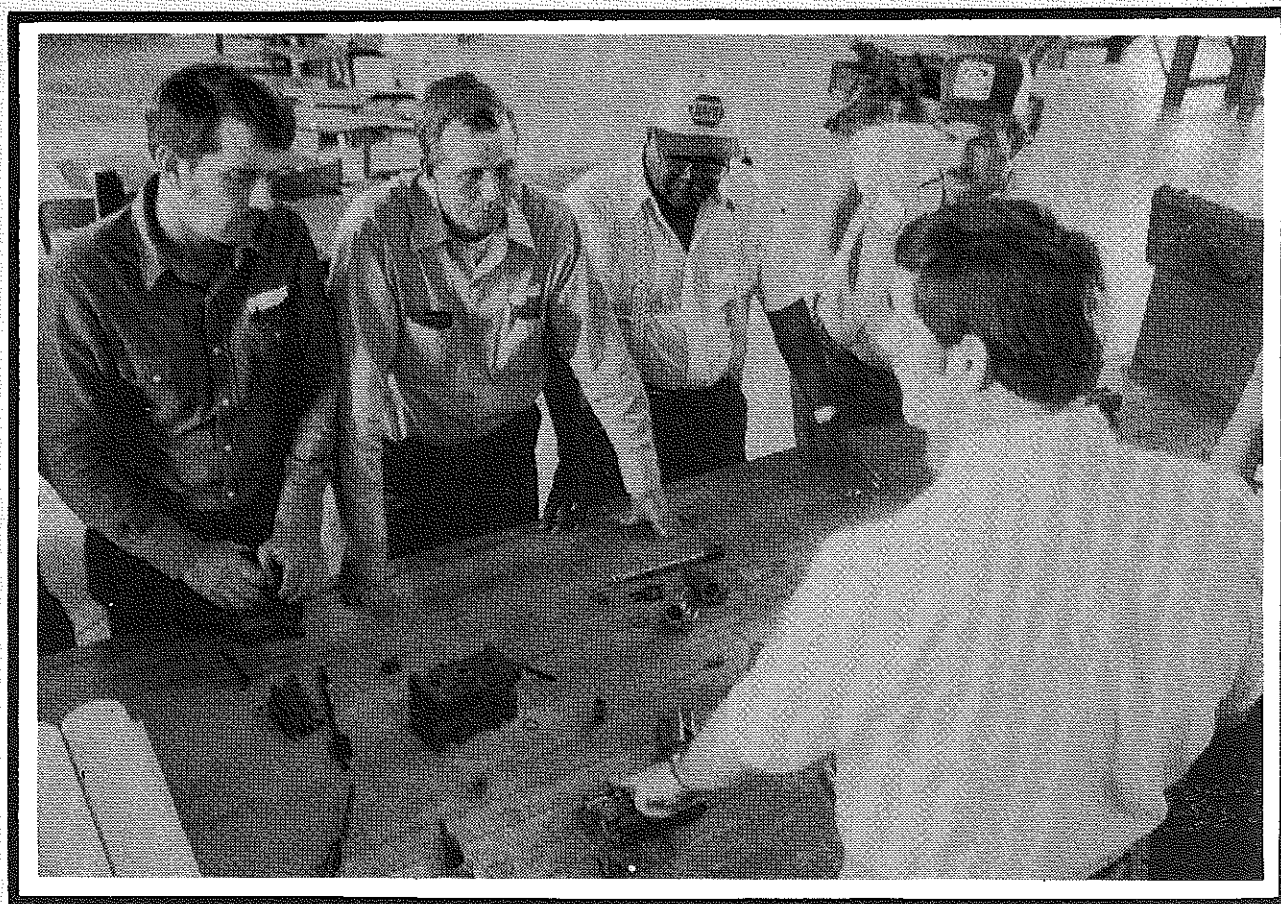


The
**Agricultural
Education
Magazine**

January, 1989
Volume 61
Number 7



**THEME: INVOLVING INDUSTRY
Agricultural Mechanics**

THE AGRICULTURAL EDUCATION MAGAZINE



January, 1989

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

PUBLICATION INFORMATION

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

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

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

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are \$7 per year. Foreign subscriptions are \$20 (U.S. Currency) per year for surface mail, and \$40 (U.S. Currency) foreign 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 (\$2.00 for foreign mail). 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. 73246

A New Beginning

The start of a new year provides the opportunity to adjust our expectations and establish new goals for ourselves and our programs. This edition represents the first effort of a new editor and a new management team for *The Agricultural Education Magazine*. We assume the challenge of upholding the standards established by a highly talented and dedicated group of past editors and agricultural education professionals who have contributed to our professional journal in a variety of capacities. Certainly, the list of authors published in *The Agricultural Education Magazine* reads like a "Who's Who" of agricultural education in this country.

It seems only appropriate that we share with the readership our goals, expectations and yes, even some of our apprehensions as we assume the task of making *The Magazine* the journal of the agricultural education profession. We are apprehensive of being able to fill "the shoes" of Dr. Blannie E. Bowen who has so ably and professionally completed three years of editorship of our magazine. The profession owes Dr. Bowen a hearty thank-you for his editorship.

As the new editor, I have set a few goals which, in some cases, I have been counseled are non-achievable. I hope to make *The Magazine* a publication which you, the readership, will read and react to beyond the theme and list of authors. Our critics often claim that if the theme is not of interest and none of the authors are known, they fail to read further. While we plan to continue the themes and theme articles, future issues will include three or four feature columns. The feature columns have been expanded to include: International Agricultural Education; Teaching Tips; Instructional Materials; Agricultural Mechanization; Computer Technology; Computer Software; Report of the National Council; and Book Review. A talented and creative group of writers within the profession have agreed to assume responsibility for the feature columns. Their assignment is to keep the profession abreast of new developments and share philosophical considerations as they apply to their columns. The special editors for the feature columns are shown on the facing page.

Another change in management includes the duties of the regional editors. Regional editors will continue to work with and advise the editor on themes and promotion of *The Magazine*. They will also serve as theme editors of at least one issue, thus becoming actively involved in the production of *The Magazine*. These individuals are listed on the inside front cover and would appreciate your suggestions for enhancing the publication.

Perhaps our biggest challenge and most earnest sought goal is to get some reaction from you, our readership. As you read the feature columns or theme articles, please let us know of your reactions and suggestions. We hope to develop a dedicated readership who will interact with our



BY PHILLIP R. ZURBRICK, EDITOR
(Dr. Zurbrick is Professor in the Department of Agricultural Education at The University of Arizona.)

writers. As editor, I hope to receive more than one letter to the editor and hopefully one or two that are supportive and positive in nature.

The Magazine has been criticized by some for not including articles written by secondary agricultural teachers. Past editors have worked diligently to encourage more articles written by grass-roots teachers. While a continued effort to this end has been undertaken, the editor's philosophy is first find good writers regardless of position in the profession and give them the latitude to select and write on subjects of perceived concern and importance. Here again, you, the readership, can help the writers address subjects of concern to you. It is only through a cooperative team effort of our readership, special editors, theme editors and writers that *The Agricultural Education Magazine* can survive.

The January theme was suggested by Dr. Glen Miller, University of Arizona, who was asked to serve as theme editor. Dr. Miller is concerned over the often reluctance or failure of educators to involve industry in our educational programs. As you read the articles written by both industry representatives and teachers, it is obvious that help is most generally available for the asking and that such cooperation "pays off" in a variety of ways. Ways that strengthen educational programs; help teachers do a better job; and expand the students' opportunities. Industry input helps assure that the instructional program is correctly focused and provides some product recognition for the industry. Industry involvement is a simple and easy way to enhance education programs.

About The Cover

Vocational agriculture teacher involved in a workshop jointly sponsored by Mississippi State University and Mr. Allen James, Service Representative with Ford New Holland, Inc. profit from the cooperative involvement of industry and education. Mr. James is author of one of the Theme Articles in this edition.

Partnerships for Excellence in Agricultural Mechanics

Teaching the theory and providing the practice of agricultural mechanics is a critical part of vocational agriculture, post-secondary education in agriculture, and agricultural education programs preparing vocational agriculture teachers. Studies show that as much as twenty-five percent of the typical vocational agriculture curriculum should be dedicated to agricultural mechanics.

Even though for some programs the nature of agriculture is changing, the majority of the principles of agricultural mechanics that have been appropriate for production agriculture are equally appropriate for new emerging areas of agriculture. New applications need to be found as programs move from production competencies to urban related competencies.

The bottom line is that production or urban, the challenges of providing industry current application for students in agricultural mechanics course work still exists. Few programs can afford the investment in equipment necessary to provide quality experiences. Few teacher education programs are adequately staffed or prepared to provide all of the in-service agricultural mechanics necessary to keep secondary teachers current. Where do we turn? We turn to the traditional employer of our product, the agricultural mechanics industry.

This issue of *The Agricultural Education Magazine* is intended to explore some of the problems and solutions in involving industry in agricultural mechanics. To explore the issues, authors were invited to contribute, representing vocational agriculture programs, post-secondary agricultural mechanics programs, agricultural mechanics related industry, and teacher education in agriculture/agricultural mechanics.

Read on!! The issues are here! Industry is pointing to a future with growth in lawn and garden, nurseries and landscaping, and food processing. Industry is saying curriculum should never be developed for more than a five-year span. Industry is concerned that colleges and universities have become "walled in" by tradition and are not providing for knowledge of the basic sciences, work ethics, or truly transferrable skills. Industry sees graduates of our programs



By GLEN M. MILLER, THEME EDITOR

(Dr. Miller is an Assistant Professor in the Department of Agricultural Education at The University of Arizona.)

as too oriented toward design with no practical application. They see graduates who are "know it all's", thinking they have reached the end of the learning cycle when they complete their formal education. But industry sees another side as well, one of a renewed partnership to meet the needs of all. They are saying it is up to teachers to take the initiative and make the partnership work.

The vocational agriculture teacher perspective sees the value of advisory committees in building ties with industry. Teachers are concerned with the low entry level wages offered by the agricultural industry and the alternative higher wages that attract students away from their area of specialization. Teachers of agricultural mechanics are also concerned about the trend in the profession represented by those teachers with anxiety about teaching agricultural mechanics. Teachers with agricultural mechanics anxiety tend to drop it from their curriculum. Is this due to a lack of adequate preparation of teachers at the university level, a lack of in-service, a lack of curriculum materials, or a failure to develop partnerships with industry which would result in expertise and confidence?

Secondary programs, post-secondary programs, university programs, and industry are proud of the ties they have developed. Industry supports national contests and scholarships at secondary and post-secondary levels that benefit countless students. These very visible efforts are productive and important. The underlying need is to utilize the industry - education partnership at the secondary, post-secondary, and university level with equal effectiveness. With an effective partnership, the future of agricultural education and agricultural mechanics is bright.

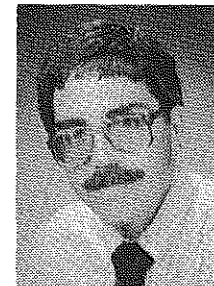
Computer Technology Resources

Sensing Technological Change

During the coming months you will begin to sense the change in *The Agricultural Education Magazine*. This change is being reflected in a variety of areas, cosmetic as well as content. One of the new features is this column, *Computer Technology Resources*, written by W. Wade Miller, associated professor of agricultural education at Iowa State University, Ames, and Nat Jaeggli coordinator for the California Agricultural Education Computer Network, University of California Davis. We will attempt to offer insights into the latest in practical computer technology for the agriculture classroom. Dr. Miller has taught both in-service and pre-service courses in computer applications in agriculture. For the past six years he has also researched the areas of computers and their use in agricultural education. Mr. Jaeggli has a background in agribusiness, application programs, agricultural education, and is an educational microcomputer specialist.

The results of the first national assessment for computer competence conducted by the National Assessment of Educational Progress (NAEP) found that most U.S. students remain illiterate with respect to the usage of computers. Access to computers at school and at home was too limited, curricula at school had not changed to make effective use of computers, and teachers were inadequately prepared to teach computers. "Except for word processing, students generally scored poorly on questions dealing with computer applications." The survey identifies the problem that for too long computers have been taught as machines and programs and not as a process; the final product of that process is effective communication.

The issue of the study is computers but the implication for us is how well prepared our agriculture students will be for jobs or for continued education beyond high school. The revolution of microcomputers in the 70's and 80's in the workplace and in schools is also a revolution in the way we communicate with one another. The written word has continued to grow more important the last few years, not less, and the volumes of information required for minimum literacy continue to expand. Our high school agriculture/FFA programs have long recognized the importance of developing communication and leadership skills. It is important that we continue that tradition by providing our students with the skills necessary to use the computer as an effective communication tool. Opportunities to support the role of computers in the agriculture program continue to



BY W. WADE MILLER AND NAT JAEGLI, SPECIAL EDITORS
(Dr. Miller is an Associate Professor in the Department of Agricultural Education, Iowa State University; Mr. Jaeggli is Coordinator, California Ag. Ed. Computer Network, University of California-Davis.)

expand. Network services are constantly being improved; work continues on several automated record book programs, and computer application contests are being offered more often.

How does an instructor involved in such a complex and varied business as agricultural education maintain a sense of technological reality as "change" continues at an unprecedented pace? One solution is to ignore the changes and continue to teach agriculture as we have in the past. Another possible solution is to become a specialist maintaining technological competence at the expense of other more general areas of interest. The nature of our jobs, however, requires that we be generalists maintaining a high degree of competence in many areas of agriculture. The goal of the authors in the coming months is to tap computer and communication specialists to generate the information that you, the professional agricultural educator (the generalist), needs to effectively and efficiently perform your job, the education of students in agriculture. We plan to take a look at topics such as: computer networks, remote database services, telecommunication services, upgrading and expanding computers, selecting computer hardware, computer resources and publications, and hardware/software security. We invite you to look here this coming year for insights into the use of computers in high school agriculture programs.

Involving Industry in Agricultural Mechanics — An Industry Perspective

We have been a society in a state of rapid change since World War II, and the rate of change seems to be accelerating with each passing year.

We have changed from a highly agricultural society, with nearly 30 percent of our people involved in agricultural production to a highly industrial and commercial society. This rapid state of change has been particularly evident in our rural communities in the last few years. Most of rural America is no longer dominated by agricultural influences — there is a combination of agricultural, industrial, and commercial influence at work in most of rural America.

Consequently, the career opportunities for our rural young people are no longer strictly agricultural in nature, and we should no longer be training large numbers of our young people for traditional agricultural careers. However, that is not to say that there are no opportunities for careers related to agriculture and agricultural mechanics. There are some segments of agriculture that are growing as the economy and population grows, such as:

- The Lawn and Garden Industry
- Nurseries and Landscaping
- Food Processing

And there has been rapid growth in the part-time and hobby farmers in our more industrialized areas and areas of concentrated employment. The affluence of this group of farmers adds to the economy and job opportunities.

So there are career opportunities for those with agricultural and agricultural mechanics training, but they are not necessarily in the traditional sense, the commercial production of crops and livestock.

Industrial and Commercial Change

The changes taking place in industry and commerce are just as dramatic and rapid as those occurring in agriculture. The loss of our high paid factory jobs (the smoke stack industries) has caused great economic and social stress in some areas. Today, there are growing areas of opportunity for our young people, but they are not in the traditional high paid factory jobs. Those areas of growing opportunity are:

- **The Service Industry** — with the phenomenon of two plus wage earners per family, the typical family needs and can afford all kinds of services, from house cleaning to servicing of their two plus automobiles. The so-called "service industries" will continue to grow in the years ahead and a young person possessing some mechanical skills could really "cash-in" on this career opportunity.

- **Government (Local, State, and Federal)** — In spite of the political rhetoric to the contrary, there has been rapid expansion of career opportunities in government. As our



BY MARION O. MORGAN

(Mr. Morgan is Marketing Manager, Butler Manufacturing Co., Kansas City.)

population grows and demands more government services, career opportunities in government will also grow.

- **Transportation Industry** — the growth of the transportation industry is directly related to gross national product. As the gross national product grows, the transportation industry must grow to support it.

- **Recreation** — We have more time and more money for recreational pursuits than ever before. The total recreational industry will continue to grow and most of this will be in rural areas. Travel, boating, fishing, hunting, etc., all bring dollars into our rural economies. Businesses supporting these recreational pursuits are service oriented and involve mechanical skills.

- **Construction Industry** — With our continued population growth and the growth of our economy, the construction industry will grow - roads, bridges, housing, factories, stores, etc. Much of this growth will be in rural areas. Construction has always and will always require mechanical skills.



Exterior view of combination farm shop and machinery storage building.

Work Has Changed

The way our work is done has changed as rapidly or more rapidly than the other changes previously discussed. The use of robotics and computer driven machinery necessitates that the work force be more technically skilled than ever

before. Technicians and engineers are needed right on the factory floor.

The work force has changed. Females and minorities are an ever increasing factor in the work force.

The work ethic is changing - not necessarily for the better. There is a real need for skilled workers with old tried and true values - the willingness to work, to give a full day's work for a fair day's pay. Schools and colleges, and particularly the vocational schools, can nurture and foster this work ethic.

How To Keep Pace

The rapidity of these changes strains both industry and our educational system to keep pace. An educational institution cannot design a curriculum for longevity. The curriculum must be designed for five years or less, with frequent review within the five year planning period. This is where industry can play an important role in our vocational educational system. A joint effort of industry, commerce and vocational education working together can plan curriculums and training that will meet the changing needs of our young people.

What Industry and Commerce Can Provide

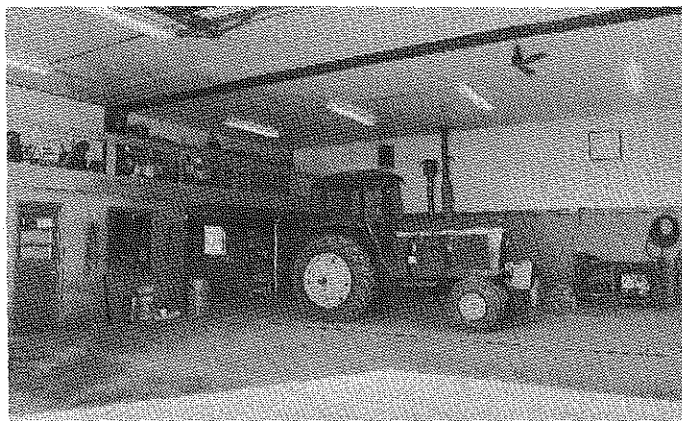
Industry and commerce can play an important role in working with vocational training advisory boards to provide advice and counsel on:

1. industry's changing needs.
2. long term and short term directions.
3. the latest "state of the art" views on mechanical, electrical, and hydraulic applications in industry and agriculture.
4. attitudes, work ethics, and skills required of new employees.
5. the "real world" perspective. Schools and universities tend to get walled in and isolated from the real world. This can cause "student shock" when students enter the "real world" environment.

Industry can also play a vital role in direct and indirect assistance through:

1. Research and study grants.
2. Providing instructional materials on appropriate subjects. All manufacturers of products and providers of services are involved in training owners and users of these products and services. Most have good owners' manuals and/or videotape instructions. These materials can be helpful in the high school or college classroom for resource material, special projects, and even classroom instruction.

For example, a modern, well-equipped farm shop is an essential part of a good farming operation today. Sample Farm Shop Plans and booklets on Design of Farm Shops can be useful classroom materials.



Interior view of a modern insulated, heated, farm shop.

3. Sponsoring contests that will add some zest and spark to high school and college instruction, i.e., the National Agricultural Mechanics Contest.

4. Industry, commerce, and commercial agriculture can work with our educational institutions to provide a "real world" laboratory program through summer and after hours supervised work programs.

"What Education Can Provide Industry"

High schools and colleges with agricultural mechanics curricula can provide industry with a valuable resource - a pool of qualified technicians and professionals. Industry needs people with the proper background and work habits, specifically, individuals with:

1. Knowledge of the basic sciences. Industry can train people for the special occupational skills unique to that industry, but not the basic sciences involved in those skills.
2. A good work ethic, who are motivated employees.
3. An agricultural background. A farm background makes for a good employee in many occupations, but it is vitally important in commercial agricultural pursuits.
4. Mechanical skills that are transferrable to other jobs and functions.
5. A broad perspective, many skills versus no skills or only a few skills.

Summary

It is a real "back to our roots trip" to sit around and reminisce about the good "ole days." However, that will not get us anywhere in this modern, changing world. Like it or not, we are living in an era of rapid change in America. This creates some real opportunities for our youth who have the basic science background and skills to compete. Industry, commerce, and vocational programs working together can train and prepare our youth to compete in this changing world.

Announcement

Anyone interested in reviewing books for the Book Review Column, please contact:

Dr. David Howell
Department of Vocational-Technical & Adult Education
Pettee Hall
University of New Hampshire
Durham, New Hampshire 03824-3599

Involving Industry in Agricultural Mechanics

Involving industry in agricultural mechanics must be based upon an understanding of the needs of industry. The driving force for industry's involvement in the educational process is the requirement for qualified, profitable new technicians for the dealers service departments. Industry is composed of dealers and manufacturers. Each group has unique resources they can contribute to your program.

Industries' Needs

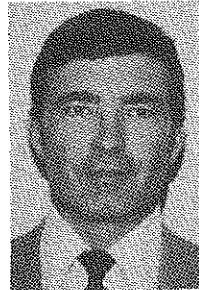
Dealers are always in need of qualified technicians who are profitable to the dealership. A profitable technician is one who is equipped with both technical information and the experience to apply it in a work situation. No new employee will be profitable when hired, but the better his educational background the more quickly he will become profitable.

Manufacturers are interested in having satisfied customers who are loyal to their products. In order to accomplish this they must have dealers who are able to provide the excellent service necessary for customer satisfaction. Manufacturers develop training materials and conduct training schools to provide technicians with the information and experience necessary to provide the customer service required for success of both the product and the dealer in the marketplace.

As a service representative, I have been involved in helping dealers find qualified new employees and in training dealer technicians. Dealers in my area found that the majority of graduates of agricultural mechanics courses were poorly prepared in several areas. First of all, they had received training as if they were to be design engineers with little or no practical application of that information. For instance, I recall a young man telling me why the design of one of our most successful products was all wrong. He was not profitable or even trainable until his attitude changed. Secondly, they tended to be arrogant, "know it all's" who thought that their education was complete and finished. Third, they were unwilling to work and wouldn't even show up regularly. Because of these experiences I was ready to do something to help improve the quality of agricultural mechanics programs.

Education's Need

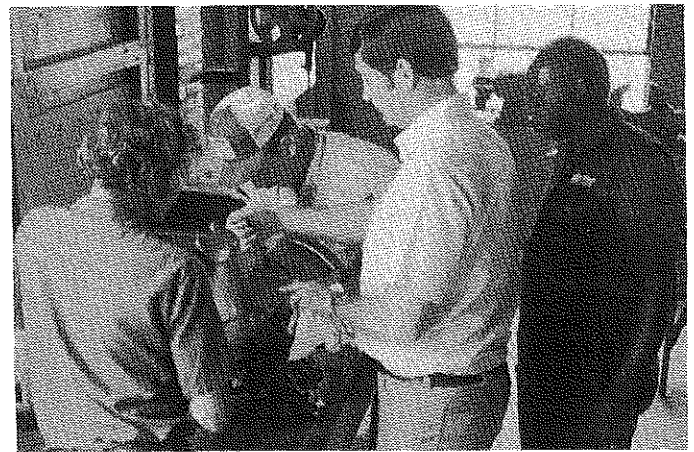
About 1980, I was invited by Dr. Glenn Shinn, Professor of Agricultural Education, then at Mississippi State University, to assist in a workshop to train instructors how to disassemble, rebuild and start the engines of the Ford powertrains which had been sitting unused in their school shops. I learned that most of the instructors were afraid to use the powertrains in their programs because they lacked the practical experience and confidence necessary to enable them to properly teach their students. The participants in that first workshop were enthusiastic and the academic results achieved by the students the following year were excellent, en-



By ALLEN JAMES

(Mr. James is a Service Representative with Ford New Holland, Inc. Clinton, Mississippi.)

couraging both them and us. Since that time I have participated in a workshop of some type every year.



Allen James, Ford-New Holland Service Representative conducts workshops for teachers and technicians on current model agricultural hydraulics. These workshops provide interaction between education and industry to discuss training needs of students and continued education of workers. (Photo courtesy of Glen C. Shinn, Clemson University.)

I have assisted in other workshops covering other components of the drivetrains and in short courses on other topics. Dr. Shinn and I developed each of the programs to provide the instructors with both theoretical and practical experience with our products. For instance, one year we were able to take a class of teachers to our North American Training Center in Memphis, Tennessee and let them get practical experience operating and adjusting tractors and various implements.

Results

I can also report that the dealers in Mississippi are happier with the quality of graduate they are now able to hire. The training the instructors have received has enabled them to attract better quality students. I define the goal of agricultural mechanics training as providing students with the technical information required to diagnose problems and follow instructions coupled with practical experience.

Diagnosis requires knowledge of both theory and the details of the equipment to be repaired. Following instructions means the ability to obey instructions and to continue his/her education by reading and following written procedures whether they are the dealers or from a repair manual. Practical experience entails learning basic skills such as use of torque wrenches, welding, light fabrication, and completing actual repairs. A graduate with this background who is eager to learn the specifics of the equipment he/she is responsible for and willing to produce a day's work is the ideal new employee. This is the ideal that we are working for and achieving in this state.

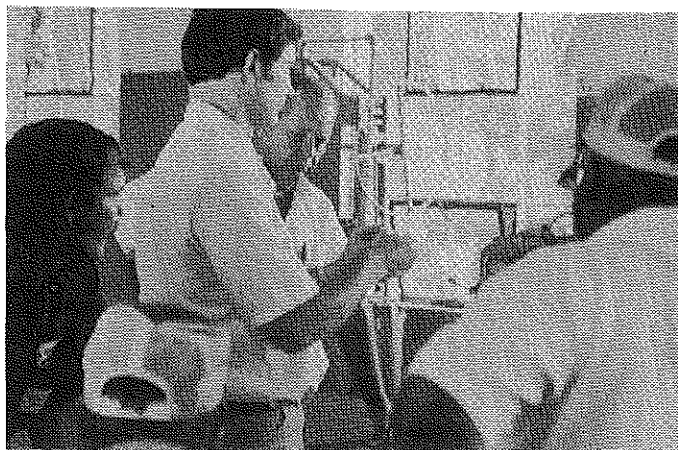
Gaining Involvement

The involvement of industry in your program will require initiative on your part. For instance, had Dr. Shinn not contacted my company I would have never become involved in the agricultural education program in Mississippi. Both dealers and manufacturer's representatives have responsibilities which fully occupy our time and we have limited resources to offer to you. We are interested in assisting you if you inform us of your needs and if you work with us.

In my opinion, the best use of manufacturer's representatives such as myself is in training instructors. We can assist best by teaching seminars and short courses designed specifically for instructors by the university agricultural education department. Instructors can also benefit by participating in scheduled manufacturer's training programs which we provide for dealer technicians. Training instructors on specific current products in these programs lets them learn what skills and training will be expected of their students when they enter employment as well as equipping them to teach those skills. Please recognize that we are experts concerning the equipment we sell and that our material will be specifically related to that equipment. The presentation of specific, product related information creates interest for students by removing it from the abstract and placing it into the area of relevant and useful.

You can expect us to be factual and fair if you properly communicate your goals. I recognize that there are differences between individuals and that you have a responsibility to know the industry person you wish to use as a resource person. Developing a working relationship with the resource person is important. If you are willing to invest the time and effort into developing such relationships, it will pay dividends. You must realize that we are also investing our time and effort toward a common goal. We can impart to your instructors information, training and experience with actual products which are not available from any other source. Your instructors will then be able to give their students an education which will be valuable to them in successfully pursuing their chosen career. We can also provide limited assistance to local programs but the major assistance will come from local dealers.

Local dealers can provide equipment for use in the local program such as new tractors or implements to set up or used equipment to recondition. The extent to which the dealer will be willing to entrust his investment in new or used equipment to your program depends upon your relationship and reputation with him. It is of utmost importance that the quality of work performed by the students be ex-



The proper demonstration of repair procedures both instructs and increases student interest. (Photo courtesy of Glen C. Shinn, Clemson University.)

cellent. This means being certain that each repair or project is properly completed before it is released. This is possible if the instructor has been properly trained and seeks assistance with problems beyond his experience. The seeking of assistance by the instructor is a valuable part of the education of his students which prepares them later to be willing to get the required information. Attempting repairs without the required information results in wasting time and money. Dealers can put the instructor in contact with a manufacturer's representative when they are unable to provide the information the instructor needs. Instructor efforts in this area will provide teaching material and contact with local employers that will assist students flow into jobs in the local community.

Future Involvement

While I do not consider that we have reached the fullness of what is possible in involving industry in agricultural mechanics education, the results of this involvement have been good. Dealers in Mississippi have stopped complaining of the quality of the graduates that they hire. This improved quality is due to two factors. First, the upgraded teachers are equipped to provide relevant training. Second, the quality of student has improved because they perceive that the training they receive is worthwhile and useful to them.

Training technicians after they are employed is very expensive to the dealer because not only does he have to pay the technician's salary and travel expenses while at school, but he also loses the income that would have been generated by the technician's work. This expense coupled with a high turnover rate for new employees causes most technicians to miss valuable manufacturer training.

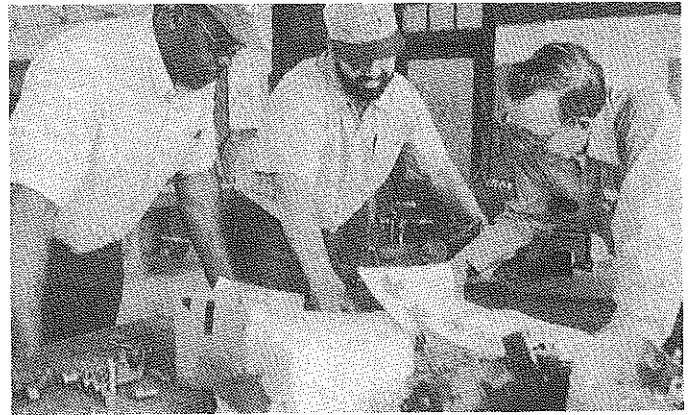
As the quality of training by schools improves, industry schools will be able to focus more quickly and precisely on the unique design features and procedures for their equipment. Such schools will be shorter and more easily held locally allowing nearly every technician to attend. Less time will be spent teaching basics that are now being taught in industry schools. This development will reduce the dealer's expense in bringing a new technician's competencies up to a profitable performance level.

(Continued on Page 10)

Involving Industry in Agricultural Mechanics

(Continued from Page 9)

As we look to the future, there are three areas in which we can improve the relationship, cooperation, and performance between education and industry. First, industry needs to assign a higher priority to giving teachers the training and the access to information necessary to teach current and relevant material in areas in which proficiency is required by their graduates. In my opinion, the best way to accomplish this is to involve teachers in technical schools provided for dealer technicians. This will require that the schools make provision for teachers to attend such training which is usually held during the winter months. Teachers attending such schools are exposed to the latest information and techniques in which their students need to be proficient. In addition, special programs and short courses tailored to the needs of teachers such as the power train workshops should be held regularly. Second, educators need to utilize the training materials that manufacturers have developed. In my experience, industry is willing to provide whatever is requested. Manufacturers need to streamline the process for providing information to educators. Cataloging the materials available and providing an easy process for ordering materials is needed. Third, students should attend manufacturer's field training programs at least once before they graduate. Instructors who have had students attend such courses report that the students were surprised (shocked might be a better word) at the fast pace of these schools. This exposure should be accompanied with supervised work experience by the students in the business world. Students



Two Mississippi Vocational Agriculture Teachers discuss hydraulic troubleshooting procedures with a Ford-New Holland Technician. This discussion helps each party better understand training needs and opportunities. (Photo courtesy of Glen C. Shinn, Clemson University.)

who have experience with local businesses tend to flow into employment upon graduation.

Summary

The key to involving industry in agricultural mechanics training is the development of relationships between educators, manufacturers, and dealers. Once sound relationships have been established, industry involvement and enhanced agricultural mechanics education will naturally result. It has been said that "you have not because you ask not." As I said earlier, take the initiative and share your dream with the dealers and manufacturers in your area and industry will respond with their best to help accomplish those dreams.

FEATURE COLUMN

Teaching Tips Venn To Leave No Doubt

The results of your latest exam are in. Your students inadequately responded to your essay that required them to compare and contrast. Most responded to the question by defining each group; no one really analyzed the groups for similarities and differences. What can you do to help your students "move up" to the level of thinking necessary for comparing and contrasting?

Through visual representation, you can help respond more effectively to high order questions. The Ven Diagram is an excellent way to demonstrate the process of comparing and contrasting.

Before using the diagram, remind your students that when they are asked to compare objects, items, ideas, etc., you are asking them to look for similarities between or among those items. Similarly, note that when you ask them to contrast those same objects, items, or ideas, you are asking them to look for the differences between or among the items.

If your students haven't had much experience in using visual representations, you might want to introduce the technique with unrelated content — compare and contrast

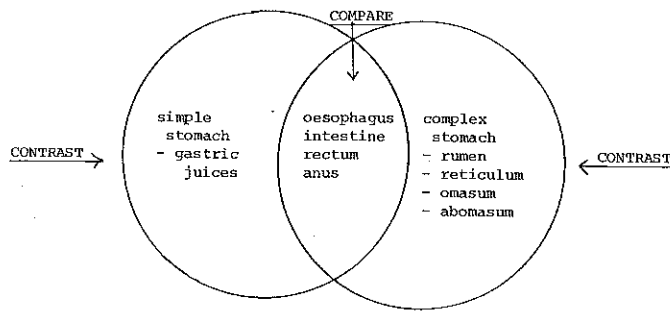


By ROSE JONES, SPECIAL EDITOR
(Dr. Jones is Special Editor for Teaching Tips.)

pinball machines and video games; compare and contrast "21 Jump Street" and "McGyver"; compare and contrast adding machines and hand-held calculators.

The Process

1. Draw a circle for each item, idea, etc., to be compared-contrasted (two groups work best).
2. Overlap the circles (see diagram). The intersection represents the comparison (similarities) and the outer portions represent the contrast (differences).



Example (Over-simplified!)

1. Compare and contrast ruminant and non ruminant digestive tracts.
2. Solicit responses for the contrasts. Solicit responses for the similarities.
3. After the lists of characteristics have been exhausted, ask the students to summarize what they have listed within

the diagram, steering them away from purely definitional responses.

4. Sometimes students have difficulty using the correct words that we associate with comparisons and contrasts. Explain and show them that some words in the English language cue the reader to comparisons and contrasts. Your list might include such words as:

Comparisons

- Similarly
- Likewise
- In a like manner

Contrasts

- Although
- However
- Yet

English textbooks have lists of such words. Look in the index for "connectives" or "coherence."

An evaluation of the procedure's effectiveness can come at examination time. If the technique has been mastered and the subsequent discussion has enabled students to elaborate on the results of their diagrams, you should notice that more and more of your students are able to satisfactorily respond to compare and contrast questions.

FEATURE COLUMN

The Council

A Question and Answer Perspective

Since the inception of the National Council for Vocational and Technical Education in Agriculture (The Council), many questions have been raised concerning its purposes, activities and reasons for existence. This article is the first in a series of articles attempting to answer many common questions concerning the past, present and future of The Council.

1. **What is the purpose of The Council?** The purpose of The Council is to provide the agricultural education family with an effective mechanism to identify priorities related to agricultural education and to develop procedures to seek and secure resources to address them. This is the essence of what is meant in the following stated goals of The Council: The Council's goal is to provide leadership that highlights futuristic planning designed to; *Stimulate Creativity, *Develop Fresh Initiatives, *Create a Climate for Renewal, *Emphasize Improvement of Successful Programs and the Development of New Programs of Vocational Technical Education in Agriculture.

2. **Isn't that the function of the U.S. Department of Education?** Yes. However the U.S. Department of Education (USDE) resources are severely limited. Historically, there have been as many as 12 staff persons specifically assigned full-time with agricultural education responsibilities. Currently there are two Program Specialists in agricultural education. Due to scarce time and financial resources of the USDE, major national efforts specific to agricultural education have been spread among existing agricultural education professional and student organizations. Because of the resource base of the National FFA Organization, many national thrusts have become a part of the staff responsibilities associated with FFA programs.



BY JOHN POPE AND LARRY CASE

(Mr. Pope is Executive Assistant to the Chairman, The Council; Dr. Case is Chairman, The Council.)

3. **Therefore, if FFA has the resources why not let the FFA board and staff address national ag ed concerns?** FFA is and will continue to support national efforts through its new and continuing programs. However the scope and resource base is not broad enough to address all the national issues of agricultural education when you consider the needs of the total program (kindergarten through adults). This involves the development of new curriculum and program emphasis as well as teacher training both pre- and in-service education. Historically the leadership in agricultural education has resisted the idea of the FFA organization taking full responsibility for the policies and direction of the program. In addition The Council is a mechanism to bring the total agricultural education family together to coordinate a total program thrust which also involves business and industry.

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The Council A Question and Answer Perspective

(Continued from Page 11)

4. Is there a real need for the national level leadership to address priority concerns? Isn't that a state and local function? The answers are yes and yes. The Congress of the United States has provided vocational education legislation and funding since 1917. Federal presence in vocational education has been established and will most likely continue in the future. Education is a function of the states, however, states look for help in coordinating education efforts and being in tune with national concerns. The report, *A Nation at Risk*, is an example of how Federal influence can impact on education. The Council has no authority to mandate change, however, it is in a position to manage the information and programs for the agricultural education family and others. This will influence directions and will provide the mechanism for related organizations to better understand where and how to allocate their resources to maximize their benefits and thus increase the total effectiveness of agricultural education. Without this influence the total program lacks direction and individual organizations and persons are not as effective.

5. But, why should we have a Council now? Indicators are showing that the foundation of agricultural education is eroding. In secondary education, the number of students enrolling is declining faster than the total student population and the number of chapters is down. FFA membership figures are the most reliable indicators of trends in the second-

dary program. The membership has declined from a high of 509,735 in 1976-77 to the current membership of 416,663 in 1986-87. The 1987-88 membership as of 6/22/88 is 404,324. In 1981 there were a total of 8276 chapters. In 1987 there were 7867 chapters.

6. So, how does The Council work? The Council is operated by the policies set forth by the Board of Directors. The individuals serving as directors are recommended to The Council from the related organizations. The Council has just implemented an organized process to seek priority concerns from all national agricultural education organizations. This process will continue to be refined and will most likely be expanded to include state level agricultural educational leadership and more agricultural business groups and organizations. After the input is processed, the priority concerns will be the basis of a program of work for The Council, and should influence the directions of the related organizations.

The work of The Council is accomplished through the establishment of task forces/committees, appointed by the board, charged specifically to study, investigate and formulate recommendations concerning a specific concern. Each task force has or will have a manager appointed by the Board of Directors.

The day to day operations are managed by a central administrative office which is currently located in the National FFA Center in Alexandria, Virginia.

In the next article of this series the current and future projects that are impacting agricultural education will be discussed.

THEME

Relationship Between Industry and Agricultural Mechanics — High School Teacher's Perspective —

First, let me tell you where I'm coming from. In the Santa Maria Valley on the central coast of California, agriculture is a multi-million dollar industry. Fresh vegetables, cattle production, and a multitude of agricultural businesses support this small community.

Our FFA is 278 strong with 387 students moving through the total program daily - almost half are involved in the agricultural mechanics program. The agricultural mechanics curriculum includes: safety, tool identification, tool sharpening, plumbing, electricity, surveying, woodworking, welding, farm power and machinery, fabrication, small engines, manual reading, record books, FFA, and computer applications.

Problems

The problems we face are not very different from any other high school in California. We try to place students in agricultural-related jobs with their high school skills or encourage them to go on to two- or four-year college pro-



By T.W. (JEFF) JEFFERY

(Mr. Jeffery is teacher of Agricultural Mechanics, Santa Maria High School, Santa Maria, California.)

grams. Making agricultural mechanics students employable immediately after high school has been a personal goal of mine throughout my teaching career. In the area of welding, the problem is not too difficult; however, placing them in other agricultural mechanics areas is definitely a challenge. Twenty years ago, a well-rounded student in basic agricultural mechanics was placed easily into related industries. Now with the technical changes and advances we have had, it is more difficult to place students as they need more ad-

vanced training. We have tackled the problem by relying on industry to take a more active part in the training of our students. Our most successful approach is through on-the-job training at a part-time level during the junior and senior years. In addition to this, our local agricultural industries continue to send new equipment for us to assemble and materials to use. Industry has certainly taken an active role in assisting our program. Businesses from all areas — oil companies, welding, and agricultural related companies — support FFA.

One problem is the old "farm boy" mentality that holds a students from the farm can be easily directed into a related trade. This is not a reality as the few "farm students" we do get tend to go on to higher education. They often hope to return home more fully prepared for a management position. We are missing these students so we must turn to the ones who are motivated through FFA, contests, and related activities. We must attract students of higher abilities and try to make them aware of the needs of industry and show them challenging careers of opportunity.

Meeting Needs

Meeting student needs is very important; meeting community needs is also important. Using an active advisory committee is a reasonable answer, if not the best. With industries input and direction, we can improve the program by meeting both student and community needs. Although at times it has been hard to change, we have made the effort and things have somehow worked out. More of our students are being placed in the local area than ever before. Our most recent graduate follow-up shows 53.5% of the last three graduating classes are employed in agricultural related businesses in our area. Seven percent are enrolled in a four-year college and 12 percent are attending a two-year institute or training school with the remainder in other occupations.

Nationwide, John Deere Company has made real gains in the area of training mechanics of all ages. Their manuals, books, VCR tapes, and seminars certainly help all of us in the teaching profession. They have been a true leader in technical agricultural training. Our local dealer, Cal-Coast Machinery owner-operator, George Johnson, and his son, Brad, have been no exception as they have taken an active role in training our students for jobs. George feels, "Field agriculture is not following the lead of the supportive agricultural industries." Through on-the-job training and the use of new equipment to use or assemble, we are able to introduce the students to the new technical training they are going to need to succeed. The trainees have been taught manual use, computer ordering, and actual billing of repairs. They have been encouraged to use the service manual and to attend seminars. Training is costly to the dealer but it is necessary to develop qualified personnel who are going to make a career in the field. When a student trainee shows promise, George sits them down and helps them plan a future with his company explaining the opportunities, wages, and benefits. He reminds them that starting at the bottom and working up is the American way; hard work does pay off in the long run.

One of the largest vegetable producers in the Valley, Teixeira Farms, Inc., also does an excellent job in helping to train our students. Many have been there a number of years and



CAL-COAST MACHINERY, INC.

Left to right: Eddie Rich - Santa Maria Program, 8 years with Cal-Coast Machinery, Lead Mechanic on Small Tractors. "Tank" Lillich - Service Manager on the job supervisor of high school students.

are part of their team. Some are in management many are part of the technical work force. Most impressive is the number of students who have remained in their welding fabrication shop. Five of the seven employees are from our agricultural mechanics program. This did not just happen by chance, but rather by opportunity and training. Annually during the last 11 years, Ed Teixeira has taken time to train four or five students. Ed states, "I am proud to have had a part in training these young men. Many have gone on to be valuable employees." The training they receive on site is further complimented by additional skills developed in the high school laboratory. These are just two of the job training sites we utilize. We have other agricultural businesses that are using our students in a similar way. Some are agricultural mechanics related and others are not. This has come about by the continual use of Agriculture Advisory Board and the efforts of the instructor in locating job sites

(Continued on Page 14)



TEIXEIRA FARMS, INC.

Forklift operator for nitrogen temperature control is Ray Bognuda. He is a Santa Maria graduate with 9 years at Teixeira Farms. Arne Olson is night supervisor for freezer operations.

Relationship Between Industry and Agricultural Mechanics — High School Teacher's Perspective —

(Continued from Page 13)

for students. Agriculture Advisory Boards should not be limited to just "Agricultural Businesses" but rather should include any related industry with interest and needs for agriculturally educated personnel. It is very important to use the Advisory group regularly — one to two meetings a year for the large group, and more with the smaller divisional groups.

The relationship of agricultural mechanics programs and industry is limited only by the desire of the instructors to go out and ask for assistance in educating students. Industry wants quality students, but doesn't always pay high wages required to motivate the student to prepare for such a career. Students should not expect to start above minimum wage, but they must have the opportunity to advance on the pay scale. Providing for a family is an important factor in establishing goals and planning for the future.

In California, we have many high school programs which are successful and are placing graduates directly into agriculture or related industry. While all programs are not so successful, I believe the reason is lack of qualified instructors in the area of agricultural mechanics. We are simply not attracting quality agricultural mechanics instructors to the teaching profession at the high school level. It is too easy to drop the agricultural mechanics program or teach it with under-qualified personnel. Industry is having difficulty attracting quality personnel because salaries are not com-

petitive. California high school programs tend to promote occupational experience through on-site job training. Industry has, in most cases, gone out of their way and done an outstanding job in training them. When the student becomes aware of salary and benefit packages, they often look elsewhere for a career in agriculture. This is hurting the agricultural mechanics industry. Through our agricultural advisory committees, we were able to change our program to meet industry's need. Industry has responded by supplying tractors, equipment, and technical information. We have not been able to convince industry of the need to offer a more financially attractive package for technically trained individuals. It is difficult to compete for students when they can double their wages by going to work in a factory or, for that matter, in the field as a picker.

Conclusion

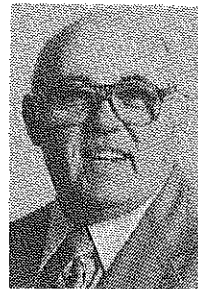
Yes, we do have an excellent partnership between agricultural industries and agricultural mechanics programs in California. We must follow industry's leads and train our students in a more demanding, as well as technical manner. I feel this can be done. Agricultural related industries must offer more to our students in terms of monetary careers or they will lose the essential manpower they must have to be successful. We definitely need more "Indians" and less "Chiefs." We must teach pride and realistic values to our students. We must teach attitudes and work habits, responsibility, and develop pride in the completion of a job. Students are molded by teachers. We must continue to recruit agricultural mechanics instructors who have the desire to establish a helping relationship between their students and industry.

THEME

Something Concrete — Industry and Agricultural Mechanics

The vocational teacher is facing a mounting frustration. The demands of the academic world versus the proficiency of practice. Agricultural mechanics educators must involve both the theory and practice. Most university curriculum committees are finding it easy to eliminate technical subject matter from the list of curriculum requirements. If technical subject matter does survive, the emphasis is on theory with practice being replaced by simulation and demonstrations. The time tested principle from the founding of the land grant institutions of SCIENCE WITH PRACTICE is being strained.

The agricultural mechanics teacher educator faces the same frustrations. The in-service educational challenges include a relevant curriculum, graduate or certification credits, technical subject matter assistance, training site location and modern tools and testing equipment. Pre-service curriculums have forced much vocational training into the in-service mold. The teacher educator must admit that help is needed. The educational facilities are frequently out-of-date at the university, the modern tools and equipment are not



BY W. FORREST BEAR

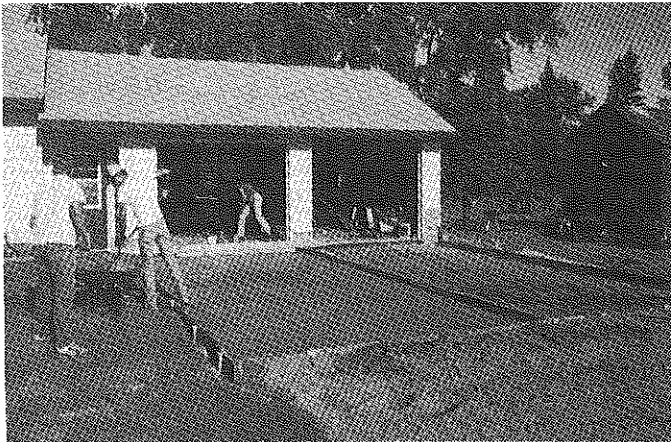
(Dr. Bear is Professor, Department of Agricultural Engineering and Vocational and Technical Education, University of Minnesota.)

available and the teacher educator may be inadequate in mastering the latest technical advancements.

Help is available for better facilities by contacting vocational technical institutes, technical institutes, technical schools and even the local high school facilities. The training sites frequently have the tools and the equipment necessary for the in-service training programs. Technical assistance can come from business and industry. There are associations and other groups within industries who will pro-

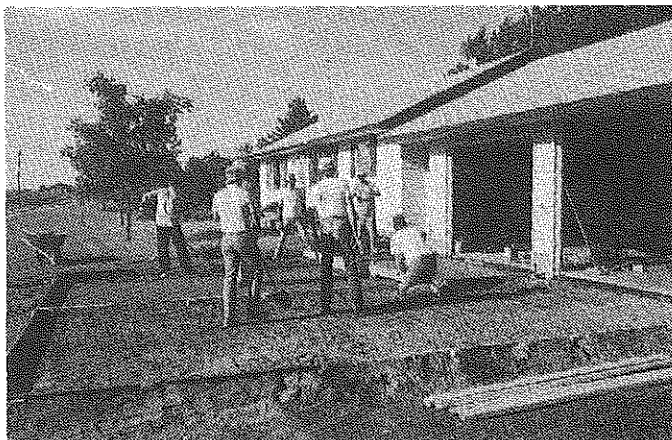
vide assistance and may be found at the local, state, regional and the national level.

As the teacher trainer for agricultural mechanics in Minnesota, I face these challenges daily. Topics for the in-service training programs are selected by the teachers through a questionnaire handled by our agricultural coordinators. Interest indicated in the topics and teacher location directs the future courses and the geographic locations. A workshop entitled Concrete Technology Applications in Agriculture was of interest to teachers in northwest Minnesota. One of the teachers planning to enroll in the class lives on a farm and needed a section of driveway in front of the garage, an entry way walk and a platform outside the back door of the garage. The need for a laboratory activity had been solved and the financing was also resolved.



Elevations have been checked and the forms are in place for the concrete project completed by the University of Minnesota In-Service class on Concrete Technology Applications in Agriculture. (Photo courtesy of Forrest Bear of the University of Minnesota.)

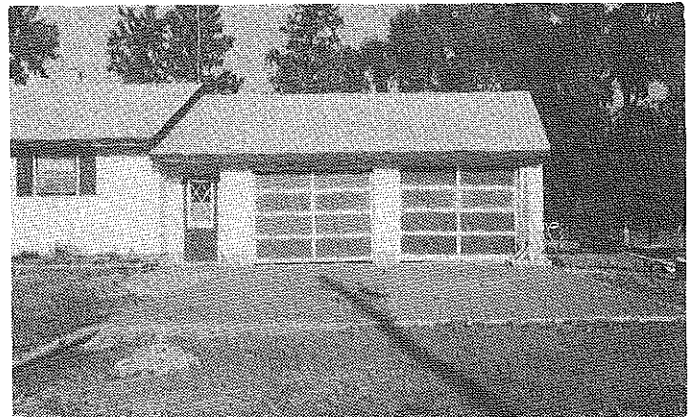
The next task was to obtain technical assistance from the related industry groups. Contacts were made to the: Promotion Director, Aggregate Ready-Mix of Minnesota; Executive Director, North Central Cement Promotion Associa-



Screeding off the base fill to obtain a uniform concrete slab is being done by the University of Minnesota In-Service class on Concrete Technology Applications in Agriculture. (Photo courtesy of Forrest Bear of the University of Minnesota.)

tion; Executive Director, Minnesota Masonry Institute; and the manager of the local Ready-mix plant where the ready-mix was to be purchased. The same technical assistance is available in your state or region but the association names may be different. To find the person to contact you might write the national headquarters for the Ready Mix Assn. and the Portland Cement Assn. The National Ready Mix Concrete Assn. is at 900 Spring Street, Silver Springs, MD 20910 and the Portland Cement Assn. is at 5420 Old Orchard Road, Skokie, IL 60077. The assistance provided for the in-service class included:

- 1) Technical manuals on concrete and masonry.
- 2) One page flyers on correct procedures, special applications and admixtures.
- 3) Video-cassette programs for interest approaches, applications and technical data.
- 4) Tour and explanation of how the ready-mix plant operates.
- 5) Technical manuals on building construction and construction of specific components.
- 6) Brochures on the correction of common problems.
- 7) Supplying a special curing and sealing product.
- 8) Arranging for a commercial pricing break for this educational project.
- 9) Provide an evaluation of and advice for the forming, placing, casting, and curing of concrete.
- 10) Helping with demonstrations on tool use during the finishing process.



The finished project conducted by the University of Minnesota In-Service class on Concrete Technology Applications in Agriculture. The job site was at the farmstead of one of the teachers enrolled in the class. (Photo courtesy of Forrest Bear of the University of Minnesota.)

Listed are the ten reasons which prompted me to seek assistance from industry when planning and conducting the "Concrete Technology Applications in Agriculture" In-Service education program. Science with practice in our agricultural mechanics educational programs is a philosophy that is endorsed by industry. Help is essential and every industry has a "HELPING HAND" which is waiting for you to extend your hand for working together for the training of better vocational teachers and vocational students.

Developing Partners From Industry In Teacher Education Programs

Teacher educators, like other agricultural educators, find themselves with 21 jobs, and a twenty line "To Do List." Parkinson's law states . . . "jobs will expand to fill all available time . . . and you must do three things before you can do the one job which is critical." Time and dollars will likely always be scarce. Teacher educators must continue to learn to manage time and resources more efficiently, and improve program effectiveness. Involving leaders from industry, as partners in teacher education programs is a priority which improves the probability of our success.

Mish (1988:859) defines a partner as ". . . one that shares; an associate or colleague; either of two persons who dance together, and; one of two or more persons in a game against an opposing side." Teacher education needs leaders from agricultural industry who fit into each of these categories.

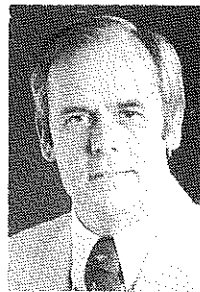
Partners Who Care . . . And Share

Contrary to myth, each state is filled with people who are successful, and want to share their success with others. Vocational agriculture, the FFA, and the university have helped thousands of people become more successful. At some point, many want to repay the institutions and organizations which have given to them. Each patron is unique, just as each student is unique. Because of this uniqueness, each may value certain aspects of our program, and want to become involved with particular activities. Our challenge, as teacher educators, is to listen to their values, and provide ways they can accomplish their goals, while at the same time, accomplishing ours.

As a result of an initial interest in in-service workshops with vocational agriculture teachers, the distributor of Stihl Chain Saws and Power Equipment established a \$25,000 trust fund with Mississippi State University. The earnings of the fund are used for scholarships for agricultural education students with need and merit. This "Patron of Excellence" feels strongly that his success should be shared with others. On the national level, Firestone Trust Fund established an annual \$12,500 scholarship program for postsecondary education of students who excel in the agricultural mechanics contest. These are not unique situations, but each required teacher educators to be proactive.

Developing Associates or Colleagues From Industry

Many leaders in agricultural industry view the university as a prestigious environment where lofty ideas are discussed and long-range goals are determined. We can share this perceived prestige with industry leaders when we truly involve them as advisors in our planning, delivery and evaluation of activities. Given advanced organizers, these partners can bring a rich perspective of community expectations of our program, and a vision of the opportunities for our undergraduate and graduate students. As a "guest



BY GLEN C. SHINN

(Dr. Shinn is Professor and Head, Agricultural Education, Clemson University.)

lecturer," or a "visiting scholar," these leaders bring realistic experiences to the classroom and laboratory. A side benefit is that industry leaders learn some of the limitations of teacher education. Everyone gains from this association.



When the Service Manager and the Technician discuss their concerns with Vocational Agriculture Teachers, everyone is a stake-holder in the success of future employees. (Photo courtesy of Glen C. Shinn, Clemson University.)

Partners Are People Who Dance Together

Dance requires cooperation, articulation, and specified conditions between the partners. If teacher education and agricultural industry are to "dance together," they should accept the same requisites. If industry leaders are to become partners, it is the responsibility of teacher educators to meet them on their turf. We should be willing to cooperate in activities which are beneficial to industry. If chain saw safety, operations, and service are priority activities for in-service education, the chain saw industry may participate by providing excellent technical materials, realia, and trainers who are specialists in solving technical problems.

Everyone cannot do everything. As teacher educators, we can provide the mechanism for articulation among secondary, postsecondary, adult, and university programs. In

Mississippi, twelve key secondary teachers were selected to participate in an in-service training activity in agricultural electrification. They met as a group on the university campus, and developed and used current industry materials. Some of the literature and hardware were supplied by local REC's and the Farm Electrification Council. These materials were then used in each of twelve area locations with peer teachers, and with local adult programs. This "teacher-as-the-trainer" approach provides leverage for teacher educators to accomplish more. At the same time, partners gain a feeling of ownership in the upgrading of curriculum in agricultural mechanics programs.

Communicate expectations and responsibilities. Just as in dance, it is important to communicate expectations and responsibilities. The expectations of both teacher education and industry must be discussed *a priori* to the activity. We must make it clear that, as a university, we cannot endorse products or "hard sell" one design over another. Agricultural industry leaders understand and expect this. It is our collective responsibility to teach a basic understanding of design, and its advantages and limitations. Too, we should teach analysis, synthesis, and evaluation skills in order for vocational agriculture teachers to solve problems under real conditions.

Partners Participate In A Game Against An Opposing Side

Unlike many games, our opposing side is ignorance, apathy, and obsolescence. We live in a rapidly changing environment. Neisbett (1982) predicted a geometric expansion of new knowledge. Today's technology is rapidly changing, and our students will live in a world unlike yesterday. We can gain the same geometric expansion of our resources when we link with agricultural industry.

Some partners prefer local settings where they have business and industry ties. This is an excellent opportunity for local programs to cooperate with training activities. Some partners prefer a state-wide approach, with all of the interaction focused through the university. This is an opportunity for leveraged workshops involving key teachers who can share the benefits with their peers. Some partners prefer regional or national involvement. This is a source which has assisted the National Agricultural Mechanics Committee in the conceptualization and delivery of contest activities and curriculum direction. Each partner has a unique interest, and each can make a unique contribution.

Benefits of Involvement

There are many benefits for agricultural education and agricultural industry. The partner relationship extends limited resources, adds cutting-edge experience, and improves teacher educators' skills and attitudes. The partner provides access to current technology and equipment which simply is not available any other way. With appropriate media coverage, this mutual cooperation improves the image of education with the publics.

Involvement in pre-service and graduate programs. A partner relationship with industry has significant impact on pre-service and graduate programs; bringing state-of-the-art technology in agricultural power and machinery, agricultural structures and electrification, agricultural construction, and soil and water conservation management. We

have felt the excitement of knowing that we are involved in learning "brand-new" technology that we can share with others. Industry leaders can bring that excitement to our students.



Teacher Educators must plan time to discuss future research and curriculum initiatives. This group arranged time during the 1988 Southeastern Region Collegiate FFA Conference in Georgia to discuss how they can work together in cooperative states research. (Photo courtesy of Glen C. Shinn, Clemson University.)

Involvement in research programs. Research in agricultural education is a dynamic response to challenges in the planning, delivery, and evaluation of effective programs. Research should respond to collective societal needs as they evolve. Industry leaders can bring a fresh perspective of the role of agricultural education and its relationships to other research agencies. When industry leaders become active partners in the planning, they also become an advocate for focused research, dedicated time, and priority funding.

Involvement related to in-service programs. In-service programs can be the vehicle to reduce apathy and obsolescence. In-service can be a programmatic effort for teachers, yet involve a broad range of industry in a few activities. As an example, in-service workshops in agricultural machinery may involve an industry partner with a specific machine. Ford-New Holland may assist with a workshop focusing on disc cutting forage harvesters, while Deere conducts a separate workshop on round hay balers. The combinations are almost endless across agricultural industry. Our challenge is to identify the resources and partners, and communicate our program to the industry.

Steps For Increased Involvement

This is a priority job; but it is really quite simple:

1. **Fight stagnation.** As teacher educators, we must be concerned about our own ignorance, apathy and obsolescence. We must continue to learn and grow as our industry changes.
2. **Precisioned inspection.** Like a good vocational agriculture program, we must have a healthy view of our community. We must know what is going on in the industry and be knowledgeable about the problems and solutions.
3. **Seek partners.** We must seek partners who can and will assist with our programs. This involves going to industry, on their own ground, and communicating our program

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Developing Partners From Industry In Teacher Education Programs

(Continued from Page 17)

goals. At the same time, we should seek their opinions regarding importance, timing, and process.

4. **Planned evolution.** We must take the responsibility to involve industry in planning, delivery, and evaluation. This can be a gradual involvement, increasing as we can see that their goals and ours are compatible.

5. **Applaud.** We should follow-up with appreciation. This is more than a thank-you note. Rather, we should communicate the value of their participation to the principle decision-makers in the industry. Everyone likes to share in the success of a job well done.

REFERENCES

- Mish, F.C., 1988. *WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY*. Springfield, MA: Merriam-Webster, Inc.
- Naisbett, J., 1982. *MEGATRENDS: TEN NEW DIRECTIONS TRANSFORMING OUR LIVES*. New York: Warner Books.

THEME

Industry Involvement in the National FFA Agricultural Mechanics Contest

There can be but one basis for justification of an agricultural mechanics contest, that is to improve instruction in the agricultural mechanics area. Dr. Thomas A. Hoerner (Proposal, 1971), Professor of Agricultural Engineering and Agricultural Education at Iowa State University, wrote that statement in 1971 in the proposal to initiate the National Agricultural Mechanics Contest. The first contest was conducted on October 11, 1972 with the Firestone Tire and Rubber Company as the sponsor and the help of sixty individuals representing industry, teacher educators, post-secondary instructors and high school instructors. Although many changes have occurred in the contest during the past sixteen years, two cornerstones remain intact. One, the basic objective of the contest is to improve agricultural mechanics instruction; two, this objective can be accomplished only with the involvement of industry along with the support of dedicated professionals in education. Presently, 125 persons serve on the National Agricultural Mechanics Committee, the organization backbone of the annual contest. Approximately one-fourth of the group represents various agriculture-related industries or governmental agencies including: Firestone Tire and Rubber Company, John Deere Company, Case-IH Company, Deutz-Allis Company, Briggs & Stratton Corporation, Smith Welding-Tescom, Inc., George Electrification Council, Alabama Power Company, AAVIM, General Electric Company, Butler Manufacturing Company, and the USDA Soil Conservation Service.

Technical Support and Advice

The National Agricultural Mechanics Contest (Bulletin No. 4, 1988) is held annually in November at the Fort Osage Vocational School near Blue Springs, Missouri. This activity is held in conjunction with the National FFA Convention. The three major phases of the contest consist of a written examination (90 questions), six problem solving activities, and performing six skill demonstrations. Preparation for all of these activities actually begins in January when the committee of industry representatives and educators from around the nation are asked to submit ideas for the specific phases of the contest.



BY VICTOR BEKKUM

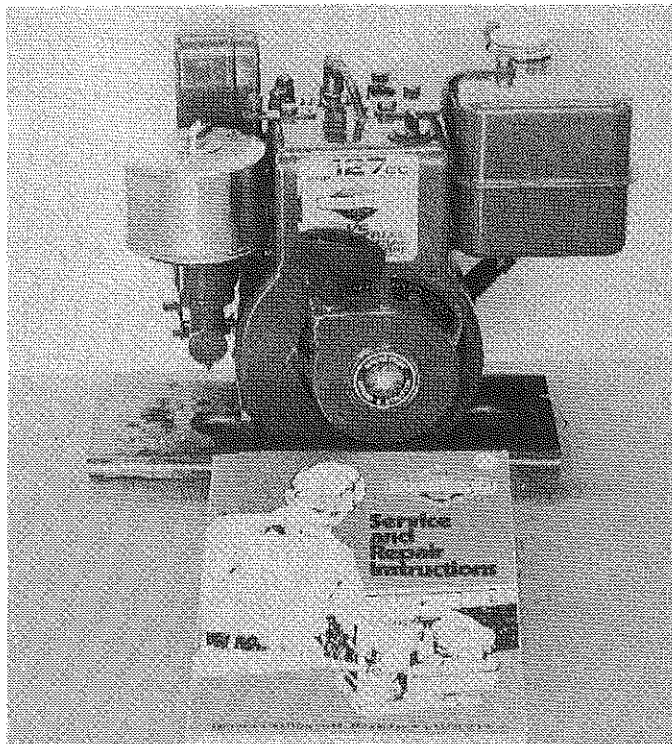
(Mr. Bekkum is Associate Professor of Agricultural Engineering at Iowa State University and Superintendent of the National FFA Agricultural Mechanics Contest.)

The industry experts who serve on the committee review the examination questions, skill and problem-solving activities for technical correctness. Their valued technical support and advice complements the instructional expertise provided by the university and college teachers. The end result is contest activities that are up-to-date, practical and relevant to today's agriculture. Most of the industry representatives in addition to reviewing the contest materials also make the annual trip to the contest to serve as judges or perform other official contest roles.

I stated previously many changes have occurred in the contest. One of the most striking is the advancement of technology in agricultural mechanics. Whether in computers, electrical controls, machinery monitors, construction techniques and materials or soil and water management, the agricultural mechanics industry and the National Agricultural Mechanics Contest are in the thick of high technology. Industry and education working together as partners becomes ever more important to keep the contest up-to-date in the future.

Equipment and Materials

Can you imagine obtaining six identical mower-conditioners and getting them to the contest site; ready to go on contest day? There is only one way we've found to accomplish such a formidable task and that's to enlist the help of the machinery industry, specifically the machinery companies. The 1988 contest held in November required major equipment and materials.



Equipment and materials provided by industry to conduct the National Agricultural Mechanics Contest - Briggs Engine and Manual.

Table I. 1988 Ag Mechanics Contest Equipment and Source

Equipment/Materials	Provided by
6 - Mower-conditioners	Case-IH Company
24 - Air-cooled engines	Briggs & Stratton Corp.
12 - Fuel-gas welders	Smith Welding-Tescom, Inc.
132 - Irrigation/drainage set-ups	Hardie Irrigation & Agr. Prod., Inc.
132 - Electrical set-ups	General Electric

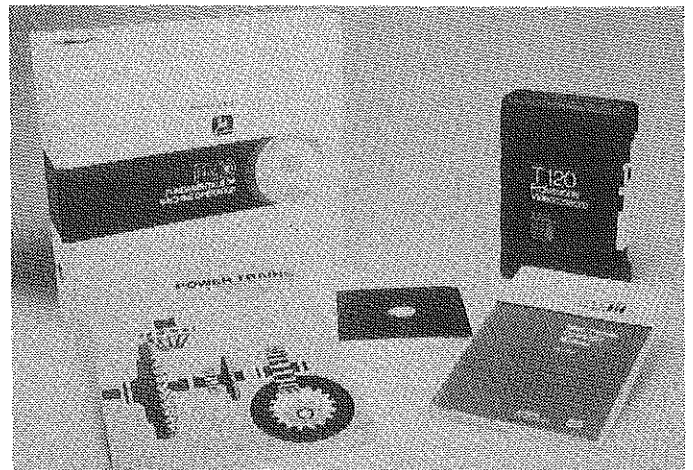
Table I provides a listing of the major items furnished by cooperating industries. In addition, several hundred pounds of metal, over seven hundred board feet of lumber, electrical testing equipment and many other items were required to conduct a relevant series of skill and problem-solving activities. Some of the equipment is donated to the National Agricultural Mechanics Committee and maintained in inventory. The 24 air-cooled engines listed in Table I, for example, were furnished by Briggs & Stratton Corporation. Also, the engines are periodically reconditioned or replaced so that the equipment used in the contest is in good condition and up-to-date; that represents a substantial commitment on the part of Briggs and Stratton. Each year small engine power is a part of the contest, Andy Cochrane, a technical writer with the Service Division of Briggs and Stratton, makes the trip to the Fort Osage Vocational School to help conduct that phase of the contest.

Educational Resources

Many agricultural industries and governmental agencies alike provide much needed educational resources. Text and reference books, instructional packets and manuals, audio-visuals, transparency masters, computer programs, models, and components are among the types of instructional materials used in teaching agricultural mechanics subjects.

The National FFA Contests - Bulletin No. 4 - provides a list of suggested reference materials for use in classroom and laboratory instruction and final contest preparation.

Many of the agricultural mechanics related industries have been prolific in developing excellent teaching materials, especially in the power and machinery areas. John Deere Publications has a long-standing reputation of providing textbooks, instructional units, audio-visuals, components and computer programs for use in high school and college programs.



Textbooks, computer software, transparency sets and operator's manuals are examples of excellent instructional materials developed by industry - FMO, FOS, VT, Computer Program Material.

Case-IH of Racine, Wisconsin is producing top quality videotapes on current topics in agricultural mechanics and agricultural engineering. This venture funded by Case-IH is conducted in cooperation with several universities providing the research base and experience. Bill Garratt, video specialist with Case-IH, recently stated they are working on educational videos in such areas as residue management, soil conservation, ground water quality, tillage practices and machinery adjustment and safety, to name a few. The ultimate goal of this major activity is to provide direct benefit to farmers to make equipment perform more efficiently and provide insight about recommended practices through a modern media approach.

Professional Development

Professional development is a key element to maintaining quality programs in agricultural mechanics. Here again, industry plays a major role. In discussing the role of teacher education in providing in-service, including agricultural mechanics, Dr. James Daniels (1986:15) at Clemson University stated, "Teacher educators have the responsibility for keeping themselves as up-to-date as possible and for serving as a continual source of current information and training techniques." Dr. Daniels practices what he preaches having served as professional development seminar coordinator for the National Agricultural Mechanics Committee for several years. Frequently, he seeks out and secures professionals in industry to serve in the role of providing in-service education to the committee members. The industry representatives on the cutting edge of technology provide tremendous insight in current topics in agricultural mechanics. Re-

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Industry Involvement in the National FFA Agricultural Mechanics Contest

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cent in-service topics have included: soil and water conservation issues and practices, telecommunications and electronics in agriculture.

Dr. Glen Shinn, past superintendent of the National Agricultural Mechanics Committee, does some practicing too. During August 1988 Ford-New Holland conducted a joint service training school for Ford-New Holland technicians and agricultural mechanics instructors. The two 15-hour workshops that focused on hydraulics were held at Mississippi State University.

Involving industry in professional development has evolved to the point of common practice. As technology advances so does industry, and it's another great partnership. Industry and education together can accomplish much more than each alone.

Scholarships

Last, but not least, are the scholarships provided to young people interested in furthering their education at the post-secondary level. A major commitment by the Firestone Trust Fund, the charitable organization of the Firestone Tire and Rubber Company to encourage post-high school education, was implemented in 1985. Each year, \$12,250 in scholarships are awarded to team and individual contest winners



Scholarships provided by the Firestone Trust Fund, as charitable trust established by the Firestone Tire and Rubber Company encourage further education - a check for \$1000.

and others who have competed in state agricultural mechanics contests. A total of twenty scholarships ranging from \$500 to \$1000 are presently awarded. The financial assistance may be used for tuition, fees, textbooks, laboratory supplies, housing or other approved educational expenses. The scholarship money can be used for postsecondary education at the collegiate, technical or vocational school level.

REFERENCES CITED

- Daniels, James, Staying Current: Inservice. *THE AGRICULTURAL EDUCATION MAGAZINE*. February, Volume 58, November 8, pages 15-16.
- Hoerner, Thomas A. A PROPOSAL FOR A NATIONAL AGRICULTURAL MECHANICS CONTEST. May 20, 1971.
- National FFA Contests, Kansas City, Missouri, BULLETIN No. 4, 1988/1989/1990: 1988. The National FFA Organization, Washington, D.C.

FEATURE COLUMN

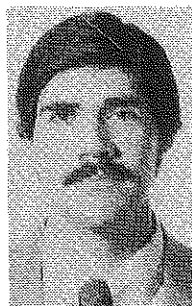
Instructional Materials Being An Effective Consumer

I'm sure most of us have seen commercials on TV for "all-purpose tools." You know the kind — those that "glue, screw, and renew." There are quick-fix books for most everything, or your money back. There is a good reason those "all purpose gadgets" are not usually found at the hardware or book store. There are few simple solutions for complex problems.

Being an agricultural educator is a demanding occupation, and as our world becomes more complicated, convenient solutions to our teaching challenges become more scarce. The ultimate curriculum supported by perfect instructional materials, the quick cure-all for our resource needs, does not exist. However, there is a wealth of instructional material available to use that will serve many of our needs, if we can only access that material effectively and use it efficiently.

Our Changing Teaching Environment

During the past decade and especially in the past five years, most states (45) have increased their recommendations for graduation requirements at the secondary level. In most instances this has reduced the number of electives students can take and has increased the complexity of the



BY GARY VARRELLA, SPECIAL EDITOR

(Dr. Varrella is a Curriculum Specialist, Department of Applied Behavioral Sciences, University of California-Davis.)

courses in our agricultural education programs. Many states have restructured some or all of the curriculum in agriculture to satisfy specific graduation requirements and to more thoroughly reinforce the "basics" or the "academic core."

The focus of the instructional materials needed by agricultural educators has changed. We must not only teach the *how*, but the *why*. Our students must be prepared to enter the work force confidently and to have the skills they need to tackle an increasingly complex technology and body of knowledge. As we plan to meet that need we must set our sights on where our students *will be*, not where they *are*. Once we have reminded ourselves that our curriculum

and the materials that support it are dynamic entities, change is more easily accepted as a necessity for progress. Then the challenge and often the frustration centers around the selection of the right materials from the wealth of sources available to us.

The Goal of this Column — Be A More Effective Consumer

We hope to help you more efficiently meet this challenge through this column. Our purpose is to provide our readers with ideas, information, and resources focused on instructional materials. This column will appear bi-monthly in *The Agricultural Education Magazine* in 1989. We will examine instructional materials from a broad perspective. Guest authors from many sectors of the education profession have been selected to contribute. We intend to take both a

philosophical and practical look at instructional materials development, dissemination, screening techniques, and future options and possibilities. We are also planning for the future. We would very much like to hear what you, the readers, would most like to see in this column. Would an examination of instructional materials on critical thinking be of use to you? Or perhaps a series on materials for the 4.1 to 4.7 million students in America who come from cultures other than our own? As we further define the needs of our readers, we will adjust our content and themes.

We will keep the focus squarely on the student and the improvement of learning. It is our intent to broaden your perspective and provide you with new ideas and resources so you may become a better consumer of the instructional materials.

FEATURE COLUMN

Agricultural Mechanization

Agricultural Mechanics Is More Than Teaching Shop

Agricultural mechanics has been an integral component of agricultural education programs. This integration has occurred not by accident, but, rather by the application of the basic principles of teaching and learning in the agricultural mechanics instructional program. This past summer while attending some teacher meetings, I overheard a young teacher ask a master teacher what was his key to being a successful teacher of agricultural mechanics. The master teacher responded, "Teaching agricultural mechanics is more than just teaching shop. If you want to be successful you must do the fundamentals. The secrets to being a successful teacher are not complicated, all encompassing puzzles, but rather basic, common sense fundamentals of teaching and learning." These insights establish a framework to explore some of the fundamental concepts of teaching agricultural mechanics.

The first basic concept which comes to mind is that teaching agricultural mechanics provides students an opportunity to learn by doing. This concept has always been a cornerstone of the foundation of agricultural education. The agricultural mechanics teaching facilities have provided teachers with opportunities for students to experience learning. It is difficult for us to imagine teaching preventive maintenance practices without the students doing the actual practices. Whereas this concept is so fundamental to the teaching-learning process, some teachers fail to apply it in their instruction.

A second fundamental principle is that teaching agricultural mechanics is an application of the problem-solving approach to teaching. So many things we do are an application of problem-solving. For example, teaching students to measure combine grain losses may be a useful competency. But, if the students do not learn to solve the problem of reducing combine losses, then the learning process was not complete. If we desire to be effective teachers of agricultural mechanics, we must continue to teach based



BY JOE G. HARPER, SPECIAL EDITOR

(Dr. Harper is an Assistant Professor, Agricultural Education and Communications, University of Nevada-Reno.)

upon the fundamental concepts of the problem-solving approach to teaching.

Another fundamental is that agricultural mechanics programs should be based upon identified student needs. This basic concept has also been a cornerstone of the foundation of education programs. Agricultural mechanics instruction must continue to provide our students with the skills, attitudes, and knowledge which will benefit them and society. The world in which we live and work is rapidly changing, however, greater emphasis is being placed upon teaching basic skills. It appears as though we have lost sight of the real needs of our students. Agricultural mechanics is an excellent opportunity to teach the basics; computation, problem-solving, following directions, keeping records, and being a safe worker, to mention a few. If we are to be successful teachers of agricultural mechanics we must base our instructional programs upon the fundamental concept of providing instruction based upon student needs.

A fourth fundamental is that successful teachers of agricultural mechanics provide an effective learning environment by demonstrating the basic teacher behaviors associated with student learning. These behaviors were first presented in a formal manner by Rosenshine and Furst in 1974. Such teacher behaviors include clarity, variability, enthusiasm, task-oriented behavior, and providing students

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Agricultural Mechanics Is More Than Teaching Shop

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the opportunity to learn the material. Whenever you enter the teaching domain of an effective teacher of agricultural mechanics you will immediately feel the learning environment. Students will be actively engaged in learning activities, they will have a clear understanding of what they are expected to be doing, they will be engaged in a variety of learning activities, they will be excited about what it is they are doing, they will be focused on the learning activity, and it will be clear that the teacher has provided the means by which they are going to learn. The agricultural mechanics laboratory is a very revealing place for teachers to create an effective learning environment because we are able to demonstrate the teacher behaviors associated with student learning. It is disappointing to hear teachers respond that today they are not going to teach because the students will be working in the shop. They have failed to recognize the basic principles of teaching and learning in providing an effective learning environment.

The next fundamental for being an effective teacher of agricultural mechanics is that successful teachers follow a general model of effective instruction. The steps of the model are very similar to the six fundamental instructional "functions" presented by Rosenshine and Stevens in the *Handbook of Research on Teaching* (1986):

1. Teaching begins by establishing where the students are in the learning process. Do they possess the prerequisite skills? By checking their previous work, are they ready to learn? For example, if we are teaching arc welding we must first establish the students' abilities and readiness to learn to weld.
2. The second function is the presentation of the instructional content. This step encompasses what we traditionally perceive as being a lesson. It includes demonstrations, examples, models, and illustrations. To continue the welding example, at this step we present and demonstrate the welding process.

3. The third function has been described as guided student practice. Within this function students are expected to demonstrate their learning by completing "required" projects. Examples would be homework, class assignments, or welding exercises.
4. Evaluation of student progress is the fourth step. Too many times we do not place sufficient emphasis on the evaluation of student performance. It is critical that students are involved in the evaluation process, receive feedback and are provided assistance to improve their learning. A welding project returned to the student with a mere letter grade provides little feedback for improvement. Evaluation should be an active learning process for the student.
5. The fifth function is providing students with an opportunity to achieve independent practice. Students are afforded the chance to build upon the required skills by developing an independent or "approved" project. This function allows for individualized instruction as well as higher levels of learning.
6. The sixth function is to provide a systematic review of previously learned material. This function includes the eventual application of learning to the workplace. Once again effective evaluation of student learning is an important component.

The sixth fundamental concept for being an effective teacher of agriculture is being competent. We not only need to know how to be effective teachers but we also need to know agricultural mechanics. Agricultural mechanics is a rapidly changing technology and it is becoming increasingly difficult to keep pace. However, agricultural mechanics is based upon the basic principles of science and mathematics and if we maintain a sound foundation in these two areas we will be able to keep pace.

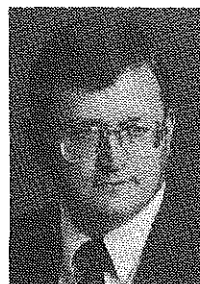
In conclusion these six fundamentals of effective instruction are by no means the only considerations we need to be effective teachers of agricultural mechanics. However, our instruction must be based upon a solid foundation of basic principles related to teaching and learning. Teaching agricultural mechanics is more than just teaching shop.

THEME

Ag Machinery Awards Unite Education and Industry

The room looked like an intensive-care unit for tractors. Solemn proctors with stopwatches and clipboards monitored the proceedings. The engines chugged and puffed while technicians bent over gauges to check heartbeat and circulation for each of the six "bugged" machines.

Outside of the room a small group of college agricultural instructors huddled at the observation window. One of them nodded his head toward the students, "If only the advisors and guidance counselors in our high schools could see this side of agriculture, our programs might get a little healthier next year."



BY LARRY A. RINEY

(Mr. Riney is Editor, Service Training, Deere & Company.)



Solving technical problems involves checking the specs in the service manual. (Photo courtesy of Larry Riney, John Deere.)

The scene could have been drawn at any agricultural machinery dealership. In fact it was the shop floor at Northeast Wisconsin Technical College, Green Bay, the site of the 1988 Postsecondary Agricultural Student Organization's Agricultural Machinery Service Technician's Award competition.

The "PAS" was founded in 1980 to help promote agricultural education on the postsecondary level by bringing education and industry together. One of the functions of the organization is to hold the technician's award program sponsored by Deere & Company each year during the national conference in March.

Don Margenthaler explains his direct involvement with the event from his office overlooking the well-manicured lawn at Deere & Company, "Deere has been involved with the awards for the past five years because the ag technician is a valuable person in any agricultural manufacturing process. These PAS agricultural mechanics students will play an important role in the immediate future of education and industry."

Mr. Margenthaler, Manager, Community Relations and Internal Communication, continues his evaluation of the operation. "We need involvement of the entire agricultural mechanics educational community with the PAS to help strengthen the image of agricultural education. We feel that the PAS experience is an important part of the technician's education. The PAS organization gives the postsecondary student in all age groups a chance to develop the leadership and skills that agriculture is going to need for the coming years. Most of all we need to show these students that industry supports their efforts. The PAS helps reinforce the idea that they are on the right track and have chosen a valid career possibility."

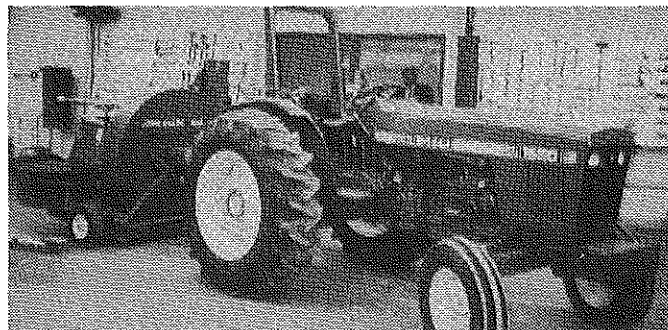
The payback from strong educational support and commitment to the PAS program may include future curriculum and articulation benefits. Dr. Larry Case, the National Advisor of PAS, during the 1988 July PAS Board of Directors meeting in Washington, D.C., expressed his desire to explore the need for an agricultural mechanics accreditation program and an agricultural service technician's certification program.

Jim Linnebur, the Manager of Service Administration at Deere, adds "Without a strong foundation such as the PAS, it would be difficult to plan anything of the scale put forth

by Dr. Case. We must do everything we can to help make sure the quality of education available to the ag technician continues to keep pace with developing technology. We can start by strengthening the ag education foundation through PAS."

"Our dealerships are putting increased emphasis on service marketing. Our customers are realizing that we can save them downtime by diagnosing and servicing their machines in the off-season with our trained technicians. This will continue to create a demand for skilled technicians. Dealerships cannot increase the number of their work orders without someone to do the job," continues Linnebur. "There will be a constant demand for college and university-trained technicians in the foreseeable future not only for Deere & Company but the entire agricultural service area."

The banner for the Postsecondary Student Organization is "Uniting Education & Industry in Agriculture." This is particularly true for agricultural mechanics. The involvement of educators and industry personnel in the Agricultural Machinery Service Technician Awards is one of the few ways that the articulation of industry needs and classroom instruction can be developed realistically. The networking of industry, educational institutions, and the students in PAS, strengthens the foundation of agricultural education.



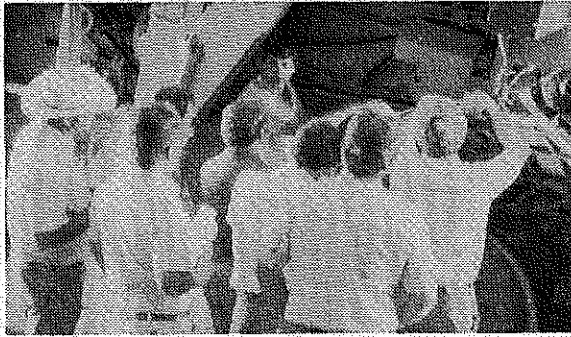
The PAS Agricultural Machinery Service Technician Award involves knowledge and skills in adjusting and trouble-shooting tractors and machines. (Photo courtesy of Larry Riney, John Deere.)

Eighteen states have chartered PAS membership. Each state has the honor of conducting a state agricultural machinery service technician awards event. The two-person team that qualifies from each state has the opportunity to advance to the 1989 national contest in Kansas City, Missouri.

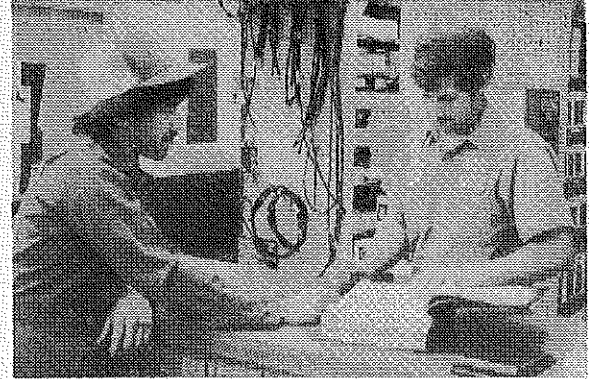
The state award recipients receive cash awards, plaques, and travel stipends when they participate on the national level. For example, the first place award national team members each receive \$500, a plaque, certificate, and travel stipend. Their school's agriculture program receives \$1,000 to be spent on educational material. The second and third place teams are given similar awards. Every team participating at the national level is awarded a stipend to help offset travel expenses.

Mr. Margenthaler urges the participation of all colleges in the PAS Conference Agricultural Machinery and the Service Technicians Award program — "We support the PAS Agricultural Machinery Service Technician Awards not only financially but with volunteers that help set up and administer the awards proceedings. It is important that industry and education help each other by getting as many top-notch students as possible into this event each year."

Stories in Pictures



Helping teachers to stay current, Dan Livezey, Service Representative, Sperry-New Holland Co., provides in-service training on the TR95 combine to Arizona vocational agriculture teachers during a four-day workshop on operation and adjustment of balers and combines. (Photo courtesy of C.O. Jacobs, University of Arizona.)



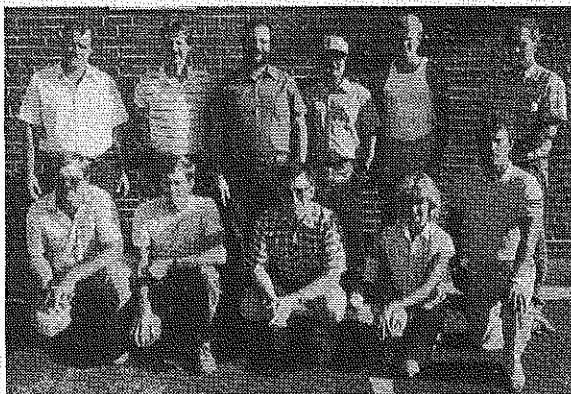
Lead mechanic, Eddie Rich, 8 year employee and former vocational agriculture student picks up from Parts Manager Jim Grand (Photo courtesy of Cal-Coast Machinery, Inc.)



Tractor owned by Santa Maria High School FFA chapter is served by an agricultural mechanics student. (Photo courtesy of T.W. Jeffery, Santa Maria, California.)

CAL COAST MACHINERY, INC.

High school owned John Deere 8430 being serviced by Ward Dugger. Tractor is owned and used by FFA and agriculture students on 120 acres of oat hay and 24 acres of broccoli projects. Tractor purchased with the assistance of George Johnson, Cal-Coast Machinery and John Deere Company.



Teachers enrolled in the University of Minnesota In-Service class on Concrete Technology Applications in Agriculture held in July 1988. (Photo courtesy of Forrest Bear of the University of Minnesota.)



Agricultural mechanic trainee is provided supervision by lead mechanic through on-the-job cooperative education (Photo courtesy of T.W. Jeffery, Santa Maria High School.)