planting and Seeding Equipment

Planters

A. The 5 major jobs of any crop planting machine are to:

1. _____
2. _____
3. _____
4. _____
5. _____

B. Identify the basic parts of the planter and list one function for each part.

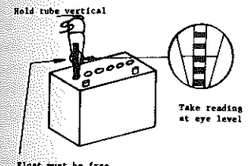


Part	Function
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____

Required activities generally result in the *construction* of some type of project such as a concrete float or cold chisel or an *operation* such as reading a micrometer, adjusting the cylinder speed of a combine or using the battery hydrometer to determine specific gravity of a battery as shown in Figure 2. These are all teachable and important skills or abilities that might well meet the objectives or skills you desire to teach in a specific unit. However, remember a required activity could be a paper type activity such as a survey of small engines at home or computing the cost of electricity for 30 days on the home farm. Again these are important skills or abilities to include in your instructional plan. The required phase of instruction should cover approximately one-third of the total time for most units.

BATTERY TESTING WITH HYDROMETER

Order No. 819



Operational Procedure:

1. Remove the cell caps.
2. Squeeze rubber bulb and insert into cell holding hydrometer verticle with battery.
3. Release rubber bulb and draw electrolyte into tube.
4. Without removing nozzle from cell, take specific gravity reading at eye level.
5. After reading force electrolyte back into cell from which it was removed.
6. Make correction for temperature differences, if needed.
7. Make temperature correction by adding 0.004 to reading (4) for every 10° above 80°F or subtract 0.004 for every 10° solution is below 80°F.
8. Record cell reading on test result form.
9. Test remainder of battery cells.
10. Determine charge of battery from Table 1.
11. Evaluate battery condition on chart.
12. Add distilled water if needed.
13. Recharge if needed (Hobar Worksheet #816).

Materials:

1. Storage battery.
2. Hydrometer.
3. Distilled water.
4. Battery syringe.
5. Storage Battery Service and Maintenance, Slide Set no. 430 by Hobar Publications.

Hydrometer Test Results

1. _____ 4. _____
2. _____ 5. _____
3. _____ 6. _____

Operation Teaches: Ability to...

1. Take a specific gravity reading with a hydrometer.
2. Determine charge of battery at different temperatures.
3. Explain hydrometer readings indicating types of battery failures.
4. Fill battery with distilled water.

Table 1

Percent of Charge	Specific Gravity	Freezing Point, °F.
100	1.260-1.280	-90
75	1.230-1.250	-62
50	1.200-1.220	-16
25	1.170-1.190	- 4
Very little	1.140-1.160	+ 5
Discharge	1.110-1.130	+19

Battery Condition

Good _____ Charge _____
Questionable _____ Retest _____
Replace _____

Evaluation Score Sheet:

Item	Possible Points	Earned
Specific gravity readings	30	
Analysis of battery condition	50	
Clean up of equipment	10	
Safety and work habits	10	
TOTAL	100	

NAME: _____

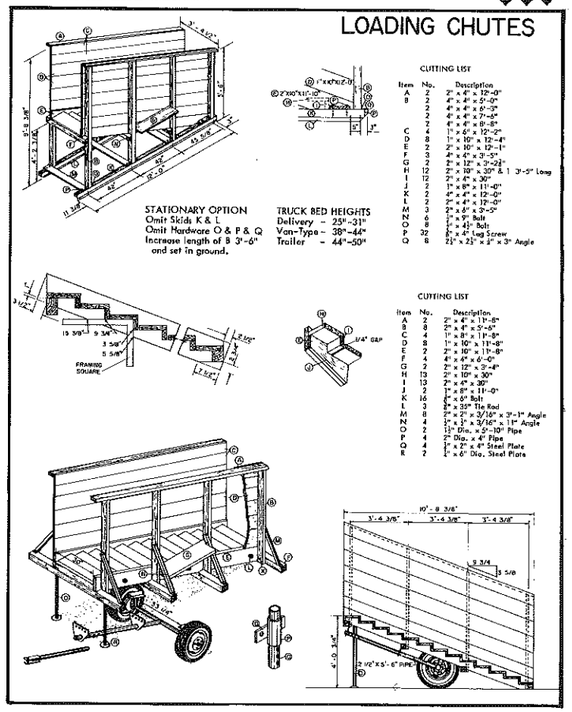
DATE: _____ GRADE: _____

3. APPROVED ACTIVITIES — The approved activity phase of the instructional program logically follows the required phase. An approved activity might be defined as *"an activity, selected by the student, of larger scope, involving numerous skills and abilities, following the required activity phase and allowing for more indepth skill development."* The word approved is the key to this phase of instruction in that the instructor and parent approve the activity selected by the student. Approval should be based on a number of factors such as: student ability, skills to be learned or more fully developed, the agricultural mechanics facility, tools and equipment available, scope or time to complete and instructor experience and background. This is an important phase and should be included in every instructional unit. It should follow the classroom and required activity phase; however, realistically this phase could come at another time of the year or it might be carried out on the home farm or in the SOE Work Experience Center. One example, if the unit is small gasoline engines, during the approved phase the student should work on a project or activity related to small gasoline engines, such as getting a lawnmower ready for storage, mounting an engine on a piece of equipment or overhauling a small gasoline engine. An example approved activity for an agricultural carpentry unit is shown in Figure 3. Imagine all the basic skills that can be taught through the construction of this loading chute. The approved activity phase of instruction should involve approximately one-third of the instructional time for the unit.

SUMMARY

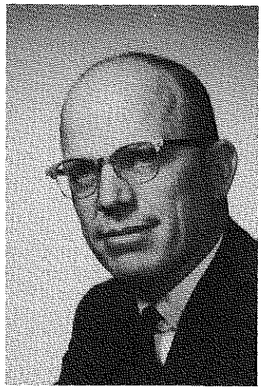
From this discussion it should be apparent that skills can and should be taught in all phases of the instructional program. Meaningful and effective projects or activities that include the skills desired for the student to learn should be planned into the total program. Too many programs have projects as the *end* rather than as a *means* to the end. The real challenge in developing any instructional program is to be able to first determine the important skills and abilities that the student should learn during the unit, next plan projects or activities that include the teaching of these skills and last carry out the instructional plan. Are you concerned about the skills and abilities that your students will possess upon completing your agricultural mechanics course? If so, you will probably plan, organize and teach effective and meaningful agricultural mechanics units that include marketable skills and abilities. ◆◆◆

LOADING CHUTES



KEYS TO SUCCESSFUL TRACTOR MAINTENANCE UNITS

by
William A. Doerr
Agricultural Education and Mechanization
Southern Illinois University at Carbondale



William A. Doerr

Do you ever feel frustrated when you teach tractor maintenance to a high school agriculture class? You introduce the unit, develop some interest and enthusiasm for it and encourage the class to bring tractors to the school shop so they can "learn by doing." The tractors start coming in, and with their arrivals your frustrations begin.

FRUSTRATIONS

The tractors range in age from rather new to quite old. Some are gasoline, some diesel. Some have a magneto; some a coil, condenser, and distributor. Two, three, four and six cylinder engines; six and twelve volt electrical systems; generators and alternators are represented. There are several kinds of air, fuel, and oil filters and the number of different sizes of tires is greater than the number of tractors. You begin to visualize the wide variety of information that the students will expect from you and you suddenly realize that it would be nearly a full-time activity during the class to instruct, supervise, and serve as an information source for only one of the students. How can you possibly effectively and responsibly relate to the entire class? And just when this realization seems overwhelming, the final straw is added—a student tows in a tractor and announces, "Dad said for me to give it a complete overhaul."

KEYS TO AVOIDANCE

The keys to avoiding these frustrations and the chaos that could result from the above described conditions are: (1) good planning, and (2) the effective use of operator's manuals. Good planning, as used here, refers to the teaching plan. It is assumed that appropriate facilities, equipment, and supplies are available, or are being planned and developed concurrently with the teaching plan.

PROBLEMS

The remainder of this article presents some suggestions for "preventive maintenance" on teaching plans, so as to greatly reduce the frustrations which seem to be inherent in the previously described circumstances. To provide a basis for the suggestions, let us first list some of the apparent problems:

1. The scope of the unit on tractor maintenance was not clearly defined and delimited. Students' and parents' expectations—a complete overhaul—have exceeded the limitations (time, facilities, equipment, personal abilities, etc.) of the class.

2. The teacher does not have time to individually instruct each student as the class members pursue their respective and specific tractor maintenance activities; yet, because the maintenance needs of the tractors vary so much, group instruction in anticipation of all possible problems to be encountered is inappropriate and excessively time consuming.

3. The instructor worries that he may not know the answers to all the questions which the students will ask concerning specifications, recommendations, procedures, etc.

SOLUTION — LEAFLETS

One solution to these problems is a series of leaflets to be used as "hand-outs" to supplement class instruction/discussion, and to stimulate use of the operator's manual as the basic informational resource for tractor maintenance. The content and purpose of these leaflets will be discussed, followed by some suggestions for using them.

1. The first of these leaflets (Figure 1) helps to define and delimit the scope of the planned activities and to establish guidelines as to what is expected of the student. The

TRACTOR MAINTENANCE

This unit will areas tractor maintenance--those routine maintenance jobs which can and should be done on the farm to keep a tractor in good operating condition, and provide for a more trouble free and longer period of service between major overhauls. This is not a unit on tractor overhaul.

In order to gain the most experience, information, and confidence, each student should arrange to have the following items in the shop during the time that the class is on this unit:

A farm tractor--any make, model, or size; Preferably from your home farm

An operator's manual for the tractor--A MUST

The following items may or may not be needed. If needed the student should furnish them and have them available in the shop as they are needed.

A change of crankcase oil
A set of spark plugs
Filter elements
Hydraulic fluid
Paint and thinner, also decals
Antifreeze for the radiator
Special tools that may have come with the tractor for clutch or brake adjustment etc.
Other items according to individual needs and desires

Grease solvent, distilled water and bicarbonate of soda will be available for your use at the school.

The work on tractor maintenance will be divided into five areas. For each area, you will receive a check sheet to act as a guide in your work. The areas those check sheets will cover are:

I LUBRICATION, CRANKCASE, TRANSMISSION, DIFFERENTIAL, ETC.
II AIR CLEANER, FUEL SUPPLY, CARBURETOR
III IGNITION SYSTEM, BATTERY, GENERATOR/ALTERNATOR
IV COOLING SYSTEM, TIRES, BRAKES, WHEELS
V EXTENDED STORAGE, PERIODIC MAINTENANCE SCHEDULE

Figure 1

student can also use this leaflet as a basis for discussing with parents the purpose of the request to take a tractor to the school shop.

The teacher should modify the suggested content, perhaps through a problem-solving approach with the class, to meet local conditions. For example, the class enrollment and shop space may prevent each student from having a tractor in the shop. Perhaps 2- or 3-member crews will have to be permitted or encouraged. Local school conditions and policies may also determine or influence what the school will furnish and what the students must provide (examples: lubricants, oil, solvents, rags, tools, etc.). Facility and equipment limitations may preclude some maintenance operations at one school (spray painting, for example) which would be possible at another school.

2. The remaining leaflets serve as student guides to self instruction by using the operator's manual. Figure 2 shows an example covering the areas: Lubrication; Crankcase; Transmission; Differential and Hydraulic Systems (Area I). The other leaflets each relate to one of the other areas listed at the bottom of the leaflet shown in Figure 1. Again, these forms should be developed by the instructor to fit the anticipated or desired situation.

LEAFLET — GUIDES

As represented by Figure 2, the purpose of these latter leaflets is to teach students to utilize the operator's manual as a reference for tractor maintenance. Rather than the instructor telling the students to "get an operator's manual and follow it," the leaflets help to structure and guide the student's work so that he doesn't aimlessly "look" at the manual, but rather has certain objectives to pursue.

Student's name

TRACTOR OPERATOR'S INFORMATION SHEET

Based on information from the operator's manual. Reference page number refers to the page of the operator's manual where the information can be found.

Tractor make _____ Model _____ Year _____

Engine hours (if tractor has hour meter) _____ Date _____

Reference Page No.	Maintenance Items	Check if done
	LUBRICATION	
	A. What items require daily lubrication? Weekly, monthly or seasonal lubrication?	
	B. What is the recommended lubrication for the alternator/generator, distributor, tachometer, etc.?	
	C. When should the wheelbearings be repacked?	
	CRANKCASE	
	A. How is the oil level checked?	
	B. What weight of oil is recommended for summer use?	
	C. What weight oil is recommended for winter use?	
	D. What is the crankcase capacity?	
	E. How often should the oil be changed?	
	F. Is there an oil filter?	
	G. When should the oil filter element be changed?	
	H. Does the breather pipe require service? If so, when?	
	TRANSMISSION, DIFFERENTIAL, AND HYDRAULIC SYSTEM	
	A. Are all three in one system, or are they separate?	
	B. How is the oil level checked?	
	C. When should the oil be changed?	
	D. What is the recommended oil?	

On a separate sheet of notebook paper, write a brief summary of the maintenance work you did on your tractor in the area covered by the topics on this page, especially those things which you did which are not specifically covered in the above check list. Include the cost of items purchased if the information is available.

Figure 2

Note that, even though the items the student is to check are usually in the form of a question, in most instances the student doesn't write a response on the leaflet. One simply lists on the corresponding line in the left margin the number of the page in the operator's manual where the information is found, and then, after determining the procedure/recommendation/specifications, if the operation is actually performed on the tractor a check mark is placed on the line in the right margin. Finally, as suggested at the bottom of the leaflet, the student prepares a brief written report to summarize the maintenance work done on the tractor for the specific topic area.

Only the one example is shown in Figure 2. Length limitations for this article prohibit an itemization of suggested items for the other leaflets, one each for the areas: Air Cleaner, Fuel Supply, Carburetor (Area II); Ignition System, Battery, Generator/Alternator (Area III); Cooling System, Tires, Brakes and Wheels (Area IV); and Extended Storage, Periodic Maintenance Schedule (Area V). Any reader interested in receiving a listing of suggested items for each of these areas may request it from the author.

USING THE GUIDES

The use of the leaflets provides for a smooth transition from classroom instruction to shop activity. The teacher can introduce each area and discuss it in general terms, explain and demonstrate the use of specialized tools, gauges, meters, etc. and demonstrate or explain some typical procedures. The appropriate leaflet is then distributed. Using it and the operator's manual, each student determines the specific information/procedure/recommendation/specifications for his tractor, and, after these maintenance requirements are known, proceeds to the shop to perform them.

Included in the discussion of the use of the guide should be some suggestions on using the table of contents and/or the index of the operator's manual to quickly locate the desired information.

Class rules are established that (1) no maintenance work is to be done until the appropriate information is obtained from the operator's manual and the number of the page where the information is located has been placed on the line on the guide, and (2) the guide and the manual are to be present when the work is being done. When supervising the shop activities the teacher can glance at the guide to determine the page number the student has recorded, then look on that page in the manual to verify that the student has selected the appropriate reference.

If the student's work appears to be progressing satisfactorily and in accordance with the recommendations of the manual, the teacher can give appropriate recognition and move on to another student. One form of recognition might be, "You are the first one to encounter that problem and all the class should know about it. I would like for you to give a brief demonstration/report on this during the first few minutes of tomorrow's class."

On the other hand, if a student is experiencing difficulties, is floundering, wandering or lost, the impersonal guide and operator's manual can be used as the "authority" to help the student get re-oriented and motivated. This

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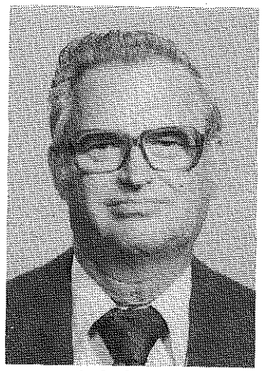
IN-SERVICE WORKSHOPS



J. C. Simmons

by
J. C. Simmons
Section Chief, Vo-Ag/Agribus.
Louisiana State Dept. of Education
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The attendance of vocational agriculture/agribusiness teachers at in-service workshops has long been a very important and required phase of the annual program for the vocational agriculture/agribusiness program in Louisiana. However, because of the type training received at these seminars over the past several years, the word "required" has been removed from any discussion pertinent to attendance by the teachers. The skills learned by the teachers have been of the type and quality needed and attendance has been excellent. The workshops are held in conjunction with the four leadership training conferences for local FFA chapter officers.

During the year teachers are given the opportunity to submit suggestions for the type instruction they feel is needed for the purpose of better conducting their programs of instruction. Developing important skills in agricultural mechanics has always been a priority in these requests and the State Staff has made every effort to arrange for intensified instruction in this phase of the program.

Each of the four workshops held during the summer are one week in length. Therefore, the program must be well planned if the information received is to be beneficial to the individual teachers. In obtaining the best qualified personnel to conduct the programs, it has always been the policy of the state department to work with industry and their resource people as much as possible. This has proved very successful and beneficial to all involved.

BUSINESS ASSISTANCE

Over the past several years updated information and new skills have been in electricity, welding, (acetylene and electric), surveying, and most recently, four week long air-cooled engine work shops were held. It was rewarding to the staff concerning the excellent cooperation received from the various companies which were contacted for the purpose of obtaining instructors in these various phases of agricultural mechanics. Several companies provided materials, supplies, equipment, etc. in addition to providing the instructors from among their company personnel.

The four air-cooled engine workshops held during 1978 were considered by many teachers to be the most successful type training they have received since the instruction in agricultural mechanics was initiated. Approximately four months prior to the time of these in-service training programs, members of the state staff contacted representatives from the various companies relative to their assistance. As previously stated, the response was very gratifying and certainly motivated the staff toward doing a good job of working with these people in organizing an instructional program. Top personnel from this major company's offices located throughout the United States, participated as instructors relative to the various phases of the program.

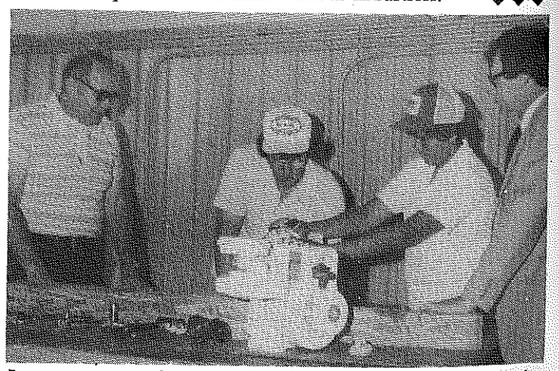
SMALL ENGINES WORKSHOP

Following is a list of the subject matter covered during the workshops on air-cooled engines:

1. Starter systems, including the actual rewinding of the starters by the students (teachers)
2. Ignition system (magneto-sparkplugs)
3. Carburetion system
4. Crankcase pressure
5. Detailed study of cylinders
6. Valve systems
7. Tear down and reassemble of engines
8. Crank system (crank shaft and cam shaft)
9. Lubrication

The well planned instructional program was well received by all teachers and was very effective toward assisting them to do a better job of teaching in their local departments. Each vocational agriculture/agribusiness teacher received a certificate denoting that they "had successfully completed a training course in repair procedures pertaining to the servicing of gasoline engines."

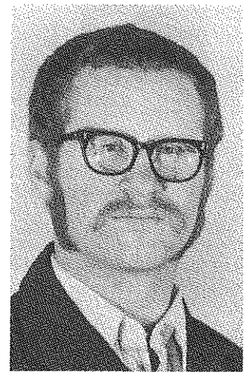
The workshops planned for these teachers have for the past several years been successful ventures resulting from the close cooperation between the State Department of Education and representatives from various industries. ◆◆◆



Representatives of the company which sponsored small gasoline engine workshops for vocational agriculture/agribusiness teachers in Louisiana observe teachers as they work with their assignments. At left is R. C. McWilliams, District Manager for Briggs & Stratton Corp. At right is Sam Grayson, President of Grayson Company, Briggs & Stratton distributor in Shreveport, La. Representatives of Suhren Engine Company from New Orleans also participated as instructors.

A SMALL ENGINE DYNAMOMETER

by
Glenn Conklin
Farmer & Former Ag. Mech. Teacher
Brooktondale, NY



Glenn Conklin

Teachers of Agricultural Mechanics!

- *Do you want a project that students can build at a reasonable price?*
  Would you like to be able to measure the horsepower of a lawnmower engine?
- *Are you interested in having a device that will help teach tune-up procedures?*
- *Would you like a device that will help teach the concepts of torque and horsepower?*
- *Do you want to stimulate student interest?*

If the answers to the above questions are yes, you should consider building a small engine dynamometer.

Most high school vocational programs offer a course in small engine maintenance and repair. An important part of such a course is student practice in engine rebuilding. All too frequently, however, students do not receive immediate feedback about the success of a given engine overhaul because the equipment the engine is intended to run is not at the school, or (as in the case of a rotary mower) because the equipment cannot be tested under load as a result of the seasonal nature of its use. Consequently, the students do not receive the benefit of fully evaluating their overhauls while the details of the jobs are fresh in their minds.

DYNAMOMETER ADVANTAGES

If a dynamometer were available to a small engine program, students could test their engines immediately upon completion of rebuilding. Such a dynamometer can be built with an automotive power-steering pump which is readily available in a junk yard. This dynamometer will provide a means to (1) demonstrate the relationship between tune-up adjustments and horsepower, (2) demonstrate the relationship between engine horsepower before and after tune-up or rebuilding, (3) determine need for tune-up or rebuilding by comparing the horsepower of an engine to what it should put out, and (4) help students visualize the concepts of torque and horsepower.

DEVELOPMENT STUDY

A study was conducted in the Agricultural Engineering Department at Cornell University* to determine the relationship between the output pressure of certain GM power-steering pumps and the torque on the pump housing. This was accomplished by connecting a one-foot-long torque arm on the pump housing, cradling the pump so the housing could rotate, and hooking a scales on the end of the arm. The pump was then coupled to a power source, and a gauge-valve setup for measuring pump output pressure was installed. The torque on the pump housing at various pressures was determined, and from this information an equation was developed.

FORMULAS

From the study an equation was derived that describes the torque vs. pressure relationship for GM power-steering pumps used on full-sized Chevrolet cars (Biscayne, Belair, Impala) from 1965 to 1973. It is:

(1) Torque in ft-lb = (.0136) (pressure in PSI) + 0.93. This formula allows us to mount the pump rigidly and still determine the torque on the pump housing and hence the torque of the engine driving the pump.

Since the formula for horsepower is:

$$(2)\ HP = \frac{T\ (\text{torque}) \times RPM}{5250}$$

Then by substituting formula (1) for torque into the horsepower formula (2) the formula for horsepower becomes

$$(3)\ HP = \frac{RPM\,[.0136(PSI) + .93]}{5250}$$

By simply taking readings of the pump output pressure at a chosen RPM, preferably in the range of 2500 to 3500, the horsepower output of a small engine can be calculated with formula (3) by plugging in the values for RPM and pump output pressure.

Formula (3) is adequately reliable when pumps from cars listed above are used, and if the pumps are not badly worn. Statistically the correlation coefficient is 0.95.

The GM power steering pumps tested have the capacity to measure up to six horsepower output of an engine. How-

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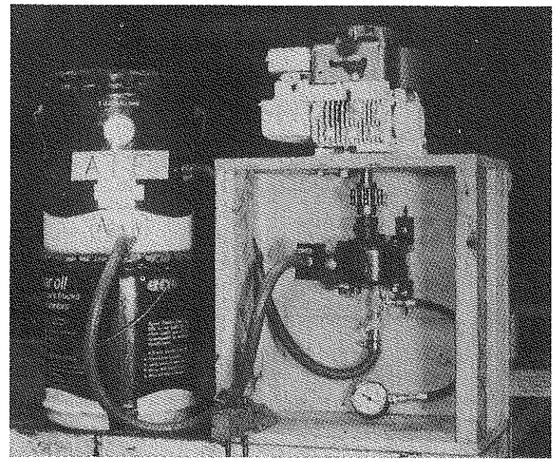
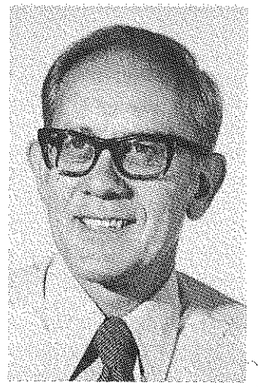


*Conklin, Glenn T., "Measuring Small-Engine Horsepower", Special Problem in Agricultural Engineering, Cornell University, Ithaca, NY 1975.

FEATURING:

A LOW-COST, EFFECTIVE, FUMES EXHAUST SYSTEM

by
C. O. Jacobs
Agricultural Education Department
University of Arizona



C. O. Jacobs

Providing a safe and healthful environment for the agricultural mechanics laboratory is a primary concern for administrators and instructors. Since the establishment of the National Occupational Safety and Health Administration in 1970, federal standards for safe working conditions have been accepted by most states as law. The regulations have had several profound effects. First, they provided insight into unsafe and unhealthful working conditions heretofore not recognized because of lack of understanding or concern, and second, they provided a mandate to do something about it.

FUMES HAZARD SUBTLE

The necessity to provide adequate eye and skin protection for all forms of welding is well accepted. It is simply impossible to weld without proper equipment and personal protection. The personal injuries resulting from improper equipment are immediate and measurable. The hazardous effect of improper ventilation of welding fumes is more subtle and the need to provide for adequate ventilation is often ignored.

The hazard to health from fumes and gases generated by a welding operation depends upon the following:

1. Chemical composition of the materials being used
2. Concentrations of chemicals in breathing zone
3. Duration of exposure

FUMES SOURCES

Air contaminants may arise from the filler rod, fluxes and oxides or alloying elements of metals being joined. The information presented in Table I is a summary of the elements which produce health hazards. Of those listed, ozone and nitrogen oxides are the principal poisonous gases, while toxic fumes are generated from metals coated or alloyed with lead, zinc, cadmium or beryllium. Fumes from metals including cadmium, copper, nickel and zinc produce "metal fume" fever.

Welding done with coated rods or electrodes releases fumes of metal oxides, hydroxides, carbonates, silicates and fluorides. Of these, fluorides are especially toxic. Fluorides are contained in low hydrogen, stainless steel, some hard-surfacing electrodes, mild and low alloy open arc wire, most non-ferrous electrodes and many brazing and soldering fluxes.

Some silver solders containing cadmium and metal alloys containing beryllium which can generate fumes which cause severe lung irritation. The results may be fatal.

VENTILATION PROBLEM

The physical problem of providing adequate ventilation for the welding instruction area for the agricultural mechanics laboratory is complex. The specification published by OSHA identifies the following minimum requirements:

1. A minimum ventilation of 2000 ft.^{3}/min. per welder, or
2. A capture velocity of 100 lineal feet per minute airflow per welder when using local exhaust hoods placed near the work.

Most schools are equipped with a common intake hood mounted over the fixed welding stations; the attached exhaust fan generally provides the minimum of 2000 ft^3/min. airflow. This type system has three primary faults as follows:

1. Welding fumes move upward directly past the welding helmet of the person. Some of the fumes enter the face shield where they are confined and breathed.
2. The high exchange rate of air in the building increases the heat loss more than is economically allowable.
3. The high cost of equipment is a deterrent to installation.

TABLE I

WELDING FUMES & GASES HEALTH HAZARDS

CHEMICAL AGENT	SOURCE	ROUTE OF ENTRY	HEALTH HAZARD(S)
Antimony	Alloy element	Exposed skin Breathing fumes	Inflammation of hair follicles--metallic taste--stomach distress
Arsenic	Metal painted with arsenic compounds Alloying element Hardening agent	Breathing fumes Exposed skin	Inflammation of mucous membranes; Skin irritation
Asbestos	Electrode coating (some)	Breathing fibers	Long term exposure causes asbestosis of lungs
Beryllium**	Alloying element w/copper	Breathing fumes	Acute exposure--chemical pneumonia; long term effect accumulative; fatigue and weakness
Cadium*	Rust preventative on steel Alloying element	Breathing fumes	Severe lung irritant--long term exposure causes emphysema and kidney damage
Chlorinated Hydrocarbon Solvents	Engine degreaser Cleaning compounds	Breathing fumes	Heat and ultraviolet radiation from arc form highly toxic phosgene gas
Chromium	Alloying element, stainless steel	Breathing fumes	Extremely toxic and irritant to skin, eyes, mucous membranes
Fluorides*	Electrode coatings Welding flux	Breathing fumes	Irritant and accumulative effect--bone damage and fluid in the lungs
Iron Oxide*	Principle element in steel	Breathing fumes	Irritant to nasal passages, throat and lungs--Long term effect not dangerous
Lead* (Lead Oxide)	Alloying element Painted surfaces	Breathing fumes and Ingestion	Metallic taste in mouth--long term effect lead poisoning
Mercury*	Rust preventative	Breathing vapors	Kidney damage; respiratory failure--long term exposure--tumors, emotional and hearing problems
Nitrogen Oxides*	Atmosphere	Breathing fumes	Irritant--hard to detect; dangerous concentrations can injure lungs
Ozone*	Gas produced by arc action on air	Breathing fumes	Very irritating to mucous membranes--excess produces fluid on the lungs
Silicon Dioxide	Electrode coating (some)	Breathing free Silica	Long term exposure leads to silicosis
Zinc*	Metal coating	Breathing fumes	24 hour metal fume fever

*Require mechanical local exhaust ventilation with sufficient airflow to maintain a capture velocity (away from worker) of at least 100 linear feet per minute

**Above plus NIOSH approved air-supplied respirator

LOW COST EXHAUST SYSTEM

A consideration of these factors prompted the author to develop a low cost welding exhaust system adapted to agricultural mechanics laboratory arrangements found in most departments of vocational agriculture in Arizona. The design and operation of the system proved useable and effective. Features of the system are:

1. Capacity—up to eight arc welding stations; more with larger fan.
2. Cost—less than $75 per station using student labor to install.
3. Effective—meets flow rates of 100 lineal ft. per minute. Intake hoods are adjustable to allow use of positioners for practicing vertical and overhead welding.

The heart of the system is the intake hood, Figure 1, which is attached to the welding screen. The hood (one for each welding station) is constructed of 28 ga. galvanized sheet steel. The fabrication was completed in a local sheet-metal shop using the pattern provided. A four inch air duct is

(Concluded on page 254)

Figure 1. Intake hood is attached to welding screen; support bracket slides on ¾" square tubing to allow hood to be raised for out-of-position welding. NOTE: Metal welding plate on table is required to direct air flow into hood and away from worker.

CONTINUED . . . EXHAUST SYSTEM

pop-riveted to the hood. A four inch dryer hose, Figure 2, connects each station to the 12 inch main duct. The dryer hose is flexible and allows the hood to be raised 18 inches on its support for practice of out-of-position welding. The hood is insulated from the welding table, therefore students cannot strike an arc on the exhaust system. The 2060 cfm. exhaust fan, Figure 3, is driven by a ¾ horsepower electric motor.

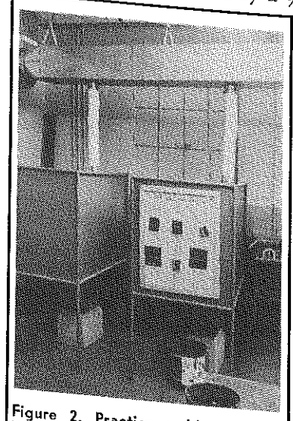


Figure 2. Practice welding stations. Exhaust hood is connected to overhead fan duct with 4 inch dryer hose.

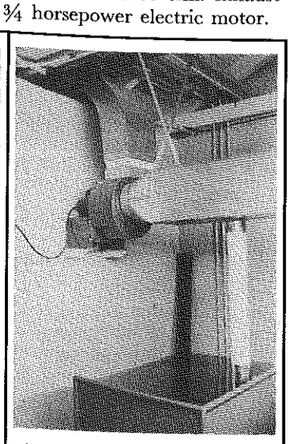


Figure 3. A 2060 cfm. exhaust fan driven by ¾ hp. electric motor provides capture velocity of 100 lineal feet per minute 11 inches from hood for up to 8 stations.

TESTS

Tests performed using a Velometer at three inches above the table provided the linear flow rates listed in Table II. (See Figure 1 for position of hood for tests).

TABLE II

AIR VELOCITY READINGS
LINEAL FEET PER MINUTE

Capture Velocity	Velometer Position - Inches from Hood					
	2	4	6	8	10	12
Flow Rate Lineal Ft/Min	245	185	165	135	120	95

Minimum requirements for safe welding conditions have been established by OSHA, which specify adequate ventilation to eliminate hazardous fumes and gases during welding operations. Cost considerations and effectiveness of exhaust systems to meet the instructional needs in agricultural mechanics laboratories in Arizona were contributing factors in the installation and testing of the system described.

PLANS SOURCE

Plans including welding table, screen and exhaust system are available for a cost of $1.00 from the Agricultural Education Department, University of Arizona, Tucson, AZ 85721. Please specify Guide Sheets-Welding System. Make checks payable to the University of Arizona. ◆◆◆

CONTINUED . . . TRACTOR MAINTENANCE UNITS

approach permits the teacher to be a partner, a co-investigator, with the student in solving the problem and reinforces the objective to "teach students to utilize the operator's manual as a guide to, and source of, information for tractor maintenance."

The leaflets can also be used, in conjunction with a supply of operator's manuals which the teacher has collected, to provide a classroom activity for those students who have not yet brought a tractor to the shop. Seeing classmates engaged in tractor maintenance activities in the shop while one (or one's team) studies tractor maintenance in the classroom often stimulates a "bring in a tractor" response.

LEMONADE?

At the beginning of this article it was implied, through a description of the great variety of makes, models and types of tractors which class members might have for a unit on tractor maintenance, that this would be an impossible or at least an undesirable situation. In reality, by good planning and effective use of operator's manuals, this apparent "lemon" can be made into lemonade in the form of a richer, more comprehensive learning experience for the student, with this additional bonus: By learning to use the operator's manuals, the students will still have the *basic* information for tractor maintenance in the future, regardless of how much technological advances modify current tractor maintenance procedures. ◆◆◆

CONTINUED . . . DYNAMOMETER

ever, it would be nearly impossible to design a mounting arrangement that would adapt these pumps to every small engine that has been manufactured. Since a large number of vertical shaft, rotary lawn mower engines have been produced, a dynamometer that fits these engines would be most useful.

PLANS SOURCES

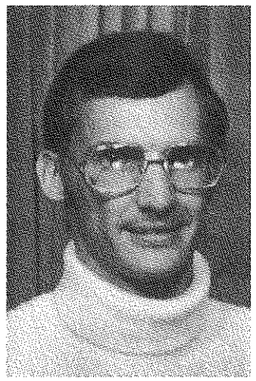
Detailed procedures and the materials needed for building and using a dynamometer for vertical shaft engines, are discussed by Glenn Conklin in his publication, "Constructing and Using a Small Engine Dynamometer." This information can also be used, with modifications to build a dynamometer for horizontal shaft engines. The publication is available from Instructional Materials Service, 3 Stone Hall, New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853. The price of this 30 page publication is only $2.00.

If a teacher were willing to spend the time to build a power steering pump calibration unit, he would have a device that would very accurately determine the horsepower of a small gasoline engine and he could also demonstrate the concept of horsepower. A copy of Glenn Conklin's study of power steering pumps, how he constructed a pump calibration unit, and how he derived the horsepower formula discussed above can be obtained by writing to Fred G. Lechner, Associate Professor of Agricultural Engineering, Riley-Robb Hall, Cornell University, Ithaca, New York 14853. ◆◆◆

SEEKING A JOB?

Have you ever wondered what an administrator looks for when selecting a new vocational agriculture teacher?

by
Richard Lee Cole
Agricultural Education
Oregon State University



Richard Lee Cole

After a rather unusual hiring year in the state of Oregon, so did the Agricultural Education staff at Oregon State University. Principals who had recently hired vocational agriculture teachers were asked to rate the importance of twenty-three criteria dealing with personal and professional preparation for teaching vocational agriculture. They rated each criterion on a scale of one to five, with one being "Not Important" and five being of "Utmost Importance."

METHOD

The questionnaire was mailed to 26 principals and sixty-five percent of them returned usable ones. Table 1 contains the mean rating assigned each criterion by the respondents. The 23 items are listed in rank order by mean rating, the higher the mean score the higher the perceived importance of the criterion.

TABLE 1

Data Summary

Rank	Item	Mean
1.	Attitude (positive or negative in outlook)	4.71
2.5	Recommendations of administrators	4.47
2.5	Recommendations of a student teacher's cooperating teacher	4.47
4.5	The personality of the applicant (as perceived during the interview)	4.35
4.5	Breadth of experiential background within the technical specialty (agriculture)	4.35
6.	Applicant's self-confidence	4.24
7.5	General appearance (dress and grooming)	4.12
7.5	The ability to sell oneself during the interview	4.12
9.5	Ability to articulate goals	4.06
9.5	Recommendations of a student teacher's university supervisor	4.06
11.5	Undergraduate course work	3.76
11.5	Breadth of technical (agriculture) course work taken at universities and/or community colleges	3.76
13.	The types of questions the applicant asks while interviewing	3.75
14.	Breadth of FFA experience	3.74
15.	Graduate course work	3.71
16.	Appearance and neatness of file	3.44
17.	Grades in graduate course work	3.41
18.	Number of years of experiential background within the technical specialty (agriculture)	3.35
19.	Grades in undergraduate course work	3.12
20.	Preference in hiring experienced teacher to first year teacher	2.88
21.	Institution where candidate was prepared	2.82
22.	Education classes taken	2.70
23.	Grades in education classes	2.65

POSITIVE ATTITUDE

The results are presumptive and could be beneficial to vocational agriculture teachers applying for jobs. For example, it was observed that a positive attitude with the ability to articulate goals, interview the interviewer, and demonstrate outgoing characteristics are very important in securing a job. Further, recommendations of the building principal, and in the case of student teachers, the cooperating teacher, are very important—more important than the recommendations of the university supervisor.

EXPERIENCE

The breadth of experience in agriculture rates high as a criterion of importance to principals in selecting vocational agriculture teachers, as does breadth of technical agriculture coursework.

APPEARANCE

In today's "liberated" society, the high rating placed on general appearance (dress and grooming) is noteworthy. Have we gone overboard to the casual side? Do some people still respond favorably to good grooming and well-dressed teachers? Evidently principals feel that jeans and a soiled work shirt and messy hair are not appropriate attire for teaching or interviewing.

COURSES

The courses taken in the undergraduate program appear to be very important, but the grades received in those courses are less significant. Therefore, you should take a wide variety of agricultural coursework in the undergraduate program and not feel like the world is going to come to an end if you happen to get a "C."

OTHERS

A pair of ratings which show great insight on the part of principals deal with grades received in graduate course work versus grades received in undergraduate course work. The higher ranking of graduate grades indicates an awareness of the importance of enthusiasm for teaching and how it affects the courses one takes at the graduate level.

Other criterion of interest toward the bottom of the list include the low importance rating for the value of educational course work and the corresponding grades. Does this ranking indicate that the educational courses are unimportant or that the quality of instruction is so low that one gets little out of these courses?

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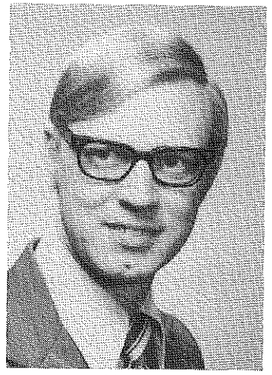


Arnold L. Mokma

POST-SECONDARY PROGRAMS IN AGRICULTURAL OCCUPATIONS

by
Arnold L. Mokma
Teacher Education
Ohio State University

In 1977-78, post-secondary programs in agricultural occupations were the largest ever. There were continued increases in the number of post-secondary institutions, number of programs offered, and the number of students enrolled.

DATA SUMMARY

When the data compiled for 1978 Directory of Two-Year Post-secondary Programs[1] was compared to previous data[2], there were some interesting developments. While the number of institutions grew over seven percent, the number of students enrolled increased less than one percent. A comparison of the 1976-77 data and the 1977-78 data is shown in Table 1.

TABLE 1. 1977 to 1978 Changes in Two-Year Post-secondary Education in Agriculture

	1976-1977	1977-1978	Percent change
Institutions offering programs	478	513	+ 7.32
One and two year programs	1,640	1,731	+ 5.55
Full-time faculty	1,903	1,941	+ 2.00
Part-time faculty	1,585	1,595	+ 0.63
Student enrollment	63,717	64,125	+ 0.64

Since Manley[3] began collecting data on post-secondary programs in 1966-67 there has been tremendous growth. The number of institutions has more than tripled. Student enrollment has grown over 600 percent. The number of faculty teaching these programs is nearly nine times greater. Table 2 shows a summary of this growth.

TABLE 2. Growth of Post-secondary Education in Agriculture

	Institutions	Enrollment	Faculty
1966-67[3]	142	10,290	393
1971-72[4]	383	32,622	1,864
1976-77[2]	478	63,717	3,488
1977-78[1]	513	64,125	3,536

POST-SECONDARY INTEREST AREA

Slightly more than one-fourth (27.9%) of the institutions provided curriculum-related student organizations. This represented a decline of nearly sixteen percent from 1976-77. Some of the institutions reported organizations for each instructional program rather than a single organization.

An important part of the education programs at many of these institutions is the adult education offerings. Over 24,000 adults are enrolled at 181 institutions. The majority of these programs are production oriented with titles such as Adult Farm Management, Farm Management Records, Veterans' Farm Training and Farm Business Management.

REACTIONS AND IMPLICATIONS

The data collected in 1978 provide evidence that post-secondary education programs of less than baccalaureate degree level continue to be meaningful in meeting occupational objectives for many students. However, the amount of growth has slowed dramatically and would indicate that there may be a plateau of more moderate growth ahead as the era of reduced high school graduates becomes a reality.

The reduction in student organizations must be taken seriously. In most states, graduates of the post-secondary programs will be looked upon as leaders in their communities. In the opinion of this writer, it appears the need for leadership training cannot be overlooked. The national meetings in 1978 and 1979 indicate there is a concern about this trend. The opportunities for programming in this area may need to be re-evaluated.

In the adult education programs, the trend continues to emphasize agricultural production. In the near future, it appears, there will be a need for program opportunities for employees of agricultural businesses, especially previous graduates of post-secondary programs.

Finally, this reduced rate of growth will provide an opportunity for the institutions to begin qualitative assessments to keep their programs relevant to the occupation goals of young people and the employment needs of the agricultural industry. The need for well-trained technicians in agriculture has never been greater. ◆◆◆

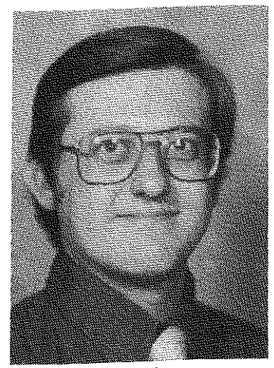
REFERENCES

[1]Erpelding, Lawrence H., Jr. "Directory of Two-Year Post-secondary Programs in Agriculture, Agribusiness, Natural Resources and Environmental Occupations." Department of Agricultural Education, The Ohio State University, Columbus, 1977.
[2]Mokma, Arnold L. "Directory of Two-Year Post-secondary Programs in Agriculture, Agribusiness Natural Resources and Environmental Occupations." Department of Agricultural Education, The Ohio State University, Columbus, 1978.
[3]Manley, Fred W. "Two-Year Technical Education Curricula in Agriculture and Natural Resources in the U.S.A."
[4]Iverson, Maynard J. "Directory of Post-secondary Education in Agribusiness and Natural Resources Occupations" (1971-72).

★ ★ ★ THIS WORKED FOR ME! ★ ★ ★

A MULTIPLE SKILLS PROJECT

by
Kirk Edney
Vo-Ag Teacher
Azle, TX



Kirk Edney

In addition to two sections of Vo-Ag II, I teach a two-hour Pre-employment Laboratory course in General Agriculture Mechanics. For use in my pre-lab, I adapted this project from a laboratory exercise assigned by Mr. Paul Chilen in Agricultural Engineering 223, at Texas A & M University. This project should require at least five class periods to complete. I like it because it utilizes the principles or skills of oxyacetylene cutting, off-hand grinding, filing, layout work, drilling, tapping and threading.

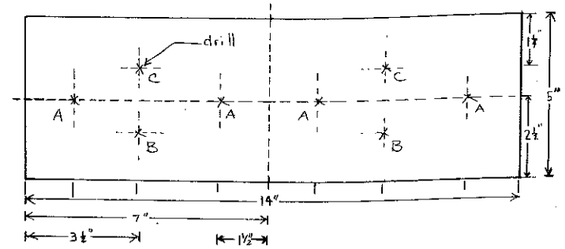
BILL OF MATERIALS

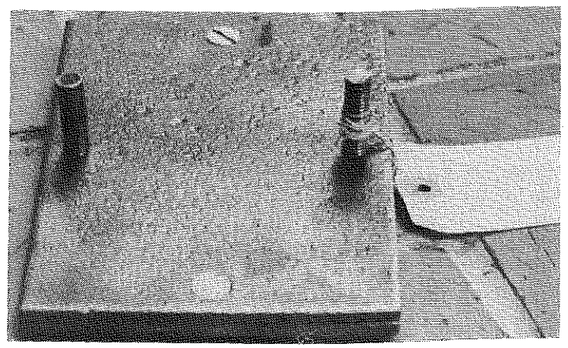
3/16″ mild steel plate, finished to 5″ X 14″
⅜″ allthread rod, ⅜ X 16 NC, 4″ long
⅜″ mild steel rod, 4″ long
¼ X 20 NC flat head stove bolt, ½″ long (2)

PROCEDURE

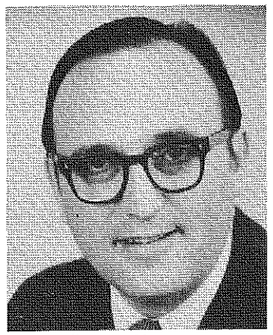
1. Use oxyacetylene torch to cut plate to a size that can be finished to 5″ X 14″
2. Clean up plate edges on pedestal grinder
3. File plate edges, instructor check with straightedge and .010″ feeler gauge
4. Paint one side of plate with DYKEM BLUE or similar solution
5. Scribe center lines along length and width
6. Scribe lines to locate centers of holes
7. Use prick punch to indent places that proper lines intersect
8. Drill pilot holes (8)
9. Drill holes:
   A. #7 drill bit (for stove bolts—4 holes needed)
   B. 5/16″ drill (for allthread rod—2 holes needed)
   C. Q drill bit (for steel rod—2 holes needed)
10. At two of the A locations, drill countersinks for stove bolts
11. Tap threads:
    A. ¼ X 20 NC for stove bolts
    B. ⅜ X 16 NC for allthread rod
    C. ⅜ X 24 NF for mild steel rod
12. Chamfer one end of mild steel rod, thread with ⅜ X 24 NF die
13. Cut plate in half at center width with hacksaw, file edges
14. Assemble the two plates with the fasteners; they should be tight and flush.

This project can be easily altered for various sizes of rods, plates, bolts, etc. A 3/16″ bit can be used in place of the #7, and a 5/16″ bit in place of the Q, if lettered or numbered bits are not available. ◆◆◆





Improving Ag. Leadership



Allen C. Christensen

by
Allen C. Christensen
Associate Dean
School of Agriculture
Cal Poly at Pomona

For a long time, agriculture had authority stemming from massive power at the ballot box. The implication was, whether openly stated or not, "If you do not do it our way, we will get you at the polls in November." The weakness of that approach was the built-in reliance on someone else to be our leaders — the farm senator or congressman, for example. As our authority waned, as it seems to in cases where we proceed in an authoritative manner, we had not developed the skill or the talent to proceed in any other way. We needed to collectively change our methods of influence, but the process of change has been a slow and painful one. This article is written with the intent to provide concepts to improve leadership methodology.

LEADERSHIP

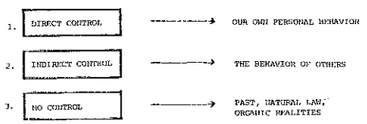
Leadership is a frequently used word in our language, and one we seldom define; however, it conveys certain impressions to the hearer. In discussing leadership, three questions would seem to be germane: What is leadership? Who are leaders? Is the attainment of an office required as a prerequisite to the exercise of leadership?

These questions can be answered simply. Leadership is the capacity to lead. Leaders are people with authority, or influence, or both in some cases, who have the capacity to lead, direct, encourage and motivate people to accomplish an objective; and, while helpful in some cases, it is not necessary for one to hold an office to be a leader.

SELF-PREPARATION

While the answers are simple, one must develop the capacity to direct the actions, attitudes, and energies of others. This requires a high degree of personal discipline and the ability to recognize the priorities in a given situation. One can spend his whole day sawing and not saw much wood if his saw is dull, and, of course, if one fails to start the saw's engine until the end of the day, his progress is even slower. Self-preparation is the key to self-confidence and seems to precede the influential leader.

As leaders or private individuals, we face three general types of problems which can be graphically displayed as follows:

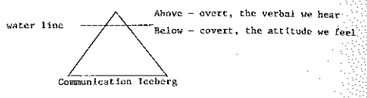


CHANGE IN ONESELF

The solution to any of these problems has a common key and that is simply to change oneself. Only we have direct control over our own behavior. Where it is our problem, we can change it if we so will it. Where we are ineffective in influencing others to accomplish a worthwhile objective, we must develop new methods of influence. The common key is a change in oneself. Where we have no control, we must change our attitude. If the mistakes or failures of the past negatively affect our thinking, our enthusiasm, or our judgment, only we can change our attitude. For those who are discouraged at past leadership difficulties, it is well to remember that we can still be 100 percent effective in the future. You, and you alone, can determine your response to a given situation. In working with people, this is an important concept.

COMMUNICATION

Leaders spend time in counseling people and one of the chief stumbling blocks they face is frequently prescribing solutions before diagnosing the problem. We must diagnose before prescribing and understand before counseling. These are fundamental keys in using successful methods of influence with others. Since we cannot do everything, we must proceed to work with and through others, and, therefore, in a leadership role, we will only have indirect control with many problems. Communication with others, therefore, is a critical factor in working with others. Communication is analogous to an iceberg. Only 10 percent of an iceberg is above the water line.



SUCCESSFUL LEADERSHIP AND DECISION MAKING

One of the more common errors made in agricultural leadership is the tendency to revert to the "authority leadership" technique. The alternative is to formulate successful leadership and decision making through the following process:

1. Get ideas, make observations, and collect the necessary information to make a sound decision.
2. Analyze observations and ideas, formulate solutions, identify personal emotional bias that affects the decision making and determine when the decision must be made to avoid losing the opportunity.
3. Take steps necessary to eliminate any emotional bias which has been identified.
4. Make the decision on the basis of fact and what is ethically right.
5. Act or implement the decision.
6. Accept the responsibility for actions taken. It is particularly important to do this when things do not work out. It is equally important to give the credit to others when things go well.

If we are to get at the attitudes of others, we must learn to be insightful, discerning, perceptive individuals. We can learn to send warm insightful messages that will lift and motivate others to see the positive, and yet we can learn to analytically discern the source and nature of the problems we face. Above all, we should remember that leadership skills are learned, not genetic behavior. ◆◆◆

Leader in Agricultural Education:

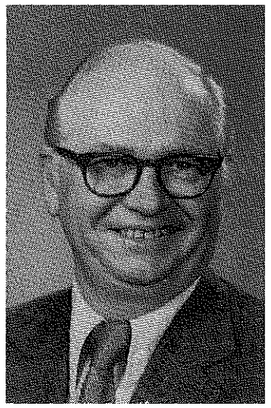
N. E. FITZGERALD

by
*George W. Wiegers, Jr.**

Nugent Edmund Fitzgerald, Dean Emeritus of the College of Education, recently stated that he enjoyed every minute of his forty-two years of active service at The University of Tennessee. His contributions to the field of agricultural education, and to the larger field of general professional education, include establishing a new department of agricultural education two years after the passage of the Smith-Hughes Act, reorganizing the College of Education by bringing together practically all teacher education units, including agricultural education, and applying ideas tested in agricultural education to the College of Education, such as full-time, off-campus practice teaching. At that time, practice teaching was done every other day during the week. Soon after becoming dean he tried the idea of sending student teachers from all subject matter areas off campus as full-time teachers for a quarter. They lived in the community full time. In most cases a university faculty member went along as supervisor of practice teaching and lived in the community, too.

Dean Fitzgerald was born in the "Show Me" state — Gerald, Missouri, in 1891. He began his career in education by earning a Bachelor of Pedagogy degree at the State Teacher's College, Cape Girardeau, Missouri in 1912. Two years later he completed the B.S. in Education degree at the University of Missouri, and in 1917 completed the work for a B.S. in Agriculture degree at the same university. He next ventured north to earn the M.S. in Rural Education degree at Cornell University (1926). Later he continued graduate work at both Columbia and The Ohio State Universities.

Like many early leaders in agricultural education, Fitzgerald began his teaching career in a rural community. In 1909, he taught in a rural elementary school, and after one year became a history and English teacher and principal of a rural high school. In the summers of 1915 and 1917, he served as an instructor of agriculture in the State Teacher's College, Springfield, Missouri. He moved from Missouri to Texas to teach agriculture for elementary rural teachers at the University of Texas in 1915. While at the University of Texas he met a certain Austin girl named Julia Richardson. In 1918, he began serving as associate professor of agricultural education at the Texas Agricultural and Mechanical College, College Station, Texas, but was soon called into military service. After becoming a Second Lieutenant he married Julia. Upon being released from the military he returned to Texas A & M.



**George W. Wiegers, Jr., Professor, Vocational - Technical Education Department, College of Education, The University of Tennessee, Knoxville.*

In January 1919, Professor Fitzgerald met with Dr. H. A. Morgan, then Dean of The University of Tennessee College of Agriculture, to discuss the possibility of establishing a department of agricultural education at The University. This conference was fruitful, and he came to The University the following April to begin developing an educational program to train teachers of vocational agriculture in the state.

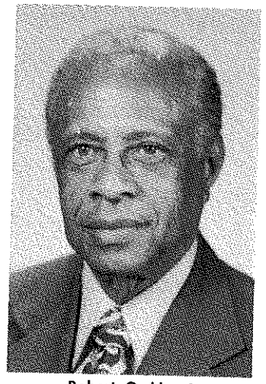
When the twenty-eight-year-old professor arrived at U-T, there were no courses organized for him to teach nor students waiting to be taught. After being on the campus a short time he was loaned by The University to the State Board for Vocational Education to serve as acting state supervisor of vocational agriculture. In this capacity, one of his responsibilities was to determine whether local departments of vocational agriculture met minimum standards for Smith-Hughes reimbursement. He visited each of the nineteen schools where vocational agriculture was taught in the state before school started in the fall. Those agricultural programs meeting the requirements set up in the first State Plan (1918-1919) were approved to be reimbursed from federal funds.

While serving as acting state supervisor of vocational agriculture, Professor Fitzgerald attempted to determine the status and educational needs of teachers of agriculture to become fully qualified as Smith-Hughes agriculture teachers. The early teachers of agriculture had previous college training in agriculture, but no formal training in agricultural education methods and techniques.

(Concluded on page 262)

ACCOMPLISHMENTS OF BLACK YOUTHS COMPARED

by
Robert C. Haynie, Chairperson
Vocational Teacher Education
University of Arkansas at Pine Bluff



Robert C. Haynie

LEGISLATIVE BACKGROUND

Generally, all vocational educators accept the philosophy that vocational youth programs are integral parts of all vocational education. On August 30, 1950, the 81st Congress of the United States passed Public Law 740. This law granted a Federal Charter to the Future Farmers of America Organization. The law legalized the FFA as an integral part of the program of vocational education in agriculture in the public school system of America. Prior to Public Law 740, the George Barden Law (now amended by the 1963 Act) specifically authorized that federal funds be spent for supervision of Future Farmers and New Farmers Activities.

The Future Farmers of America, or FFA as it is commonly known, was at that time a national organization for white boys studying vocational agriculture in public secondary schools. The other contemporary black youth organization was the New Farmers of America, commonly known as NFA. The New Farmers of America was the national non-profit organization which had for its purpose the development of its members in their vocational, social, and recreational life through established local chapters where vocational education in agriculture was taught. The Future Farmers of America (FFA), established in 1928 as an organization for boys who study vocational agriculture in public secondary schools, is designed to stimulate boys to do better work in vocational agriculture. The New Farmers of America (NFA) was a similar program for Negro boys studying vocational agriculture. As the public schools were integrated, members of the NFA became members of the FFA.[1]

Because the integration question of the FFA and NFA has emerged, perhaps we should reminisce briefly about what transpired and how it happened.

The U.S. Supreme Court ruled unanimously that segregation of black and white students in public education at any level was unconstitutional. Monday, May 17, 1954, started out as a quiet day at the United States Supreme Court in Washington. Reporters expected routine decisions. But the day became memorable in America's history when Chief Justice Earl Warren began reading the court's judgment on Brown V. Board of Education of Topeka. Within a few minutes, Warren came to the momentous words, "We conclude unanimously, that in the field of public education the doctrine of 'separate but equal' has no place. Separate educational facilities are inherently unequal."[2]

However, one must bear in mind that it was eleven years and three months later before the actual merger of FFA and NFA became a reality. In the meantime, both youth organizations at both local, state and national level were making a great deal of progress. During this intervening period (the period between the 1954 Land Mark Supreme Court Decision and actual merger in 1965) the Arkansas Association of New Farmers of America, with nearly four thousand members, and sixty agricultural education teachers contributed more to the welfare of its constituency than any other period in the fifty-year history of vocational agricultural youth activities. For the most part, the advisors were aggressively concerned about developing leadership and citizenship abilities in their students; on the other hand, the agricultural students were more responsive and competitive with more zest for scholarship recognition. Reference is made to those forward looking agricultural students who became local, state and national officers, who also were recipients of FFA Foundation Awards that total more than four thousand dollars a year in Arkansas. These students were destined to become our leaders today. The NFA stimulated many of the small-town and rural boys to become leaders, not only in their home communities, but they are found in many prestigious positions as lawyers, doctors, farmers and USDA officials.

The status of black students and teachers in agriculture has changed immensely since integration in 1965. This statement is confirmed in light of both an empirical conclusion and a formal study of the situation.

PURPOSE OF THE STUDY

The purpose of my scientific study was to determine the extent of accomplishments of black youth in NFA and FFA compared with those not participating in organized youth activities. It was also designed to measure the effectiveness of organized systematic youth activity programs by following up former graduates of these programs prior to 1965 and subsequent to 1965.

The specific objectives of the study were:

1. To identify achievements of black students enrolled in NFA prior to 1965
2. To identify the performance of black students not enrolled in an organized youth group prior to 1965
3. To identify achievements of black students enrolled in the FFA subsequent to 1965

While this study was duly concerned with the personal outcome of each individual graduate who participated in the research project, it was pointed out that these investigative efforts were motivated primarily by the interest in vocational youth programs as vehicles for youth with special needs to raise their levels of employability, and to increase their potential for adequate vocational adjustments.

(Concluded on the next page)

CONTINUED ACCOMPLISHMENTS . . .

METHOD

The method used in this study consisted of the following steps:

In the first step of the study, emphasis was placed on compiling a list of appropriate and specific criteria indicating measures of success. Attention was placed on the factors included in the initial questionnaire, submitted to a group of agricultural educators and others to test the validity and reliability of the factors. The questionnaire was reviewed and all factors with no value were eliminated. Finally, the validated questionnaire was constructed.

The second step involved the selection and random sampling of the four population groups of black students enrolled in a youth group associated with agricultural and non-agricultural education in Arkansas. The random sampling was stratified in the following manner: (1) Black students enrolled in NFA prior to 1965; (2) Black students not enrolled in a youth group prior to 1965; (3) Black students enrolled in FFA, the integrated agricultural youth group subsequent to 1965; and (4) Youth not enrolled in FFA subsequent to 1965.

The third step involved the final construction of the validated questionnaire; preparing a cover letter; selection of NFA, FFA and non-agricultural graduates in the various areas; and distributing three hundred and forty-four questionnaires to agriculture teachers and school administrators. Two hundred and eighty-five questionnaires were returned. However, only one hundred and ninety-three were completed and accepted for coding.

FINDINGS

The findings of the study were as follows:

1. There was a difference between the effectiveness of NFA as compared with that of the FFA. The NFA graduates ranked the need and adequacy of the training they received much higher than those who graduated from FFA. They regarded the training provided for them to be directly responsible for their success in many ways. The NFA graduates presented a positive feeling because many of them were successful business, professional, and community leaders.

2. Those who graduated prior to 1965, who were not members of the NFA placed a low value on the need and adequacy of youth leadership training.

3. The study revealed that NFA graduates were involved in community leadership roles, and they were better qualified to discharge their duties and responsibilities than the FFA graduates.

4. The FFA graduates held significantly more responsible community positions than the non-FFA graduates, who finished school subsequent to 1965. The study revealed that more NFA graduates were making use of their leadership training than the FFA graduates, and they were extremely satisfied with their community status.

5. It was apparent that the NFA group possessed more knowledge and ability about leadership and citizenship than did the FFA group. There was convincing evidence in the tables to support the fact that graduates in non-NFA groups and the non-FFA groups were inadequately prepared to assume community leadership roles.

RECOMMENDATIONS

On the basis of the findings, recommendations are made:

1. That all agricultural teachers become sensitive to the unique needs of black agriculture students
2. That a formal study be made to determine what is responsible for the decreased number of black agriculture students participating in FFA activities
3. That the FFA Foundation Program be restricted so that black agriculture students would have a reasonable opportunity to participate
4. That the state FFA Constitution be revised in a way to encourage participation of black agriculture students
5. That black agriculture students be encouraged to participate in the Area and District FFA Contests
6. That more time be spent on informing black agriculture students about the opportunities in vocational agriculture and the FFA
7. That school administrators be informed about the lack of participation on the part of black agriculture students in FFA
8. That a state ad hoc committee be formed to study the plight of black students enrolled in vocational agriculture and the FFA. This committee's report should be filed with the State Director of Education, State Director of Vocational Education and the Arkansas Vocational Agricultural Teachers Association.

BIBLIOGRAPHY

[1]Report of the Panel of Consultants on Vocational Education; *Education for a Changing World of Work*. Superintendent of Documents Catalog No. 5 280; page 58, U. S. Government Printing Office; Washington, D.C.; 1963.

[2]Arkansas Educator — July 1976; page 5.

THE GREENHOUSE ENVIRONMENT, by John W. Mastalerz. New York: John Wiley & Sons, 1977, 629 pp., $18.95.

This is a comprehensive book covering topics associated with the greenhouse environment and factors affecting the growth of flower crops. Specific cultural practices and schedules for common greenhouse crops are not included. Contents deal with the individual factors which affect the physiological growth responses of plants. Such factors include temperature, solar and luminous radiant energy, carbon dioxide and oxygen supplies, water, and nutrient requirements. The introductory chapter describes the types of greenhouse structures and coverings and selecting the proper location of the greenhouse. A chapter dealing with growing media discusses the functions, preparation and pasteurization of soil mixes. The final chapter defines growth regulating chemicals and relates the response of flower crops to these chemicals.

Each environmental factor is discussed in a separate chapter, but the author stresses that the combination of all factors, interacting with each other, determines the productivity of a greenhouse. Methods are described to adjust greenhouse structures and equipment so as to grow crops with higher quality and yield. Pre and post-harvest environments are discussed. Energy saving tips are given to conserve heat and utilize solar energy. Extensive literature is cited at the end of each chapter for further investigative reading.

John W. Mastalerz is Professor of Floriculture at Penn State University. He holds degrees in Horticulture from the University of Massachusetts, Purdue, and Cornell. He is the author of several floriculture crop manuals.

This book was written for persons with a college background in greenhouse environment control. It is suggested that readers have a basic knowledge in the fields of botany, chemistry, physics and soils.

Rosemarie Rossetti
Delaware City-County JVS
Delaware, OH

CONTINUED *LEADER*

The first State Plan designated The University of Tennessee at Knoxville to train white teachers and the Agricultural and Industrial State Normal at Nashville to train black teachers. No teacher training was offered to serve future Smith-Hughes teachers until the fall of 1919. An agricultural education program was scheduled for the summer, but only one teacher showed up. He was given a pig by the Dean of the College of Agriculture and sent home. For the new program, Professor Fitzgerald organized "Special Methods" courses for future teachers of vocational agriculture. Two seniors and eight others with degrees met the Smith-Hughes requirements in 1920.

To assist beginning teachers with needs not met in on-campus courses, he initiated an itinerant teacher training program during his first year at The University.

The agricultural education department at U-T grew and prospered under Professor Fitzgerald's leadership for forty-two years, twenty-four served as department head and eighteen as dean of the College of Education. He took an active part in helping set up and maintain vocational agriculture programs to comply with the state laws and the well known Smith-Hughes Act. He was instrumental in helping to get adult farmer classes organized in the State and provided leadership in helping to organize the Future Farmers of Tennessee (later Future Farmers of America) in local high schools. He spent much time in the early days of the teacher education program helping teachers develop sound supervised farm practice programs with their students.

While Professor Fitzgerald was head of the department, he initiated a publication called "News Letter to Tennessee Teachers of Vocational Agriculture" which continued for many years. From 1923-25, he was editor for the Agricultural Education Section of the *Vocational Education Magazine;* from 1938-42, editor for Agricultural Education of the *American Vocational Association Journal;* and co-author of *Farm Practice Accounts* in 1931.

Professor Fitzgerald carried out another of his ideas by setting up a laboratory facility in a nearby vocational agriculture department to train future teachers of vocational agriculture. The local teacher who taught vocational agriculture and supervised the students was an employee of both the local school and The University.

In 1929, Professor Fitzgerald employed a person to provide needed leadership for establishing and improving the farm shop programs in the State, and in 1938 he secured a person to develop subject matter for teachers and another person to do research in agricultural education. These early specialists, Professor Henry C. Graybeal in agricultural mechanics, Dr. A. J. Paulus in subject matter, and Dr. E. B. Knight in research, made significant contributions to vocational agriculture in Tennessee and to the profession. Through the years Professor Fitzgerald placed much emphasis on serving teachers in the field with technical and professional field courses and organized subject matter publications, and in maintaining a high level of cooperation with the State Department of Education.

"Prof" Fitzgerald lost his familiar title when he left the "Farm" for service on the "Hill." Four agricultural education heads served under the Dean. They were Dr. J. B. Kirkland, Dr. Bonard S. Wilson, Dr. A. J. Paulus, and Dr. George W. Wiegers, Jr. In 1971, the Department of Agricultural Education was merged into a new Department of Vocational - Technical Education.

Dean Fitzgerald has been a member of numerous educational associations, societies, commissions, fraternities, and other organizations. These include the American Association for the Advancement of Agricultural Teaching, Society for the Advancement of Education, National Education Association, American Vocational Association, American Association of School Administrators, Tennessee Advisory Commission on Conservation, Phi Kappa Phi, Phi Delta Kappa, Alpha Tau Alpha, Acacia, Masons, and others. He was president of the Teacher Trainers' Section of the American Vocational Association in 1935. He has chaired and served on numerous university, state and national committees.

The Southern Regional Conference of Agriculture honored the Dean with a Distinguished Service Citation in 1951. In 1965, the Acacia Colony initiated a scholarship fund in his honor. Upon his retirement in 1961, the Dean and Mrs. Fitzgerald were honored by former students, faculty and others. Mrs. Fitzgerald passed away in 1962. The Dean was again honored with a dinner and gifts on his 86th birthday. The Mayor of Knoxville issued a citation declaring April 18, 1977, "N. E. Fitzgerald Day in Knoxville," and he was cited by Governor Ray Blanton, an agricultural education graduate of U-T, as "An Outstanding Tennessean." He was also cited by the State Legislature for his achievements. He resides at 6 Hillvale Circle, Knoxville, Tennessee 37919. ◆◆◆

CONTINUED *SEEKING A JOB?*

The low rating received for hiring experienced teachers over beginning teachers was interesting in light of the seeming preference for hiring experienced teachers in Oregon during 1978. Likewise, the low rating on institution of preparation also is of interest considering the seeming preference principals exhibited last year in Oregon.

INTERRELATED

It appears that one cannot totally separate the factors identified on this list; they tend to interrelate to form for administrators a composite picture of a candidate's worth. However, the table does provide a prioritization which a candidate may utilize in preparing for an interview.

HOW DO I STACK UP?

This information was gathered primarily to assist graduating seniors who are preparing for interviews. Ask yourself — "How do I stack up?" Take the time to prepare yourself for the interview: survey the community and school, have questions ready to ask, aggressively go after the job if you want it. Take the time to be well-dressed, get a hair cut, shave, smile — it doesn't hurt. After you've secured the position, maintain your well-groomed, well-dressed, well-prepared professional image by being it. ◆◆◆

GRANDFATHER'S COLLECTION

In reply to the farmer who wrote in regarding income tax: No, the government will not allow you to deduct last year's tax as a bad investment.

It has been reported that Indians on Western reservations are showing signs of uneasiness. Perhaps someone has told them that the white man wants to give them back their country. At any rate, the politicians really made the rounds during the last campaign. One politician giving a speech to an Indian tribe in Arizona was given a dramatic reception. Upon promising a guaranteed five thousand dollar yearly income the entire tribe rose up and yelled, "Hoya, Hoya, Hoya".

The politician was excited by the response. "Every family will have a Cadillac." Again,"Hoya, Hoya, Hoya".

Gaining momentum the politician finished off with countless other promises and at the conclusion there was a deafening roar, "Hoya, Hoya, Hoya".

Enthralled by this response the politician said that he would very much like to see the tribe's famed herd of cattle. To this the chief replied, "Yes, we would be pleased to show you but please don't step in the Hoya".

Then there was the nurseryman who ran for Senator on the campaign slogan, "What the government needs is more pruning and less grafting".

Think About It . . . The fullest and best ears of corn hang lowest towards the ground.

Labor problems in agriculture are being handled in ingenious ways. One friend of Grandpa's has come up with a unique solution.

"You see that fellar. Well he works for me and I can't pay him. In two more years he gets the ranch. Then I work for him until I have to take it back".

From the Cowboy Dictionary . . . Collateral — A Latin word meaning, "What the banker doesn't known won't hurt him".

Know what one of the definitions of the word "farmer" is? According to Webster a farmer is "a person who pays a fixed sum for some privilege, or source of income". Webster must have talked to somebody different than the old sodbuster Grandpa once ran into.

"How's your cotton coming?" Grandpa asked.

"Ain't got none", was the reply.

"Didn't you plant any?"

"Nope, feared of boll weevils".

"Well, how is your corn?"

"Didn't plant none. Feared there wasn't going to be any rain".

"Well, how about your potatoes?" Grandpa was just a little curious.

"Ain't got none. Scairt of potato bugs".

"What did you plant?" Grandpa asked in despiration.

"Nothing", was the answer. "I just played it safe this year".

Until next time . . .

Keep up the good work.

THANKS

Our thanks to Lee Pitts for sharing his column, "Grandfathers Collection," with us. Lee is a former State FFA President from California, who began collecting jokes and anecdotes for his personal use in speeches. It became a hobby, and he felt it a shame to let these treasures remain buried. He first shared them in a livestock publication for which he was field editor. The response was so good he developed them into columns he sells to magazines to enliven their publications. We are very happy Lee would share his column with us through the non-profit *Agricultural Education* Magazine in remembrance of where the column got its start, Vo-Ag and the FFA. If any of you know of magazines which would like to carry his column to entice their publications, have them write Lee Pitts, 757 Woodlands, Los Osos, California 93402, for details. Thanx — Ed.

CONTINUED *PROJECT CONSTRUCTION . . .*

7. Utilize community resources to provide facilities, equipment, or expertise that the school or the teacher does not have.
8. Develop standards for facilities and equipment which facilitate the project construction method.
9. Work with the school's insurance company to provide coverage for the liability associated with storage of machinery in the vo-ag shop.

SUMMARY

Project construction can cause the teacher to face many more problems than those that may arise from a "bench-type" approach. In some areas of instruction, the problems may be too great to solve. However, the merits are such that every effort should be given to maintain project construction in as many phases of the agricultural mechanics program as possible. ◆◆◆

AVA-AG DIVISION FIFTH ANNUAL AG ED RESEARCH MEETING

ANAHEIM, CA — NOVEMBER 30, 1979 — CALL FOR PAPERS

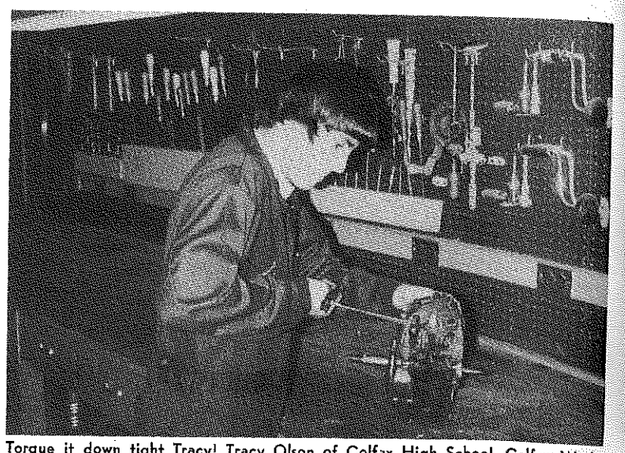
Send seven copies of a summary of prospective papers to include:
- a. Objectives of the study
- b. Methods
- c. Data Sources
- d. Results and/or Conclusions
- e. Educational or Scientific Importance
- f. Name(s) and Address(es) of Author(s)

BY JUNE 15

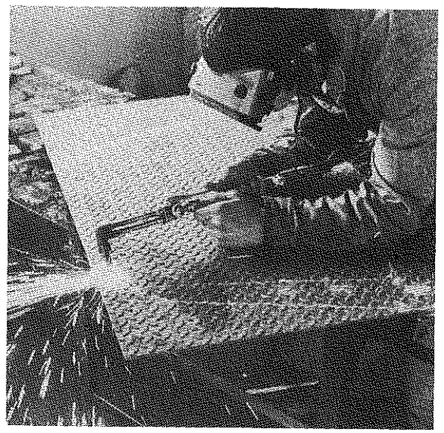
Send to:
RONALD A. BROWN
National Ag Ed Research Meeting
P.O. Drawer AV
Mississippi State University
Mississippi State, MI 39762

STORIES IN PICTURES

by Joe Sabol

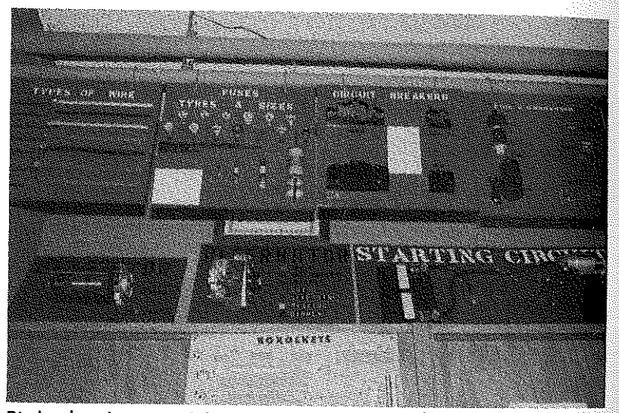


Torque it down tight Tracy! Tracy Olson of Colfax High School, Colfax, Washington, is seen in the final stages of small engine overhaul. These and other Ag. Mechanic skills will enable him to eventually find a career in agriculture. (Photo courtesy of his teacher, Fred Cockle and Dr. Joe Cvancara of Washington State University.)



Project construction is a practical way to develop those critical Ag. Mechanics skills according to Wynn Van Ansdle of Colton, Washington, His student, Marty Becker, is cutting some deck plating to be used in his wood burning stove. (Photo courtesy of Wynn Van Ansdle and Dr. Joe Cvancara of Washington State University.)

Fabrication and tractor safety are two very important skills for Pete Jorgenson (top) and Jay Jenks at Connell High School, Connell, Washington. Their vo-ag teacher Phil Renz teaches critical skills via the learn by doing method as these boys complete the roll bar installation on the school tractor. (Photo courtesy of Lyle Holt, Connell High School and Ron Crawford, Department of Agricultural Education, State Department of Education, Washington.)



Display boards prepared by students help get the idea across to Vo-Ag students at LeRoy-Ostrander, Minn. Mr. Richard Schaufler believes the realism of the display is an effective teaching tool. (Photo by Dr. Curtis Norenberg, U. of Minn.)

(L-R) Sam Stenzel, NVATA Executive Director; Mrs. Pat Stenzel; J. J. L. Johnson, General Sales Manager, Ford Tractor Operations for North America; James W. Guilinger, President, NVATA. Ford Tractor Operations sponsors a dinner annually during the National FFA Convention for vocational agricultural teachers receiving the Honorary FFA American Farmer Degree. The teachers are eligible to receive a Ford Tractor Power train for instructional use in shop classes. (Photo courtesy NVATA)

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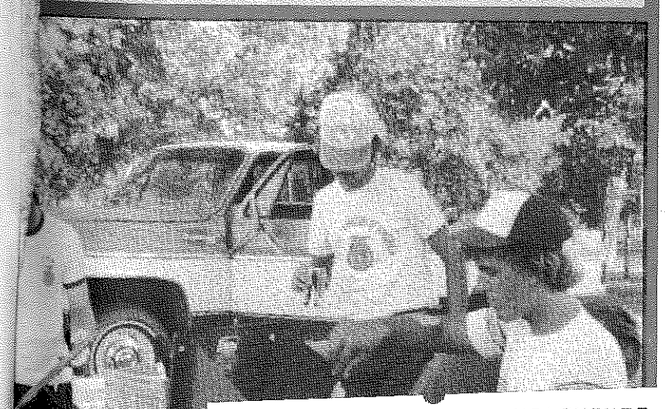

FEATURING:

- FACILITIES IMPROVEMENT
- FFA PAST IN PIX
- SHOP SAFETY DEMERITS
- BETTER SOEP'S
- IN-SERVICE DOLLARS
- GRANDFATHER'S COLLECTION

Theme—
Summer Opportunities Supervision, Planning, In-Service Education, Conferences, Repairs, Other Activities?