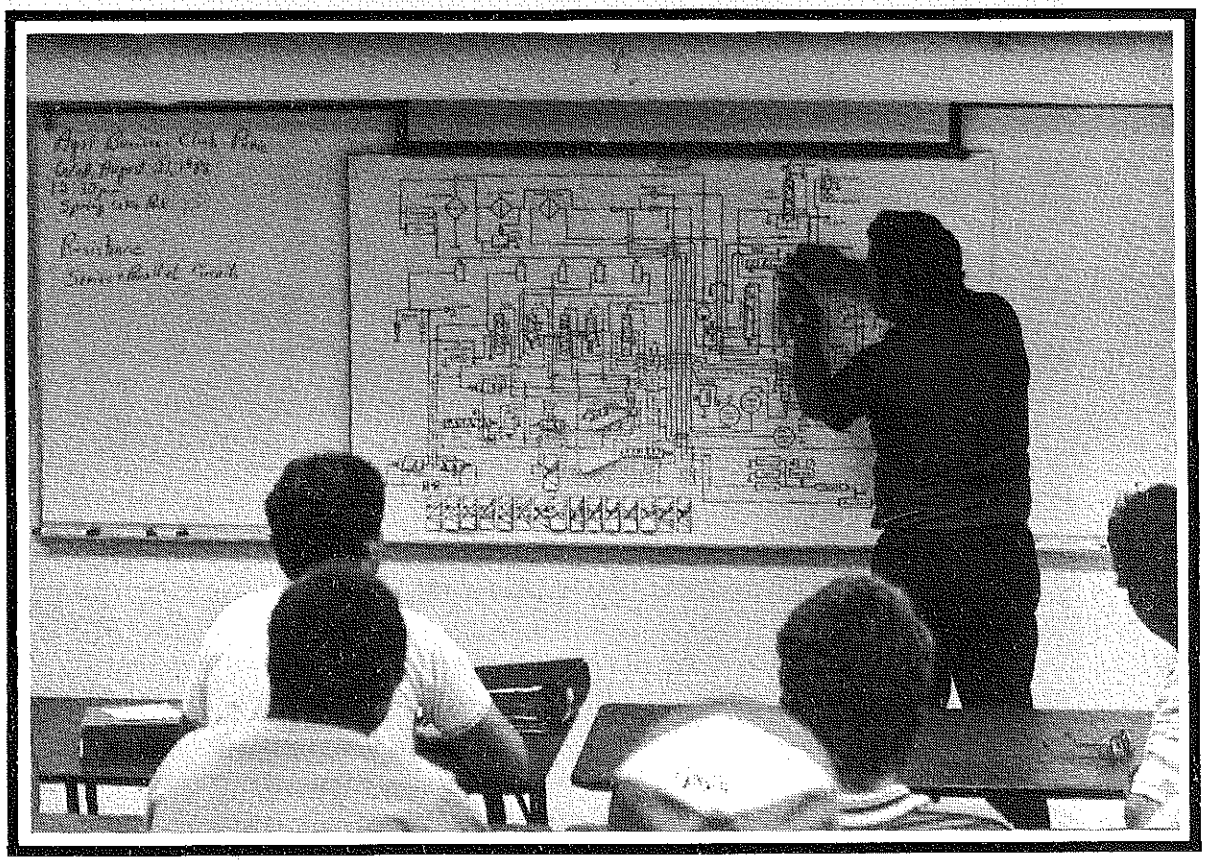
The
Agricultural Education
Magazine

February, 1986
Volume 58
Number 8



THEME: Staying Current — Agricultural Mechanics

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

PUBLICATION INFORMATION

THE AGRICULTURAL EDUCATION MAGAZINE (ISSN 0002-144x) is the monthly professional journal of agricultural education. The journal is published by THE AGRICULTURAL EDUCATION MAGAZINE, INC., and is printed at M & D Printing Co., 616 Second Street, Henry, IL 61537.

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

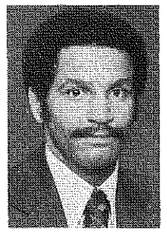
POSTMASTERS: Send Form 3579 to Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, Virginia 23111.

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are $7 per year. Foreign subscriptions are $10 (U.S. Currency) per year for surface mail, and $20 (U.S. Currency) airmail (except Canada). Student subscriptions in groups (one address) are $4 for eight issues. Single copies and back issues less than ten years old are available at $1 each. All back issues are available on microfilm from Xerox University Microfilms, 300 North Zeeb Road, Ann Arbor, MI 48106. In submitting subscriptions, designate new or renewal and address including ZIP code. Send all subscriptions and requests for hardcopy back issues to the Business Manager: Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, VA 23111. Publication No. 07324677.

EDITOR'S PAGE

Technical Competence is a Must



BY BLANNIE E. BOWEN

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

The educational reform movement and its related scholarly reports forced most Americans to rethink questions about what type of schooling is best for our future generations. We were told in every possible way that students were not learning at rates demanded by a sophisticated high technology society. Now that the rude awakening is over and the dust is beginning to settle, some of the more realistic questions are being posed. Let's examine a few of the most popular.

What should we do differently to prepare teachers for the classroom? What routes other than a farm background might be used to provide technical competence for agricultural education graduates? How do we deliver on-the-job training or inservice education to vocational agriculture teachers so they remain viable? Obviously, simple yes or no responses will not suffice for questions of this caliber. We must find better delivery systems. Here is a sampling of the current alternatives.

One solution being tried in a few institutions is to disband the college of education and require more coursework through subject matter departments. Another alternative is to have teachers achieve certification after they complete a fifth year of study. Solutions involving merit pay and related compensation plans would have teachers become more competitive through survival of the fittest battles. Also, stringent entrance and exit testing programs appear to be gaining favor. No matter which alternatives are put in place, vocational agriculture teachers must be masterful in directing the learning process yet technically competent.

In deciding which themes would be appropriate for 1986, several prominent vocational agriculture teachers, state supervisors, and teacher educators from across the U.S. were asked about their major professional concerns. How to get and stay current with technical agriculture was by far one of the most popular topics. Other information-seeking approaches also pointed to technical competence as a major concern.

One of these approaches involved getting high technology integrated in agricultural education. Although microcomputers can handle many applications for agriculture and education, most computer software requires users to be at least remotely familiar with the subject matter. Unfortunately, when many agricultural educators start to integrate computers into their instruction programs, this technology does a very good job of amplifying gaps in their subject matter knowledge base. The garbage in - garbage out principle works quite well when technical information is missing.

Several other critical incidents pointed to technical agriculture as a major professional concern. While reviewing FFA proficiency award applications, this writer noted that a student received $500 for one market hog. The appropriate signatures suggested that hogs were quite profitable that year. Fortunately, students being taught by a student teacher were not convinced that most dairy goats weigh close to 850 pounds. It is also nice that the college of agriculture student from Philadelphia learned just how many eggs a rooster can produce per day since roosters are larger than hens.

While these incidents appear alarming, they are in fact true. Most agricultural education professionals hope that the above incidents are mere chance occurrences. I must be convinced otherwise. As some of my colleagues in the legal profession would state, "The preponderance of evidence precludes thinking to the contrary." Additional concerns must be aired when young farmer and adult education activities virtually disappear from vocational agriculture programs. The same alarms must be sounded when successful farmers and ranchers turn away from the reliable county Extension agent and seek their advice from private agriculture consultants and researchers at the Experiment Station.

Could it be that agricultural education has a serious credibility problem because it cannot deliver programs that meet clientele needs? Credibility cannot be secured or maintained when solutions that are 20 - 30 years behind the times are given to potential and former clients who have associate and bachelor's degrees. These individuals and their children will simply seek alternative delivery systems when agricultural educators prove that they are unwilling or incapable of meeting the needs of the community.

Most of the 1986 themes have a technical focus because we must put more "Ag." into vocational-technical education in agriculture. Probably life's most frustrating moments arrive when we try to teach a subject without the requisite preparation. On the contrary, few things can match the satisfaction that comes to a teacher who has that rare blend of enthusiasm, presentation skills, and subject matter competence needed to direct the learning process.

Dr. Dale Perritt secured the authors and developed the Staying Current in Agricultural Mechanics theme. These individuals are to be congratulated for giving their time to this professional activity.

THEME

Facing the Challenge of Staying Current

By R. Dale Perritt, Theme Editor

(Dr. Perritt is an Assistant Professor in the Department of Agriculture at Stephen F. Austin State University, Nacogdoches, Texas.)

With current technologies doubling every eight years, teachers of agricultural mechanics face the unenviable task of remaining a "jack of all trades" while becoming a "master of many." Maintaining skills that are concurrent with today's technologies is not a new problem for vocational agriculture teachers but rather an old problem that has created a new challenge for today's professional teacher. Gone forever, if they ever did exist, are the days when a teacher could, through a seeming osmosis, simply absorb new information as it filtered its way down to the practitioner.

The lag time between discovery and obsolescence, which once provided the teacher somewhat of a grace period to acquire new skills, appears to be disappearing with each passing year. What can the teacher in the field do to short-circuit the natural decline of technical skills which begins the first day on the job?

New Skills Needed

Before teachers can make strides toward technical competence, they must first be willing to admit incompetence. Admitting that areas of weakness exist may be one of the biggest hurdles that teachers must overcome. If your conversations concerning laboratory skills and techniques often contain statements such as, "This is the way we have always done it", or "back when I was," you may be a prime candidate for a needed overhaul in technical skills. A close examination of "what is" as compared to "what should be" may reveal the areas where improvements are needed.

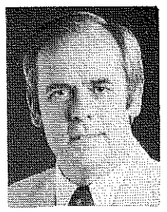
It is no longer enough for the teacher of vocational agriculture to depend on others such as state staff and teacher educators to supply all of the continuing education needed to remain current. Today's professional must assume an aggressive attitude and take advantage of every opportunity to update the total agricultural mechanics program which includes personal skills as well as facilities and equipment.

In This Issue

The articles developed for this issue offer viable solutions to the challenge of staying current in agricultural mechanics. I encourage the reader to examine the suggestions presented by the authors and incorporate them into a game plan for maintaining relevant instruction in agricultural mechanics.

THEME

Agricultural Mechanics Contests: A Part of the Problem or Part of the Solution?



By Glen C. Shinn

(Dr. Shinn is Professor of Agricultural and Extension Education at Mississippi State University and Superintendent of the National FFA Agricultural Mechanics Contest.)

When you look at your NVATA Pocket Diary, there is less than 40% of the school year left. If you look at your curriculum guide and program of activities, there is more than 60% of the work remaining. February is a month of time conflicts! One teacher said, "I've got to quit 'teaching' and start working with contests!" Another begins to integrate the skills and knowledge into a demonstrable examination. The first is frustrated and can quickly burnout. The second may coach the team which performs above their expectations. It is a matter of philosophy and organization. Ralph Tyler (1949:1) asked, "What educational experiences can be provided that are likely to attain the purposes of the school?" If knowing, doing, and valuing quality work in the agricultural industry is a part of the purpose, then properly conducted contest activities can serve as a useful vehicle to keep the program current.

The FFA Ag Mechanics Contest

This contest provides a capstone experience for secondary students who are enrolled in vocational agriculture and studying agricultural mechanics. The contest was first organized in 1971 and is managed by a national committee of 115 members from education and industry. It is sponsored by the Firestone Trust Fund, a charitable trust of the Firestone Tire & Rubber Company. Together, the committee develops the activities of the contest and recommends policies to the National FFA Advisory Committee for National Contests. The rules as well as a detailed description of the operations of the contest are described in "National FFA Contest, Bulletin No. 4, 1985/1986/1987."

The contest includes subject matter from power and machinery, structures and electrification, plus construction and soil & water conservation. Microcomputers are used as a problem solving tool to determine technical alternatives. Every student is involved in hands-on skill activities, problem solving, and a written examination drawn from the subject matter. One-half of the student's score is determined by performance skills and the remainder from written examination and problem solving activities.

The National PAS Awards

The PAS Equipment Service Technician Awards program is a special project sponsored by Deere & Company and is in the second year of operation. The activities are designed especially for postsecondary agricultural students enrolled in an agricultural machinery service curriculum. A demonstration activity was conducted during the 1985 national convention. The first National Awards Program will be held in Bismarck, North Dakota on March 19, 1986 in conjunction with the National Postsecondary Agricultural Student Convention. This program is also organized and managed by a national committee from education and industry.

The focus of this awards program is to evaluate the proficiency and recognize the accomplishments of the technician who plans to work in the agricultural machinery industry. The subject matter is taken from the six systems found in agricultural machinery. Half of the evaluation is based on the technician's ability to diagnose and repair components. The remaining scores come from calibration, adjustment, identification, and a written examination. The "PAS Awards Bulletin" is available from Dr. Kenneth Olcott, P.O. Box 34, Cobleskill, NY 12043.

The Philosophy

Learning by doing is a central focus of the contest. A common goal is to promote quality instructional programs. Every meeting searches for improvements and changes which reflect both student and industry needs. The activities are based on sound learning theory involving the student as an active learner. Learning becomes a pleasant and challenging experience which provides corrected practice and feedback. The contest provides both transfer skills and rewards. Although winning is important, both committees are more interested in individual accomplishment.

These contests recognize the whole person; one that knows, does, and values quality work. When contests are correctly organized, they are a summary of sound educational practices which are stimulating for the student and the teacher. John Conrads (1985:14) reports that ". . . the greatest single challenge is to educate and train young men and women in order to develop the skills to work with, and maintain, today's complex systems, and then reach out to develop tomorrow's systems."

The Industry

We have excellent cooperation from agricultural industry. Firestone Tire & Rubber Company has been most helpful as principal sponsor of the FFA Contest. Deere & Company has helped in a special way with both activities. These two companies not only invest several thousand dollars but the time of a substantial number of people. Companies such as Alabama Power Company, Briggs & Stratton, Deere & Company, General Electric, Hesston, Hobar, MaKita USA, Smith-Tescom, Sperry-New Holland, and Stanley have provided tools, equipment and personnel.

They see the results of sound instruction and they want to be a part of success! The Firestone Trust Fund has established twenty scholarships for secondary students to continue their postsecondary education. Deere & Company will provide $7,000 for state and national student awards plus a budget for the operational expenses. Industry is ready and willing to assist quality programs that are seeking ways to stay current. But you and I must continue to search for ways to establish new partnerships.

Integrating Curriculum and Contests

The contest bulletins serve as an excellent resource for curriculum renewal. There are some 90 suggested references in Bulletin No. 4 dealing with agricultural mechanics. Perhaps not a complete list, it provides a good start toward the selection of text materials which facilitate learning. The FFA and PAS bulletins value understanding, performance and attitudes of students as important outcomes.

Both recognize problem solving as an important critical thinking skill. Subject matter is identified to structure understanding and performance activities. It can be structured so that each learning experience not only builds on the preceeding ones but adds breath and depth to the understanding. When using the bulletins, current research findings and the experiences of an active advisory committee, the curriculum becomes dynamic and the program will grow and improve.

Warning!

Sometimes contests can "become the tail that wags the dog!" The contest experiences must be congruent with the purposes of the school and the goals of the student. The activities should mirror the curriculum of modern programs and provide observable evidence that instruction is relevant. Used correctly, contest activites can be multidimensional to provide continuity, sequence, and integration of subject matter involving students with many learning styles.

Winning at all costs is not a desirable behavior in education or industry. If contests serve as a vehicle to bring many of the learning principles into practice and challenge the learner toward individual achievement, then it is worth the efforts of 150 of your friends.

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ARTICLE

Six Tools for Staying Current in Agricultural Mechanics

By Donald M. Johnson

(Mr. Johnson is a Graduate Assistant in Agricultural Mechanics Education at Western Kentucky University in Bowling Green.)

A vocational agriculture teacher who plans to provide students with an effective instructional program in agricultural mechanics must stay up-to-date on the latest developments in the field. This is a tall order considering the rapid rate of advancement in all areas of agriculture, including mechanization. Fortunately, there are several effective methods busy teachers can use to keep programs current. Let us examine six of these.

Six Tools

Magazines. All agriculture departments should subscribe to a number of carefully selected general and specialized agricultural magazines. These magazines, by their very nature, carry articles on the latest developments and trends in all areas of agriculture. These articles should be used as a basis for reports, discussions, and projects related to current innovations in agricultural mechanics.

Field Trips. Carefully planned and conducted field trips are a very effective method of instruction. Actually seeing new equipment and/or processes in use on the farm or in an agribusiness gives special meaning to classroom study. Progressive farmers and agribusinesses are eager to have agriculture classes visit and observe their operations.

In today's educational climate, however, field trips may need to be scheduled for non-school hours. Although this has obvious disadvantages, it has at least one positive aspect: Only students who are genuinely interested will attend.

Resources Persons. Local agribusinesses are usually more than willing to share their resources with vocational agriculture classes. The local farm equipment dealer would undoubtedly welcome the opportunity to discuss new features of this year's equipment line with an agricultural mechanics class. Many other local agribusiness people will also share their expertise with your students. There is a two-fold gain to be made with the successful use of resource persons: The students receive current "real world" knowledge and the vocational agriculture program gets a public relations boost.

Teach Principles. Students who learn the "whys" (basic principles) of agricultural mechanics are better prepared to adapt to changes than are students who only learn the "hows" (operational procedures) involved. In agricultural mechanics we need to make it a practice to teach the whys along with the hows. Innovations rapidly make specific operations obsolete; however, basic principles never change. Let us plan our teaching with this in mind.

Advisory Council. The local advisory council can play an important role in keeping the agricultural mechanics program up-to-date. The council members are in an excellent position to point out changes which need to be made in the instructional program. Vocational agriculture teachers should make it clear that they are receptive to any constructive suggestions the advisory council has to offer. They should seriously evaluate all suggestions and implement any needed changes.

In-Service Training. The local school administrators, state supervisory staff, and teacher educators have a shared responsibility for providing inservice programs and workshops which help teachers keep up-to-date. Vocational agriculture teachers should support these efforts and let program planners know of areas which need additional emphasis. Working together, we can assure quality inservice programs.

Summary

Yes, staying current in agricultural mechanics will take much hard work and dedication on the part of all concerned with vocational education in agriculture. Fortunately, the agricultural education profession has never been short on these two qualities.

"Agricultural Mechanics Contests: A Part of the Problem or Part of the Solution?"

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THEME

Agricultural Mechanics/ Resources for Staying Current

By Clinton O. Jacobs

(Dr. Jacobs is a Professor in the Agricultural Education Department at the University of Arizona.)

When confronted with the challenge of "Staying Current" in agricultural mechanics, the teacher of vocational agriculture may view the thought as an act in futility. Changes in the amount of scientific knowledge, the application of sophisticated communication processes and the introduction of new products and processes continue to generate obsolescence at an ever increasing rate. The adage of "running faster to stand still" illustrates the teacher's frustration of trying to stay current when adjusting programs of instruction to be in concert with the educational needs of today's agricultural industry. Historically, teachers of vocational agriculture have always championed changes in local programs of instruction in order to prepare students for those competencies which were contemporary with needs.

However, it is a natural psychological reaction for all of us to resist change. The philosophical concept of "be not the first to accept the new nor the last to reject the old" is a tempering approach to curriculum planning when innovation and experimentation is required. In vocational education, curriculum changes cannot be at the whims of the imagination. Unfortunately, the ability of the teacher of vocational agriculture to conduct sophisticated and controlled research to determine curriculum content and at the same time acquire new skills to implement the changes is seldom the practical approach to staying current. Even research published through colleges and universities and the pronouncements of experts are not in themselves sufficient to bring about effective use of research data. It is only when the findings and expertise are clearly relevant to the problems of the practitioner that there is little difficulty of insuring use. The vocational agriculture teacher is comfortable only with research findings that have been obtained from primary source data and properly interpreted and packaged for local use.

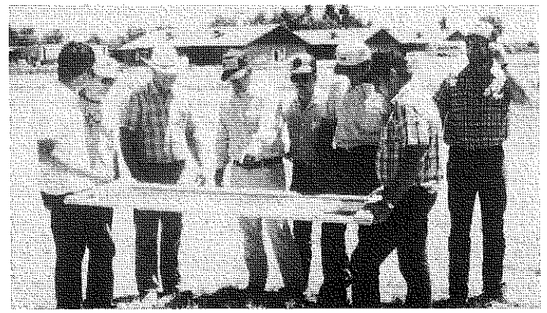
Evaluate Our Attitudes

As teachers, we must continually evaluate our professional attitude and determine how we can remain current and establish the proper direction of thrust. Studies of the professional development of physicians and engineers identify that approximately two-thirds of these professionals reach their peak of effective performance by the end of seven years of practice. Thereafter, a slow decline begins in which activities tend to become routinized and habituated — they get in a rut and become bored with their work. The other third of the professionals were able to direct their energies to new challenges and improve their professional performance.

Staying current is a challenge that can produce energies which will prevent the "seventh year sag". The philosophy of Confucius is appropriate to staying current: "If a man won't try, I will not teach him; if a man makes no effort, I will not help him. I show him one corner and if a man cannot find the other three, I'm not going to repeat myself." This identifies the point that organized inservice training workshops provided by colleges, universities, and commercial agencies and the update information that they provide is of no avail without the support of the profession for which it is designed to serve.

Local Expertise Available

Perhaps the best single source of information for staying current exists within the agribusiness industries of local and adjacent agricultural communities. The expertise which exists among selected producers, dealers, service persons, and financial agencies represents a vast storehouse of current practical knowledge when they are used as resource persons. It is imperative that these community resources be utilized and made a part of the ongoing instructional program. The expertise that local persons possess can provide direction for identifying current state-of-the-art production and business practices. The supervised occupational experience programs of students provide an indirect opportunity for the teacher to gain insight into current practices.



Teachers of vocational agriculture attending a Sperry-New Holland workshop for combine operation and adjustment evaluate thrashing and cleaning ability in an on-site machinery update. Rick Henry, Buckeye, AZ, New Holland dealer (second, right), provided the equipment and expertise.

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Staying Current As An Experienced Teacher of Agricultural Mechanics

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Teacher conferences are another means of getting teachers together to share information. Usually these conferences provide some kind of inservice training for the teachers; therefore, the teacher should make an effort to attend these meetings. Some schools and businesses are also working together now in cooperatives in which teachers are given recertification credit for a specified period of work in the businesses. This gives the teacher an excellent opportunity to observe new procedures and products and to get hands-on experience.

Summary

There can be no doubt that teachers need to stay current. Quite often the work experience projects in the agricultural mechanics shops reflect just how current a teacher is. There are many things that teachers can do to improve themselves, but perhaps the most important thing is to actually get involved and work on the new equipment. Sometimes teachers have to get their hands dirty in order to really learn. Staying current does require time and determination, but it pays off in a better education for the students. In fact, teachers owe it to their students, the school, and the community to stay current. It is simply part of a job well done.

THEME

Tips For Survival: A Young Teacher's Perspective

By Bert Gilmore

(Mr. Gilmore is a Vocational Agriculture Teacher at Sturgis High School, Sturgis, Mississippi.)

In today's world we see things change faster than at anytime in the past. School is half over and you wonder where the time has gone. Time waits for no teacher and it seems to speed up as it passes.

"Look at me, a young teacher of vocational agriculture in my first or second year of teaching and I'm already behind the times." Behind in technical and scientific knowledge. If this typifies you, then you've just taken the first step toward surviving in today's everchanging world.

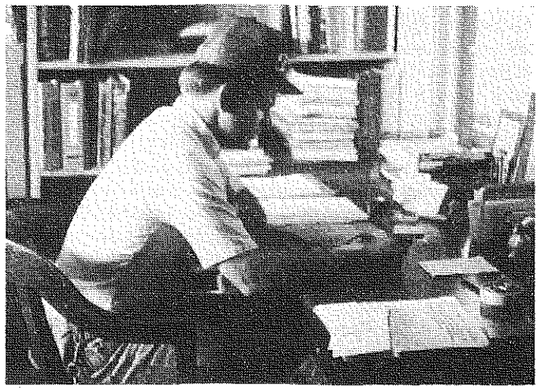
Finding out just how much there is to learn about agriculture and agricultural mechanics brings us one step closer to survival. We all know there is a world of knowledge to be attained about the subject.

We must realize that we can't learn everything or we would spend all our time learning instead of teaching. We must also not become overwhelmed with the amount of information out of which we receive nothing of value. I think that one of the most difficult things a young teacher encounters is not knowing the answer to a question that a student or young farmer might ask. Don't let not knowing "the answer" throw you off balance. Instead be quick to say "I don't know, but we'll find out". Then, as soon as possible, pursue the answer to the problem or question. Involve that student or young farmer in finding that information. This will help you as well as the student. Simply being honest will never dampen your credibility.

Get Involved

Get involved with innovative farmers and agribusiness representatives. Visit these farms and agribusinesses on a regular basis. We can learn from each other by observation and inquiry. This group can be used as advisors and resource people for the program. Involve this group in special demonstrations you might be conducting or that they could conduct for your class. Use their farms and businesses as field trip sites and use them and their employees as guides. I certainly am amazed at the great help these people can be. Don't be afraid to ask good questions. They will respect you for trying to learn and will probably invite you over while something special is happening.

A tour of a new or innovative farm or agribusiness will provide information for both the teacher and the students.



Scheduling quiet time in the office for professional reading will prove critical for staying current (Photo courtesy of Bert Gilmore).

Remember that careful planning is a must for tours and field trips. For example, if you plan to tour a tractor dealership, permission must be granted by the dealer and the school administration. The trip must be properly timed to produce a better effect for the students. Discuss with the tractor dealer the many services being provided and then carefully ask this person to show you and your students the things you desire to see.

Professional Development

Professional development is also an important step toward survival. It is hard to find the time for graduate courses, workshops, and field days. If we are to remain current in today's world, we must engage in these activities. Time management is the key to being able to attend these activities. Plan them in advance. Convince your administrator that what you're attending is important to the program. In the case of a short field day, you might even invite your administrator to go along.

Many times young teachers will let work toward an advanced degree hinder their performance on the job. Don't let this happen! Plan graduate classes on a timely basis keeping major program activities in mind. Planning these courses to help satisfy program objectives can help keep us current. For example, if a beginning teacher is concentrating efforts toward planning the total program, a course on program planning would be helpful. Taking a course in agricultural power and machinery might be helpful for an upcoming adult class on this topic.

We need to look at workshops, industry open houses, and field days along these same lines. Try to attend as many of these activities as possible, but be sure you've managed your time to not interfere with your job.

Finding time to read agricultural publications is a difficult task after all those visits, graduate classes, and workshops. Time management and learning what to read, scan, or throw away will help you make better use of your reading time.

Use the professional organizations to help keep you up-to-date on changes in legislation dealing directly with vocational agriculture. Keep yourself involved in the affairs of these organizations. Voice your opinions and ask questions during meetings.

Efforts to stay current are beneficial to the teacher in that they make the job easier and build confidence. These same efforts benefit the program and the student.

THEME

Staying Current in Agricultural Mechanics — Industry's Perspective

By C.E. Bass

(Mr. Bass is a Service Manager with John Deere Company of Dallas, Texas.)

Everyone knows that trying to tell someone how to remain current in an industry that is anything but static may be like shooting at moving targets. When conditions change, the target moves. From my perspective in the farm equipment industry, changes are dictated by the general economic conditions in agriculture. Nineteen eight-four was not a banner year for farm equipment sales. However, 1985 did show some signs of improvement with possibly the biggest boost coming in the easing of interest rates. With this factor and many others considered, the farm equipment industry can expect better times ahead. The nightmare of the past three years appears to be ending and the light at the end of the tunnel is not an oncoming train.

The economic impact of the past few years with its sometimes devastating effect has no doubt brought about changes which will affect the producer, consumer, and student of agriculture machinery. The industry will be leaner, tougher, and more competitive. The dramatic cost cuts which were necessary as a result of the downturn forced the industry to be more efficient, more productive, and more resourceful. Changes initiated by research and development to meet the demands of a changing industry have also brought about greater demands on the people who use and service agricultural equipment. Larger machines will increase productivity per person hour, but the sophistication incorporated in technically superior equipment will also place great demands on all of us to stay up-to-date.

Standing In The Gap

Obviously, we need to discuss the requirements for servicing these new and often complex systems. The introduction of electronics will have an even greater impact than the introduction of extensive hydraulics in the 1960s. Hydraulics had a severe impact on dealer service capabilities, and it took a number of years to develop hydraulic service expertise. No one can or will wait for this long a learning curve on electronics. We must act now to build reliable service expertise. Our efforts should start at high schools, vocational schools, and community colleges.

Diagnostics will be a key issue. Since electronics are intangible in some respects, it is important that good troubleshooting methods are taught. Failed items must be quickly identified and replaced without indiscriminate replacement. Today's information shows a 20% - 80% rate

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Staying Current in Agricultural Mechanics — Industry's Perspective

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of wrong diagnosis and replacement of parts that were good. This leads to expensive repair costs and unnecessary downtime. The introduction of proper teaching methods on this new technology will immediately help reduce this service deficiency in the future.

Technological advances the last few years will continue and will change service procedures and employment needs. There will be a need for more technical-minded people — those who know and understand how and why the product works as well as how to repair it. Basic theory is quite often not stressed enough in technical schools. A good basic background could significantly reduce the amount of time required by industry to train new employees.

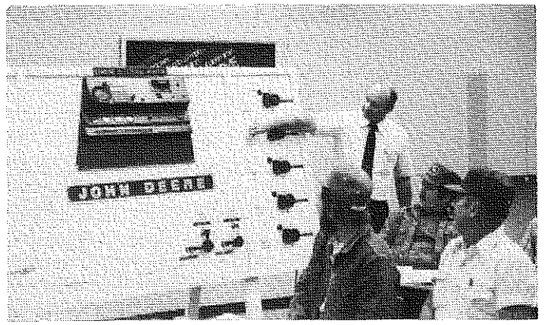
Obviously, we must teach students in the basics of industry. Basics in diesel engines, hydraulic systems, and electronics will be of utmost importance, along with the use of more up-to-date methods and use of current components and training aids. Diagnostic ability is dependent on a clear understanding of concepts. Instructors must be kept attuned to fast changing technology.

Farm machinery manufacturers have the ability to design, engineer, test, and manufacture products faster and beyond the ability to keep service expertise current with modern machinery. More aggressive training programs in local and regional schools can help take up the slack. If this effort does not occur, the introduction of more productive farming systems could be slowed somewhat. We hope this will not happen.

We must educate and train members of our community to acquire skills that are desired by business and industry. And these skills must be at a level that enables the graduated student to get and hold a job. Also, we must be prepared for more adult education with the idea of retooling a work force whose skills have become obsolete in today's job market. This basically is the mission and function of vocational education.

A Cooperative Effort

This leads to another area of concern and this is closing the gap between what industry expects and what vocational/technical schools are able to offer.



Component analysis is and will continue to be an important part of the agricultural mechanics curriculum.

First, let's look at the expectations of business. The ideal service you can provide is to prepare students in such a way that they can begin immediate productive performance without additional training. Being realistic, this is not always possible or practical due to the wide array of possible job requirements. They should, however, acquire certain basics that will assist graduates in becoming members of a skilled work force in a relatively short period of time. It is not enough, however, to teach a student how to troubleshoot and repair a machine. They must have a basic understanding of communication skills, regardless of their job interest. They also must be taught that the real world expects such things as initiative, punctuality, tidiness, cooperation, organization, good grooming, and a friendly smile.

Customer relations are valuable in that the customer must be treated with courtesy and respect, and that work must be completed expertly and in as short a time as possible. This type of training needs to be included if it is not already in current curriculum. In short, business wants an employee who can and will perform at a high skill level and a high personal character level. Remember the saying, "You'll never get a second chance at making a good first impression." This rule applies today as much as ever. All these expectations prove to be a pretty tall order, especially for the relatively short period of time that you have students in class.

Since this is not a one-way street, let's now flip the coin to the other side. What should vocational/technical education expect from business and industry? Industry should be included on advisory boards to provide guidance on curriculum. Industry should offer training opportunities for vocational instructors that will help them be more current as to the latest requirements brought about by technological changes. Industry should have an open-door policy which will allow vocational classes to visit businesses and get a first-hand view as to what business is all about. Industry should provide speakers or workshop leaders to work with educators toward common goals and mutual benefits. Industry should also concern itself with the high cost of training equipment. Although industry could not totally equip all schools, some provisions could be made to provide training aids at reduced prices.

Work study programs for students could provide additional opportunities. Likewise, industry has the responsibility to provide honest feedback on the performance of former students. Schools should initiate some type of follow-up program to solicit constructive criticism. This feedback, from both business and students who have been working for a period of time, will give vocational teachers good tips that may lead to changes and improvements in the curriculum and also insure good communication and that no gaps exist. Industry must make every reasonable effort to support vocational/technical education. We in the farm equipment industry support your programs. Graduates of these programs often become valued employees of dealerships and are essential to maintaining the productivity of agriculture.

John Evans, Service Representative for Deere and Company, explains hydraulic system test procedures to teachers during an inservice workshop.

Staying Alert

Vocational institutions have to be alert to changes which may affect the mission of vocational/technical education. To service today's products with yesterday's methods means a doubtful tomorrow. Highly specific course content is needed and must be accompanied by highly efficient and effective teaching methods. This obviously demands that teachers keep current on their skills at all times, since a teacher who is behind cannot lead the students ahead. I challenge you to remain as current as possible by keeping up with trends and teaching techniques so curriculum can be adjusted as needed.

Many parents still push their children toward college because a college education supposedly opens the door to the good life. The reality of the job market is different — many college-trained people are looking for a job, while many skilled trade positions cannot be filled. Therefore, you can see the value in the tremendous service you provide to the entire agricultural industry. It is not an easy task that you have, and we probably do not take time to thank you enough. In fact, we probably do not communicate enough. But working together toward positive results will mutually benefit all of us.

THEME

Instructors — Can You Stay Updated In Agricultural Mechanics Technology?

By Gordon G. Jindra

(Mr. Jindra is a Mechanics Instructor in the Agri-Business Department at Mankato Technical Institute, North Mankato, Minnesota.)

All of us in the educational field ask ourselves, "How am I to stay up-to-date on the constant changes industry is making?" We see changes in electrical and electronic monitoring systems, advancing complexities in hydraulics, power trains, diesels, etc. We see changes in companies such as Case-International and Duetz-Allis that are going to require us to remember the original systems while learning new ones. I do not have a crystal ball from which to offer everyone answers, but I do have a number of suggestions that may help you stay updated.

I see the information needed to remain up to date coming from different sources including the academic area, the technical area, and a combination area. First, let us take a look at the academic input. What can they offer us? Teaching techniques have to be a priority and the list includes lectures, effective demonstrations, discussions, use of field trips, and many others that could be mentioned. We have listened to lectures that kept us on the edge of our seat while others were considerably less effective. What makes one interesting and the other boring.

Effective Teaching Needed

Possibly things that spark interest such as instructor enthusiasm, an up-to-date knowledge of materials, sharing personal experiences, and discussion with the class (not preaching) were missing from the instructor's presentation methods. I feel we not only need to update technical information but, also how to present it. Are teaching aids used properly? Twenty years ago it seemed there were virtually no aids for teaching agricultural mechanics. Today, we have an abundance, but I feel we want to be careful not to have a total video presentation. If that is what the student wanted, he/she could have purchased the video, studied it, and forgotten about "you". Teaching aids should be exactly what they imply, "Aids". We need to learn to use them to supplement our presentations and not to replace them.

The demonstration is another area where teacher trainers skilled in teaching methodologies can help us in preparing for more effective instruction. Are you showing what you want to in your demonstration, or is there a better way to present your material? Have you outlined your objectives before you start? Perhaps, instead of the instructor doing all of the demonstration, students should be designated to present a portion of the demonstration, followed by discussion. "Learning by doing" has always been a good method of teaching in our program.

The supervision of on-the-job training is a very important area in which we need to develop expertise. We need to make sure that our students attain a well rounded experience, that they get exposure to engines and machinery, make field calls, work in the parts department, predelivery of new machinery, or whatever is applicable to their chosen field. I feel expertise is needed to coordinate evaluations in order to insure that they are an asset to the

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Instructors — Can You Stay Updated In Agricultural Mechanics Technology?

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student trainee. The time spent with employers to make sure that they are aware of the student's needs is critical. Fitting the training program into the regular work schedule takes effort and expertise from both the employer and the coordinating instructor.

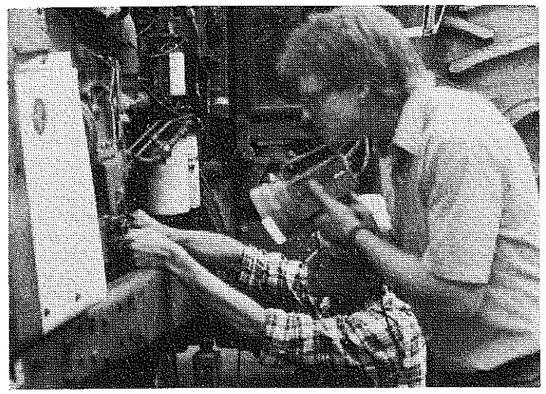
Technical Assistance

The second broad heading is technical competence. Updating our technical skills and knowledge is a problem area we face, and probably one we identify with more directly. As previously mentioned, the ever changing industry puts a heavy demand on our talents to keep our teaching information updated. What can we do to remain technically competent?

One of the best methods to keep current is to attend industry service schools. I feel many companies have made excellent training courses available. Many have segmented them for various levels of experience so you can pick the level of competence you need. You want to keep in constant contact with area company representatives as to their update schools. You do not have to travel across the country for education when it might be offered next door. I recommend the one or two week "home office" or "in plant" schools that many companies offer due to the depth and quality of instruction.

Exchanging ideas very often prevents the "re-inventing of the wheel". I find that when I attend schools, conferences, banquets, or other functions, there is always the opportunity to share new ideas and things you may have been doing. Generally, if you are willing to share your ideas, others will add projects or materials they have developed to make a real educational experience for all.

Working in industry is another excellent means of attaining technical expertise, but it may be difficult to find the time or get approval to be away from our teaching positions. In the Agri-business Mechanics program at Mankato Technical Institute, we utilize customer units to offer "hands on" training for our students. As we assist students in troubleshooting and repairing tractors and machines, it gives us an opportunity to reinforce our knowledge of equipment repair.



Second year students are adjusting the high idle R.P.M. as part of the practical diesel training.

I feel the "self study" has to be one of the means to increase your technical knowledge. If you do not understand a hydraulic system, sit down and read the service manual until you do comprehend the operation. If you are asked a question such as, "How much will a turn on the fuel adjusting screw of a Bosch Diesel Injection pump affect the delivery?", answer it by setting up a demonstration (if you have a pump calibration stand or fuel rator) to see what effect each one quarter turn has on fuel delivery. Not only are the students going to be interested and learn, but your ability to answer that question and the knowledge of the particular pump will be enhanced. That is only one example of hundreds of demonstrations and self-education projects you can challenge yourself.

The opportunity to review technical papers may be another means to stay abreast of the forthcoming changes in industry. Keep yourself current with articles in industrial and professional periodicals.

A Joint Effort

The third general area I mentioned is a combination of technical and academic. There is a definite need for participation in conferences held by industry, our professional organizations, or other educational institutions. There are excellent settings for enhancing your knowledge. While meeting with educators or company personnel, you may ask some of them to speak to your classes or serve on your advisory council. Take the opportunity to discuss with them your philosophy and teaching procedures and at the same time find out about new teaching aids they may be able to provide you. It is difficult to get donations from industry representatives if they do not know your program exists.

Updating the Curriculum

The last area I want to confront is updating of curriculum. First, I feel it is our obligation to make sure that our instruction is strong in teaching the basics. It is impossible for students to understand today's advanced electrical and hydraulic systems until they comprehend basic electrical principles, hydraulic principles, pumps, valves, etc.

Some of the means of updating our curriculum may include the use of advisory committees. The most practical way to find out what is needed by our graduates is to ask the people who are hiring them. Also, look to recommendations from past graduates for program improvement. Utilize the audio visuals that are being developed by industry and publishers dealing with technical education. Remember, some of your best teaching material may be those you develop yourself out of your own needs. And, do not forget the students you presently have in class as an aid to you in evaluating you teaching strategies. Make sure that you are introducing some new material every year. This will make you purge your teaching outlines and keep current.

Everything must start with an enthusiastic instructor, a person who is proud of his/her talents and wants to turn out top quality students. If you feel this enthusiasm, you will seek out all the avenues to keep yourself up-to-date.

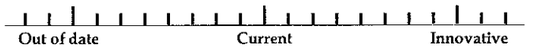
THEME

Staying Current: Inservice

By James Daniels

(Dr. Daniels is an Associate Professor in the Agricultural Education Department at Clemson University, Clemson, South Carolina.)

The term "staying current" generally implies all or none, current or not current, up to date/out of date. In reality, the concept of currentness with respect to education or agricultural technology clearly exists by degrees. It is a relative term having scale. Perhaps in this context, the state of being current is the midpoint of a continuum which has "out of date" and "innovative" as its extremes.



New technologies along with their adoption very seldom come about over night; they are instead phased in or out over a period of time — computer applications being a perfect example. An inspection of the present technologies being utilized in the profession would undoubtedly reveal varying degrees of currentness among both individuals and programs. Only in rare cases could it be accurately said that programs or individuals were found to be totally current or totally not current.

For the most part, the need for upgrading currentness in agricultural mechanics is not different from the need for upgrading currentness in other instructional areas of agricultural training programs. When differences in need exist, they are attributed to difference in subject content rather than educational worth or importance. Any attempt to prioritize this need solely on the basis of subject area would serve no useful purpose.

In this context, the term inservice usually refers to those activities which are designed to result in an upgrading in the degree of technology currentness. Currentness elevation should always be the primary product of successful inservice training efforts.

Major Responsibility

The first step in examining and hopefully improving the process of inservice in agricultural programs is to recognize the most important position involved. This is of course the classroom teacher. No one is in a better position to determine program needs than a competent teacher. This responsibility requires the teacher to constantly monitor not only subject matter, but also equipment, supplies, facilities, methods, techniques, and in fact all aspects of the program. Evaluation procedures should be utilized frequently to help identify and determine program needs. Once needs have been identified, it is the responsibility of the teacher to seek and request assistance from a qualified source.

Three Sources of Inservice

Teacher Education Department. A vital component of any respectable teacher training departments mission should be to provide inservice assistance upon request to practitioners in the field. This is especially true for departments in land grant institutions. Teacher educators have a responsibility for keeping themselves as up to date as possible and for serving as a continual source of current information and training techniques. Awareness is the responsibility of teacher educators, and since awareness precedes need determination, teacher educators play an important role in perpetuating the inservice process.

Inservice assistance should be available to teachers both individually and collectively. The following are some recommended activities to improve inservice:

a. Frequent surveys and research to help teachers identify weaknesses and needs.
b. Solicit requests for inservice assistance.
c. Provide workshops based on needs.
d. Assist with annual teacher conferences.
e. Assist in arranging industry sponsored training activities.
f. Obtain and make available related information and developments from all agricultural departments at their institution.

Teacher education should not exist to provide inservice, but should exist because of clientele requested needs. Ideally, teacher educators are in a position to have access to the most current technology in agriculture. They should give priority to establishing an effective vehicle to help make this technology available to teachers in the field upon request. Perhaps the establishment of a toll free "hot line" through the teacher education department for use by vocational agriculture teachers is needed. This would greatly enhance the department's position as a source of inservice assistance by providing teachers with immediate answers, suggestions, and information. This service would be of particular benefit to first year teachers.

Advisory Committees. Traditionally, these committees have been utilized by vocational agriculture teachers more in terms of program evaluation and in support roles than for inservice purposes. If these individuals are properly chosen and utilized as representatives of the local agribusiness industry, they can be a vital source of current agricultural information, practices, and experiences.

Individual members of the committee, depending on the area of agriculture they represent, can provide teachers an opportunity to experience firsthand new developments in agriculture. Some examples are operating a new combine or other equipment, observing installation and/or operations of computerized systems, and observing innovative practices and methods in all areas of agriculture.

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Staying Current: Inservice

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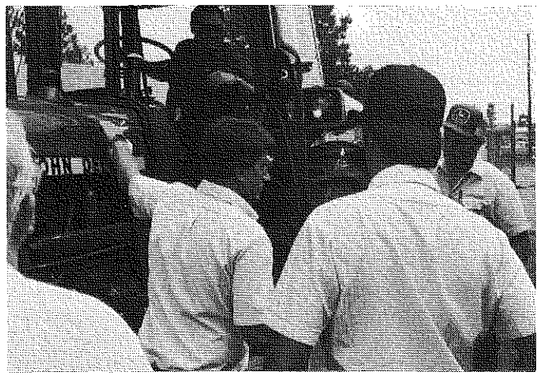
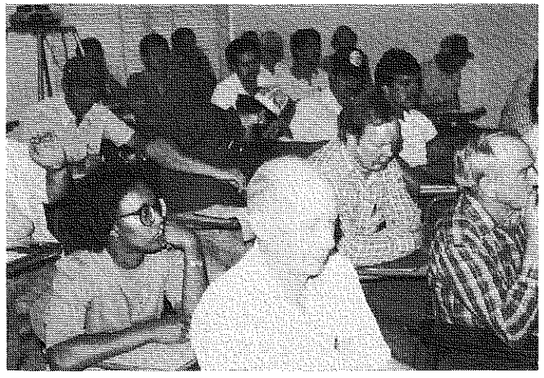
Commercial Agricultural Companies. Because of their vested interest in agriculture, combined with their established systems of public relations, these companies can be a prime source of inservice assistance. In most cases, their only stipulations being to give them ample lead time for making arrangements. Based on past experiences, it is clearly evident that agricultural companies are most eager to provide training sessions, demonstrations, tours of facilities, resource persons, printed materials, audio visuals, teaching aids and in some cases supplies and equipment. Teachers who are not currently taking full advantage of this source should make a special effort to establish a good working relationship in this area. In the interest of establishing long term programs of assistance, teachers must out of common courtesy give those companies who provide assistance proper credit and recognition. Usually, a written expression of appreciation will suffice.

Evaluation

Traditional external evaluation procedures serve adequately in assessing the value of inservice efforts. These procedures usually involved feedback in one form or another from the recipients of the training. Due to the circular dependence and perpetual nature of the inservice currentness upgrading process, internal evaluation efforts are usually limited to self-evaluation procedures. Self evaluation (preceded of course by awareness) at all levels is a must. The results should ideally be utilized for diagnostic purposes.



Field representatives from Deere and Company serve as instructors for an inservice workshop on tractor hydraulic systems (Photo courtesy of Dale Perritt).



Participants in the hydraulic systems workshop enjoyed classroom phase of their inservice (Photo courtesy of Dale Perritt).

ARTICLE

Tractor Service and Maintenance — Historic or Modernistic

Have you evaluated your tractor service and maintenance lesson plans recently? Does your curriculum reflect the horsepower of the fifties and sixties or the seventies and eighties? Be honest, should you be classified as historic USA or as advanced for developing countries?

Deere and Company has not produced a gasoline tractor since 1960 in the agricultural line. Air conditioning was introduced in 1973 as a factory installed option. Electronic sensing devices were introduced first in corn planters in 1969 and entered the combines in 1970. The function of the electronic sensors can be to tell the muscle, hydraulics, what to do and when.

By W. Forrest Bear

(Dr. Bear is a Professor in the Agricultural Engineering and Vocational and Technical Education Departments at the University of Minnesota.)

Hydraulic Diagnosis

With hydraulics as a 'muscle' your tractor can have hydrostatic steering, hydraulic power brakes, rockshaft-depth adjustment, draft sensing cylinders, hydraulic shift transmissions, and even a comfortable seat. For these to function, the tractor has one or more hydraulic pumps, several control valves with a hydraulic fluid system that must be stored, cooled, cleaned, and operated at both high and low pressure and temperature. The tractor operator's manual probably has a page of malfunctions which can occur with directions of where to go next to pinpoint the problem.

After your students recognize a problem and identify the component for testing, do you have a: 1) flow meter, 2) pressure guages which test from 0-100 psi, 0-300 psi and 0-5000 psi and 3) all the necessary fittings to match any tractor which may come through the door? If not, you do not have the diagnostic tools necessary to do the job. Are you prepared to direct the tracing and testing of the hydraulic circuits and interpret what a drop from two to three psi or a decrease in 10-20 engine rpm means to the hydraulic system? If not, then maybe you aren't prepared to teach hydraulic systems diagnosis. However, you can teach the necessary principles and practices for identification of problems. The post-secondary educational institutions are the ones to train the mechanics and service technicians and they will have the necessary tools and testing instruments. The biggest favor you might do for your students is train them to know when to return the tractor to the dealership.

It may lack a lot of romance, but maybe your task as a high school teacher is to preach cleanliness, changing of filters, selection of the proper fluids and lubrication and proper weight and ballast for the tractor. Thus, do a good job of what you can do best. The proper service and maintenance and tightening of those loose nuts help prevent the problems which cause work for the dealership.

Air Conditioning

Air conditioning instruction and diagnosis will increase your vocabulary and process terminology. There is ambient air duct differential, high or low side pressure, pressure/vacuum, refrigerant, temperature and pressure relation, condensor, evaporator, compressor, expansion valve, receiver dryer and others. Digest those terms to understand the function of the components and the trouble shooting tests can start. Continuity circuit checks are to be taken with the ohmmeter at six locations, voltage checks at three locations, and the diode check in two locations. The circuits are in technicolor utilizing eight color codings on the conductors. The tractor operator forgets to appreciate the air conditioning until it quits working. It becomes a priority item rapidly.

Do you have air conditioning in your service and maintenance curriculum? Now, what can you teach at the high school level and what should be left for the post-secondary educational program? What can the operator repair and which jobs go to the dealership?

Electric Sensors, Gauges, and Lights

Check the old rules on when to service the air cleaner. It read, "Every ten hours or sooner if the tractor is being operated under dirty conditions." Who defines the dirty operating conditions? Today, the restricted air flow in the air filter intake system sends a light signal — now just remember to look because it is the silent type.

Tachometers can now determine the ground speed, PTO speed, and engine rpm. The dial gauge has been replaced with a digital display with touch switches. The high compression engine and the power train create heat. The tractor operator wants to know if the fluids, lubrication, and hydraulic are doing their job so the operator checks the head temperature, clutch temperature, hydraulic oil temperature, and coolant gauges on the instrument panel. Pressure is also monitored in the engine and transmission oil.

The instrument panel uses four colors to highlight the voltage output from the alternator and if voltage is excessive or too low, the amber service alert light comes on. Engine water temperature is color coded from 160°F. to 240°F. The amber service alert light is activated at 230°F. to 240°F and the 240°F. temperature zone is 'Red' for an emergency. The red stop engine light comes on, but in case you aren't watching the instrument panel, the warning alarm should attract your attention. Imagine, an amber light and a horn that beeps as a service alert but a flashing red light and a steady horn means 'stop the engine and shut down all circuits.' Head lights, flood lights, tail lights, and the cab lights are on circuits with relays, switches and circuit breakers. The diesel engine has eliminated the old ignition secondary circuit test. However, with gasoline, LP, or diesel, the alternator and starter are still needed in the lesson plan as is the cooling system. Fortunately, the VOA meter is economical to buy but how much testing are you prepared to teach? How are your electrical system lessons planned.

This lesson plan evaluation could be continued for other engine and power train components, but the point has been made. When was the last time you revised your instructional package for tractor service and maintenance? What should you be doing and what should be left for the post-secondary school system and/or as official work for the dealership? Are you repairing and overhauling tractors with high school students? Should this training be left for the post-secondary schools? Some teachers proclaim they do overhauls, but I've never seen a new model tractor or a four-wheel drive unit in a high school mechanics laboratory.

I feel that high school students need a basic service and maintenance program. Their teachers should stop before they're in over their heads and/or instructional time schedule.

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ARTICLE

Transferring Agricultural Mechanics Skills

By Glen M. Miller

(Mr. Miller is a Graduate Teaching Assistant in the Department of Agricultural and Extension Education at Mississippi State University.)

Teachers of agricultural mechanics on all levels are faced with a common problem. How do we give our students the competence in agricultural mechanics that they may use to gain employment in the highly diverse agricultural industry? How can we be sure that the skills I teach are not so narrowly focused that I graduate specialists who have very limited employment opportunities? What guidelines can I follow in teaching that will insure a competent agricultural mechanics graduate who has the ability to apply the knowledge and skill to a diverse number of jobs? How can I insure the transfer of learning from my program to new situations?

Transfer is not a new concept in education. A prominent member of the educational psychology community, E.L. Thorndike (1874-1949), proposed transfer as a major part of his explanation of learning. In the law of 'Response by Analogy,' Thorndike recognized the fact that persons placed in a novel situation would react with responses that they would employ for other situations with some identical elements (Lefrancois, p. 39). This would imply that in agricultural mechanics instruction, we should include as many identical elements as possible to the jobs our students will perform after graduation.

Teaching for Transfer

Judd (1908) and Hendrickson and Schroeder (1941) carried Thorndike's theory further by experimenting with teaching principles of such a general nature that they facilitated solving many problems and learning many things that seemed very different (Gage & Berliner, 1984). This research would imply that in agricultural mechanics instruction, teaching basic principles would facilitate problem solving and transfer to new situations.

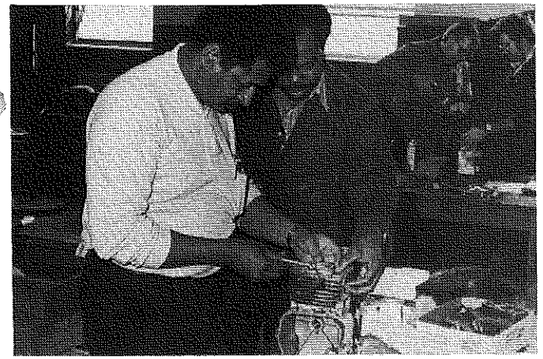
The contemporary view of transfer relies heavily on research on metacognition and on expert-novice differences. Metacognition is knowledge about one's own cognitive system (Gage & Berliner, 1984). The person practicing metacognitive skills asks the following kinds of questions: "What do I know about this subject? How much time will I need to learn this? What is a good plan of attack to solve this? How can I predict or estimate the outcome of this task? How shall I revise my procedures? How can I spot an error if I commit one?" (Gage & Berliner, page 358).

This tells us that we do certain things when we teach novices to arc weld, pack wheel bearings, trouble shoot an electrical system, or drive a tractor. We model for our students (give demonstrations, etc.), give them a vocabulary to use in describing their performance, and teach them how to regulate and monitor their performance. "Along with teaching them a strategy for doing things we teach them strategy for monitoring what they do. The monitoring part of instruction is metacognition" (Gage & Berliner, page 360). These metacognition skills allow experts to apply what they know to problem areas. This is the critical factor in transfer. Our students must be able to regulate and monitor their performance of agricultural mechanics skills, not just perform the task in an unthinking manner.

Conditions for Transfer

Two conditions are necessary for transfer to occur. First, students must have enough experience with the area to be sure they can learn the skills needed for transfer to occur. This implies that the basic principles needed must be taught in some depth, not just addressed in a 'surface' manner. Second, we must help students by modeling (demonstrating) problem-solving techniques needed. We must tell students how the skill and knowledge they are learning will transfer to new situations. If we are demonstrating measuring side clearance on a piston for a small engine, we must be sure our students understand the basic principles and emphasize that the operation is similar for any engine. We refer to this practice as teaching for procedural transfer. To achieve it, we must teach broadly applicable concepts, principles, and procedures.

Dr. Glen Shinn, Mississippi State University, practices modeling as he demonstrates the installation of an engine seal to Mississippi vocational agriculture teachers. The demonstration was preceded by classroom teaching of the basic principles involved. (Photo courtesy of Glen Miller).



Teachers practice measurement competencies which, if built on principles and practiced sufficiently and correctly, may be transferred to new situations. (Photo courtesy of Glen Miller).

Compentency attainment must be supervised and corrected to insure that the skill the students learn will transfer to new situations. (Photo courtesy of Glen Miller).

Steps to Follow

What are some steps that teachers can follow to insure transfer of agricultural mechanics competencies? A) Competencies should be presented in situations as close to the agricultural industry as possible. Your students cannot gain transferable skills strictly with pencil and paper. They must experience the 'real thing'.

Students need to have enough supervised practice to achieve a high level of competence so transfer will occur. One trial will not insure a transferable skill. B) We must provide related experiences in the classroom/laboratory environment so the student can practice transfer under our supervision. C) It is important that what we teach be accurate and detailed so the students can recognize differences as well as similarities when they attempt to transfer a skill. D) We must teach skills in progression from the simple to the complex. If students can see this relationship, they are better able to transfer it to new situations. E) When we teach a principle or arrive at a conclusion, students should be given as many examples as possible. F) It is essential that we carry the competency to the application level by utilizing the supervised occupational experience program (Gage & Berliner, 1984).

Vocational agriculture students, like all learners, are complicated. As teachers, we can be more confident that our competencies will transfer to the world of agricultural mechanics occupations if we implement these basic principles of transfer in our classes.

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ARTICLE

Providing Inservice For Power Equipment

Were you able to maintain and repair power equipment (planer, jointer, table saw, etc.) during your first year as a vocational agriculture teacher? If you could, you were the exception! In most cases the first year teacher has not developed the competencies necessary to maintain and repair power equipment. Sure, a mechanically inclined individual can read the operator's manual and determine how to do what is necessary. But that takes a lot of initiative and one can easily procrastinate, especially with no experience.

The preservice teacher education program cannot adequately prepare the teacher with all the needed competencies. Only basic courses can be provided, leaving the responsibility to the teacher to develop the additional competencies.

(Continued on page 20)

By Jordan Hudson

(Dr. Hudson is an Assistant Professor of Agricultural Education at Virginia State University.)

Providing Inservice For Power Equipment

(Continued from page 19)

One approach to developing needed competencies and staying current in the mechanics program is to participate in workshops which provide hands-on activities to troubleshoot, maintain, and repair power equipment. Until recently in Virginia, inservice training for maintenance and repair of power equipment had been provided primarily through demonstrations. Inservice sessions were held at the teachers' conferences and representatives from industry presented the latest service information, gave demonstrations, and provided some hands-on experiences for the teachers. The exercises involved only a small percentage of the teachers and did not cover all the power equipment in the laboratory. However, for the past two years, workshops have been conducted at different school locations over a four-day period. The manner in which the workshops were planned, conducted, and evaluated may be of interest to others.

Care should be taken in planning and conducting workshops for the improvement of local facilities. Once the need has been established, either through a survey or local request, there has to be cooperation and coordination among teachers, administrators, supervisors, and teacher educators. All those involved should have a planning session to set priorities and delegate tasks.

The most appropriate location for the inservice workshop is in the local departments. In a school system which has 12-16 vocational teachers, the local vocational administrator can be in charge of organizing the group. If the local system is small, other vocational teachers from surrounding areas can be invited to attend. In cases where the workshop is held in more than one school system, the state supervisory staff, in conjunction with local administrators, should be in charge of organizing the group.

Planning should start at least six months prior to the anticipated date of the workshop. This allows time for industry representatives to visit the sites and make recommendations on specific repair parts needed. In many cases, the representative will be able to identify worn bearings and other problems requiring attention. This type of planning is critical when replacement parts are needed. Being able to remove and replace parts when the expertise is available is very beneficial to the participants as well as to the local department. Try to avoid time lags in this area if possible. Replacing parts after the workshop is over can be perplexing.

Arrangements have to be made with the local administrative personnel to hold the workshop in the locality. State supervisors should become involved with the administrative personnel in planning who should attend. Teachers should obtain permission to attend the workshop when it is held away from the local school.

Plans should be made to give the participants some type of credit for participating, either college credit or non-college credit. In some cases where there were enough vocational teachers in the school system, the local administration requested that an inservice credit course be offered locally and the system provided part of the tuition from local funds. Teachers could use the credit for an advanced degree or for certification.

An industry representative should be present at all power equipment maintenance workshops. This person brings the latest service information and insight to the program. As one teacher wrote in the comments section of the evaluation, "Working on the machines while someone with expertise was nearby was beneficial." The representative not only provides expertise, but is able to record the name and number of the needed parts.

Host teachers should be requested to remove sawdust and debris from the machines prior to the workshop. Some teachers object to attending a workshop which becomes a housekeeping activity. The host should also provide the following: tools, sharp blades to replace in planer and jointer, operator's manuals, oven cleaner, ammonia with lemon, steel wool (fine and medium), Varsol, WD-40 or CRC lubricant, dry lubricant (paste car wax, silicone spray, powdered graphite), stiff brushes and rags. If possible, refreshments for a break are nice since they assist in creating a climate for learning.

The teachers should form a good idea of what is to be accomplished. Once the workshop starts, the group should troubleshoot all the equipment to be used during the workshop. This is also a good time to review (preferably with a handout) the steps to follow in adjusting and maintaining each machine (references are listed at the end of the article). Safety precautions and common problems that have occurred with similar machines can be discussed at this time.

Teachers should be divided into groups of two and assigned to a specific machine with one experienced teacher working with an inexperienced teacher. The host teacher should be assigned to the planer since it is usually an item most in need of adjustment and one that the teacher should be careful that it is adjusted correctly. If possible, new groups should be formed when the teachers rotate to another machine. Teachers from the same school should be on separate teams.

The person in charge of conducting the workshop, usually a teacher educator, should go from group to group explaining procedures and shortcuts, verifying that correct procedures are being used, and providing positive reinforcement to the participants. For those machines on which major problems are found or major adjustments have to be made, assemble the teachers and have someone "show and tell." As each machine is completed, have each group leader explain what was accomplished.

At the conclusion of the workshop, the teachers were asked to evaluate the format and content using a Likert-type scale to indicate the degree of agreement with given statements. They were also asked to provide written comments. Many of the teachers said this type of workshop was one of the most beneficial and gave it a very high rating.

If we are to develop the competencies necessary to maintain the agricultural mechanics laboratory, we must participate in inservice workshops that provide hands-on experiences in power equipment troubleshooting, maintenance, and repair. These workshops should be based on surveys to determine what is needed. They must be well planned by administrators and supervisors, carried out in local vocational agriculture departments, and conducted by personnel with the needed expertise. Only quality workshops can be expected to provide teachers with the needed competencies. *(Continued on Page 21)*

References

Irvin, D.W. (1971). POWER TOOL MAINTENANCE. New York: McGraw Hill.

Houdaille Industries, Inc. (1981). POWERMATIC'S GUIDE TO PLANING EXCELLENCE. McMinnville, Tennessee.

Powermatic Houdaille, Inc. TROUBLE SHOOTING HANDBOOK. McMinnville, Tennessee.

The Cover

Course lectures should include class discussions to increase student participation and material retention. (Photo courtesy of the Agri-Business Department of Mankato Technical Institute).

ASSISTANTSHIPS AND FELLOWSHIPS

1986-87 Report . . .

Assistantships and Fellowships in Agricultural Education

BY RICHARD F. WELTON

(Dr. Welton is a Professor of Agricultural Education in the Department of Adult and Occupational Education at Kansas State University.)

The 1986-87 survey of institutions offering assistantships and fellowships in agricultural education is provided by the Publications Committee of the American Association of Teacher Educators in Agriculture. This survey is published to assist those in the profession who are seeking information about graduate studies. Twenty-five institutions responded to a request for details concerning assistantships and fellowships.

Key to Understanding

The information is provided in the following order: nature of assistantships (number available); number of months available during the year; beginning month of employment; amount of work expected; monthly remuneration and other considerations, such as remission of fees; whether aid is for master's, advanced graduate program, or doctoral students; source of funds; the 1986 deadline for application; and the person to be contacted. Slight variations in this pattern are due to the nature of the data provided by reporting institutions.

University of Arizona

Research Assistantships (2); 9 or 12 months; June or August; one-half time, 20 hours/week; $600 per month; out-of-state tuition waived; master's; department budget; March 1 or 6 months prior to enrollment; Floyd G. McCormick, Department of Agricultural Education, The University of Arizona, Tucson, Arizona 85721, telephone (602) 621-1523.

University of Arkansas

Research Assistantship (1); July 1; one-half time, 20 hours/week; $500-650 per month; full tuition and fees provided; master's or doctoral; May 1; Nolan Arthur, Department Head, Department of Agricultural & Extension Education, Agriculture Building Room 301-B, University of Arkansas, Fayetteville, Arkansas 72701, telephone (501) 575-2035.

Teaching Assistantship (1); September 1; one-half time, 20 hours/week; $500-650 per month; full tuition and fees provided; master's or doctoral; May 1; contact same as above.

Arkansas State University

Graduate Assistantships (2); 9 months plus 2 summer terms; approximately August 15; $4,250 for 9 months plus $550 for each summer term; master's; May 1; J.A. Hayles, P.O. Box 1080, State University, Arkansas 72467.

University of Florida

Research Assistantships (3-5); 9-12 months; August; 14-20 hours/week; out-of-state fees waived; master's; varies depending upon position; April 1; C.E. Beeman; Department of Agricultural and Extension Education, 305 Rolfs Hall, University of Florida, Gainesville, Florida 32611.

University of Idaho

Research Assistantship (1); 12 months; July 1 or later; 20 hours/week; $600 per month; out-of-state fees waived; master's or doctorate; Agricultural Experiment Station; April 15; Douglas A. Pals, Department of Agricultural and Extension Education, 225 Morrill Hall, University of Idaho, Moscow, Idaho 83843, telephone (208) 885-6358.

Iowa State University

Research Assistantships (4); 9 or 12 months; July or September; one-half time, 20 hours/week; $635 per month; fee reduction; master's or doctoral; Agricultural Experiment Station; March 1; David L. Williams, Head, Department of Agricultural Education, Iowa State University, Ames, Iowa 50011.

Fellowships (2); 12 months; September; 20 hours/week; $655 per month; full fees paid; master's or doctoral; March 1; USOE for Minorities and Women; contact same as above.

Kansas State University

Teaching Assistantship (1); 9 months; August 26; 16 hours/week; $564 per month; out-of-state fees waived, in-state fees reduced; master's and doctoral; March 15; Ralph Field, Department of Adult and Occupational Education, Kansas State University, Manhattan, Kansas 66506, telephone (913) 532-5535.

Louisiana State University

Teaching and Research Assistantships (6); 9 and 12 months; June, August, and January; 20 hours/week; minimum $450 for M.S. with no teaching experience, $500 for M.S. with teaching experience, and $700 for Ph.D. students; most fees waived; Departmental and Graduate School funds; May 1 for Summer, July 1 for Fall, December 1 for Spring; Gary Moore, Department of Vocational Agricultural Education, Louisiana State University, Baton Rouge, Louisiana 70803, telephone (504) 388-5748.

University of Maryland

Graduate Assistantships for minority students; 9½ months; approximately August 15; 20 hours/week; remission of tuition for 10 credits per semester; $7,000-7,200 per year (1985-86 rates); Aid for qualified graduate students (M.S. or Ph.D.); March 15; Clifford L. Nelson, Professor & Chairman, Department of Agricultural and Extension Education, University of Maryland, College Park, MD 20742, telephone (301) 454-3738.

University of Minnesota

Research Assistantships (2-5); 9-12 months; September 15; 10-20 hours; $809-1,003 per month (50%); tuition reduced by two times % time appointed; master's or doctoral students; University; April 15; Edgar Persons, Head, Division of Agricultural Education, 320 Vocational and Technical Education Building, University of Minnesota, 1954 Buford Avenue, St. Paul, Minnesota 55108, telephone (612) 373-1020.

Fellowships in Vocational Education (2); 9 months; September 15; none, but full-time students; $1,500-2,000; master's or doctoral students of outstanding potential; Graduate School; April 15; Director of Graduate Studies, Department of Vocational and Technical Education; 210 Vocational and Technical Education Building, University of Minnesota, 1954 Buford Avenue, St. Paul, Minnesota 55108, telephone (612) 373-7780.

Mississippi State University

Research Assistantships (2); 9 or 12 months; July or August; $300-900; out-of-state fees waived; doctoral; March 1; Jasper S. Lee, Department of Agricultural and Extension Education, Post Office Drawer AV, Mississippi State University, Mississippi State, Mississippi 39762, telephone (601) 325-3326.

Teaching Assistantship (1); 9 months; August; $300-900; out-of-state fees waived; master's educational specialist, or doctoral; March 1; contact same as above.

University of Missouri-Columbia

Research Assistantships (2-4); 9-12 months; July and September 1; 20 hours/week; $611 per month; out-of-state fees waived; doctoral; May 1; Curtis R. Weston, Agricultural Education, 435 General Classroom Building, University of Missouri-Columbia, Columbia, Missouri 65211.

Teaching Assistantships (2-3); 9 months; August 20; 20 hours/week; $611 per month; out-of-state fees waived; doctoral; May 1; contact same as above.

Montana State University

Graduate Teaching Assistantships (2), pending funds on a yearly basis; 9 months; September 15; approximately 15-20 hours/week teaching undergraduate classes; $4,500 per year plus fee waivers; master's; May 1; Max Amberson, Department Head, Department of Agricultural and Industrial Education, College of Agriculture, Montana State University, Bozeman, Montana 59717.

Graduate Research Assistantship (1), pending funds on a yearly basis; 9 months; September 15; approximately 15-20 hours/week conducting research activities; $4,500 per year plus fee waivers; master's; May 1; contact same as above.

University of Nebraska

Graduate Teaching Assistant (1); 9-12 months; July 1; 20 hours/week; $500-700 per month plus remission of tuition; master's candidate; department budget appointment; April 1 or until filled; O.S. Gilbertson, telephone (402) 472-2807.

Graduate Research Assistant (1); 9-12 months; July 1; 20 hours/week; $500-700 per month plus remission of tuition; master's candidate; department budget appointment; April 1 or until filled; contact same as above.

Project Director/Coordinator (1); 12 months; July 1; 30-40 hours/week; $1,000-1,800 per month; remission of tuition and fees plus fringe benefits package; advanced graduate or doctoral student; special project funding; April 1 or until filled; contact same as above.

North Carolina Agricultural and Technical State University

Graduate Assistantships (1-2); 9 months; August; 10 hours/week; $300 per month; University; July 1; Dr. Albert W. Spruill, Dean, Graduate School, or A.P. Bell, Head, Department of Agricultural Education, North Carolina Agricultural and Technical State University, Greensboro, North Carolina 27411, telephone (919) 379-7711.

Graduate Research Assistantships (2); 12 months; August; 20 hours/week; $480 per month; USDA: July 1; A.P. Bell, Head, Department of Agricultural Education, North Carolina Agricultural and Technical State University, Greensboro, North Carolina 27411, telephone (919) 379-7711.

North Dakota State University

Graduate Research Assistant (1); 12 months; July 1; one-half time; $530 per month; master's; Agricultural Experiment Station; February 1; Don Priebe, Professor and Chairman, Agricultural Education Department, 155 Home Economics Building, North Dakota State University, Fargo, North Dakota 58105, telephone (701) 237-7437.

The Ohio State University

Teaching Assistantships (1-2); 12 months; July or later; one-half time; $570-700 per month; in- and out-of-state fees waived; doctoral; February 1; J. Robert Warmbrod, Chairman, Department of Agricultural Education, The Ohio State University, Agricultural Administration Building, 2120 Fyffe Road, Columbus, Ohio 43210-1099, telephone (614) 422-6321.

Research Associateships (3-4); 9-12 months; July or later; one-half time; $570-700 per month; master's or doctoral; February 1; contact same as above.

Teaching Associateships (1); 12 months; July or later; one-half time; $650-750 per month; in- and out-of-state fees waived; doctoral; March 1; Joe Gliem, Department of Agricultural Engineering, Ives Hall, 2073 Neil Avenue, Columbus, Ohio 43210, telephone (614) 422-8972.

Research Associateships (12-15); July 1 or later; one-half time; $720 per month for doctoral; $570 per month for master's; in- and out-of-state fees waived; February 1 (will accept applications year-round); Robert E. Taylor, Executive Director, National Center for Research in Vocational Education, The Ohio State University, 1960 Kenny Road, Columbus, Ohio 43210, telephone (614) 486-3655.

The Oklahoma State University

Teaching Assistantships (2); 10 months; September 1; 20 hours/week; $735 per month; out-of-state fees waived; August 1; doctoral; Robert Terry, Professor and Head, Department of Agricultural Education, 448 Agriculture Hall, Oklahoma State University, Stillwater, Oklahoma 74078, telephone (405) 624-5129.

Teaching Assistantship (1); 12 months; September 1; 20 hours/week; $735 per month; out-of-state fees waived; August 1; contact same as above.

Research Assistant (1); 12 months; September 1; 20 hours/week; $735 per month; out-of-state fees waived; August 1; contact same as above.

The Pennsylvania State University

Teaching and Research Assistantships (4); 12 months; August 20; 20 hours/week; $3,195 per semester; remission of fees; out-of-state; master's and doctoral; March 1; Samuel M. Curtis, Head, Department of Agricultural Education and Extension, 102 Armsby Building, University Park, Pennsylvania 16802, telephone (814) 865-1668.

Southern Illinois University

Teaching Assistantships (3); 12 months; Summer or Fall; 20 hours/week; $610-650 per month; tuition waiver; April 1; James Legacy, Department of Agricultural Education and Mechanization, Southern Illinois University, Carbondale, Illinois 62901.

Teaching Assistantship (1); 9-12 months; Summer or Fall; 20 hours/week; $610-650 per month; tuition waiver; April 1, contact same as above.

Microcomputer Lab Assistantships (2); 9 months; Fall; 20 hours/week; $610-650 per month; tuition waiver; April 1; contact same as above.

Texas A&M University

Assistantships: teaching (3), non-teaching (3), research (2); 9-12 months; generally September 1 or January 15; 20 hours/week; $750 per month for doctoral, $500 per month for master's; out-of-state tuition waived for teaching or research assistantships; public (state) and private; April 1 for September appointment; Don R. Herring, Graduate Coordinator, Department of Agricultural Education, College of Agriculture, Texas A&M University, College Station, Texas 77843-2116, telephone (409) 845-2951.

Fellowships: doctoral (2), master's (2); 12 months; generally September 1 or January 15; 20 hours/week; $800-1,000 per month for doctoral, $500 per month for master's; public (state) and private; April 1 for September appointment; contact same as above.

Texas Tech University

Graduate Teaching Assistantships (3); most of the work is lab TA's; 10 months; September 1; 20 hours/week; $485 per month; building use, university center, and out-of-state fees waived; master's; Houston Livestock Show Funds; April 15; Jerry D. Stockton, telephone (806) 742-2816.

Graduate Research Assistantship (1); write/edit a Texas FFA History book; 12 months; July 1; 20 hours/week; $485 per month; building use, university center, and out-of-state fees waived; master's; Texas FFA Alumni Association Funds; April 15; contact same as above.

Graduate Research Assistantships (3); developing interactive computer/video curriculum material; 12 months; July 1; 20 hours/week; $485 per month; building use, university center, and out-of-state fees waived; master's; Texas Education Agency Funds; April 15; Curt Paulson, telephone (806) 742-2816.

Graduate Research Assistantship (1); evaluate Vo. Ag. I and Vo. Ag. II curriculum; 12 months; July 1; 20 hours/week; $485 per month; building use, university center, and out-of-state fees waived; master's; Texas Education Agency Funds; April 15; contact same as above.

Utah State University

Teaching Assistantship (1); 9 months; September 1 (summer employment is additional and negotiable); approximately 20 hours/week; $575 per month plus out-of-state tuition waivers; master's; March 14; Gilbert A. Long, Department Head, Department of Agricultural Education, Utah State University, Logan, UT 84322-4805, telephone (801) 750-2230.

Virginia Polytechnic Institute and State University

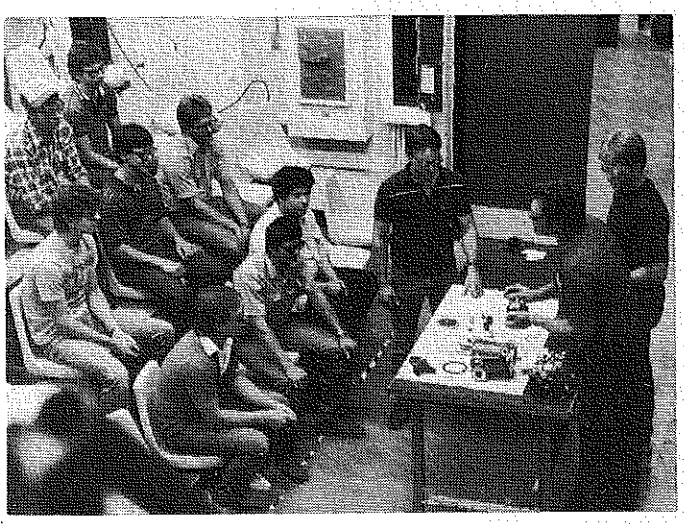
Instructor (1); 12 months; July 1; 20 hours/week; $850 month; doctoral with 3 years professional experience — two years teaching agricultural education; University; March 1; John Crunkilton, Agricultural Education, Room 222 Lane Hall, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

Graduate Assistant (1); 9 months; September 16; 20 hours/week; $650-775 per month; master's or advanced degree; University; March 1; contact same as above.

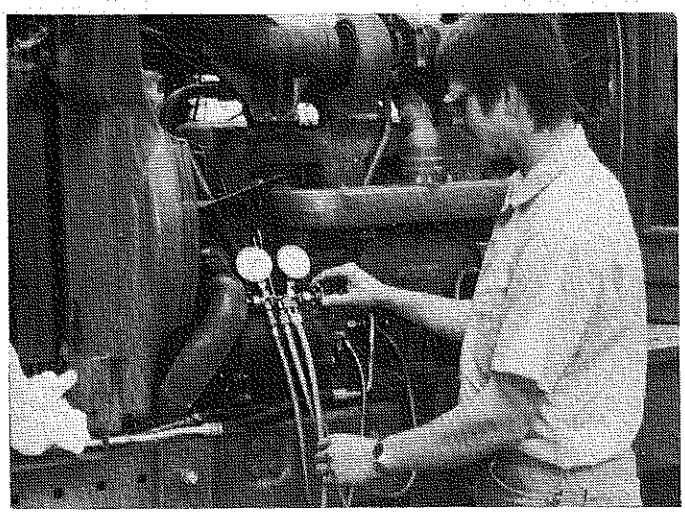
University of Wisconsin/River Falls

Graduate Assistantship (1-2); 9 months; September; 15-20 hours/week; $500-520 per month; remission of out-of-state fees; master's; state funding; April 1; Richard A. Jensen, Chairman, Department of Agricultural Education, University of Wisconsin/River Falls, River Falls, Wisconsin 54022, telephone (714) 425-3555.

Staying Current in Agricultural Mechanics

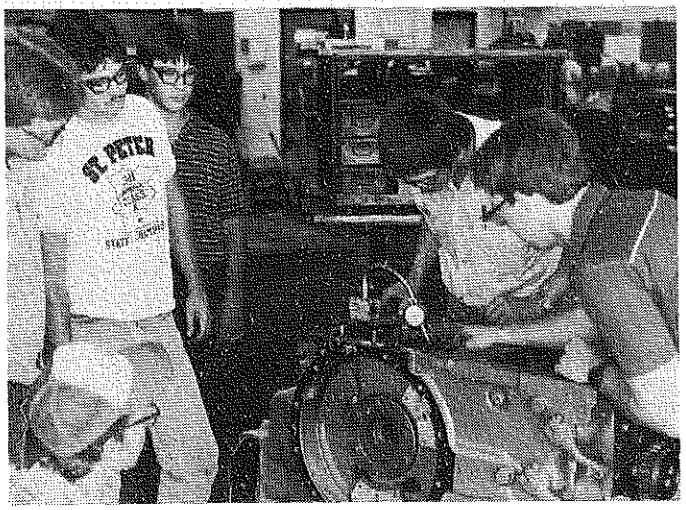


Students and instructor explain the operation and worn parts of this axial piston pump to the remainder of the class.



Hands on training allows both the student and instructor to enhance their knowledge in the mechanics industry.

Two students are participating in an air conditioning demonstration while the other class members observe procedures.



Students are setting the backlash between the ring gear and pinion on the school training model. Proper demonstration procedures are essential.

(All Photos Courtesy of the Agri-Business Department, Mankato Technical Institute, North Mankato, MN)