THEME: Basic Competency Programs
Basic Competency Programs . . .
Are There Any Dinosaurs?

What should be taught in vocational agriculture/agribusiness? How should the time of students be used in learning activities? What methods and the objectives of instructional programs should be used? These are a few of the fundamental questions which have faced agricultural educators. Answers have been sought but never really found. Our programs have involved satisfying—the decisions which were made involved compromises and imperfect information.

What Should Be Taught?
In recent years, the controversy over what to teach has been resolved by the objectives of our students as the base in which to build instructional programs. The approach has been that once we knew the occupational goals of our students we would conduct competency studies of the occupations. The studies would supposedly indicate the competencies people in the occupations needed. This appears to be a good approach in that it pinpoints what students need to learn, and it is probably the best approach we have. This approach has precautions and, for any assessment of it should be tempered with the everyday realities of the educational environment.

Are there knowledge and skills which people need for success which are not revealed by competency studies? Educators have the responsibility of making decisions about the level of competence to be taught and the prerequisites for instruction in a specific competency.

Other factors strongly emerge in determining what is to be taught. These include the “everyday realities” of personal interests of the teacher, pressure of the local school administration, influence exerted by state supervisory personnel, instruction in teacher preparation programs, and the available instructional materials and facilities. Do these considerations have more impact than the needs and interests of students?

Enter the Dinosaurs
The matter of what to teach cannot and should not be taken lightly. A personal example will be used here. The Editor has two children enrolled in the elementary school (grades 3 and 4). The theme is dinosaurs. The word “dinosaur” is rooted in the Greek words of meaning, dismal and terrible, and is used today with connotations of fear. While Stegosaurus was about 25 feet long, it was protected with bony plates, and had a nerve center 20 times the size of its brain near its hip. The children can identify and describe each dinosaur merely by showing them a picture. This raises the first problem. The picture is actually an artist’s perception and may be considerably different from the dinosaurs. That which has been learned may be (and probably is) incorrect.

The next problem is that my knowledge no mention has been made by their teachers of the animals which are of the most importance in our lives today. The differences between hogs, beef cattle, and dairy cattle have not been taught. If they were shown a photograph of these animals, they could not tell them apart on the basis of their school instruction.

Does vocational agriculture/agribusiness have any “dinosaurs”? If we look around, we might find the need for some of our instructional content to be much like dinosaurs—extinct. Or we might find some that lack relevance to the purpose of the program and needs of students. Sometimes state and local reward systems encourage perpetuation of “vo-ag” dinosaurs. What about furniture making and leather working? These are obvious “vo-ag dinosaurs” in most places where they might continue to exist. “Vo-ag dinosaurs” come to life when we don’t include the proper content, use the correct methods and techniques in teaching, allocate time and energy among content areas, and have the needed facilities and materials. These dinosaurs are further enhanced when students are not required to be active in the learning environment and the teachers are unprepared for their work.

Beyond the Dinosaurs
Beyond the obvious “vo-ag dinosaurs” there are those which are not so obvious. Some educators would use terms such as “curriculum balance” and “program relevance” to describe the less obvious dinosaurs. Local programs may be impacted by state-level curriculum guides and reward systems. Some states place heavy emphasis on livestock shows. Other states emphasize production agriculture almost to the exclusion of the real world of agricultural industry. Still other states emphasize different program areas.

The best way to overcome problems of curriculum balance is through basic competency programs, especially at

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Basic Competency Programs . . . . Are There Any Dinosaurs?

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the ninth and tenth grade levels. This involves developing the curriculum around common competency areas such as reading science, social science, and life skills. The competency areas are designed to be age-appropriate and to focus on the needs of students at different stages of development.

Another step in overcoming a lack of curriculum balance at the local level is through the adoption of standard curriculum and instructional materials for vocational agricultural education. It is imperative that such materials reflect a balanced approach and allow for a certain amount of localization. The balance must be in both content and instructional strategy.

The task of developing standard curriculum and instructional materials is awesome. Input from the best research available is needed. The individuals selected for this task must be the best in our profession. They must have sound, modern philosophies of vocational agriculture/agribusiness education, as well as a broad understanding of programs throughout the United States. They must understand the meaning and scope of agricultural education in agriscience, agriculture, and agricultural business principles. The competencies to be included are those which are prerequisite to a wide range of agricultural occupations.

The Theme — April, 1980

This issue of the MAGAZINE addresses the theme of Basic Competency Programs. The Theme Editor is Max Ambergson of Montana State University. Dr. Ambergson has a massive amount of experience in studying the needs of agricultural industry, carrying out competency studies, and curriculum development in vocational agriculture/agribusiness. He has solicited articles from leaders in the profession for this issue of the MAGAZINE.

The Cover

The photograph on the cover shows a student working under the direction of a man part of a program at Gallatin Equipment Company in Belgrade, Montana. Supervised occupational experience is important in the application of basic competencies. (Photo courtesy of Max Ambergson, Montana State University.)

The Competency-Based Core Curriculum: Innovative and Accountable

The vocational educator's concept of the kind of education required for each individual is not particularly different in theory than that of the idea of a need for specialized instruction. It is deplorable to find a high school graduate, or even a drop-out, who cannot read, write, speak, or do simple calculations. It is also deplorable that many people do not have a thorough understanding of both the nation's heritage and his or her own family heritage. It is unacceptable if the person cannot find employment because he or she has not been prepared to become an employable, productive citizen.

Courses which make up the academic and vocational curricula of high schools, technical schools, and colleges were thought to be adequate in preparing people for life and for gainful employment in agriculture. This has been proven to be a false assumption. Students taking a mathematics course do not always improve their basic skills in reading and writing. Likewise, taking a mathematics course does not always improve the ability of students to do mathematical calculations. Furthermore, enrolling in an animal science course does not ensure that a student will be properly prepared to make a crop.

The general public has become alarmed about schools and courses taught within the schools. Forces both within and outside the school system are making demands that schools be held accountable—responsible for students learning what schools purport to be teaching. The concept of accountability is perhaps the major reason why educators are now emphasizing total programs of competency-based instruction rather than a "one or two year course." The shift to competency-based instruction does not mean that some traditional courses will not continue to be taught. The major concern will be to develop an instructional program that is integrated and designed for a purpose and that results can be measured by people observing and studying the program.

In a competency-based curriculum, specialized programs in technical agricultural education are based on the knowledge, skills, attitudes, and experiences developed by students participating in the core curriculum. Students determining the core curriculum need to determine the area of instruction in agriculture in which they wish to enroll. This area of emphasis is usually defined while the student is enrolled in the core program.

The degree to which schools may wish to offer specialized programs in agribusiness knowledge is determined by local constraints of time, school size, and organization, teacher qualifications, financial resources, adequacy of physical facilities, and the demand for employees in a particular specialized area of instruction.

Small internal combustion engines play a vital role in performing necessary work in agriculture/agribusiness. Operation, trouble shooting, and maintenance skills are considered core ag-mechanics competencies.
What Is A Competency-Based Core Curriculum

In Vocational Agriculture?

Down through the years different curricular patterns for vocational agriculture have been espoused, used, and sometimes abandoned. Among them have been the horizontal or traditional, vertical or spiral, fused, cross-sectional, modified cross-sectional, and modular approaches. Now increasingly, teachers are being encouraged to develop and use a "competency-based core curriculum." What is such a curriculum? How does it differ from other curricular approaches? If such an approach is sound, is it developing and using such an approach a logical responsibility of the local teacher of vocational agriculture or should a state-wide competency-based core curriculum be developed and then used by teachers in local programs? These are the three questions addressed in this article.

What is it?

To describe a competency-based core curriculum we first need to define four terms in the context in which they are (or should be) used, namely, curriculum, core curriculum, competency, and competency-based curriculum.

As used here, a curriculum is "...a body of prescribed educative experiences under school supervision designed to provide the individual with the best possible training and experience to fit him for the society of which he is a part, including qualifying him for a trade of profession."

In other words, the curriculum is the total of all the intra-extracurricular purposive learning experiences acquired by the student while under your thumb as the teacher. This includes such activities as FFA leadership activities, formal study in the classroom, informal teaching-learning activities built around productive enterprises or cooperative work experiences, group activities, individual activities, activities at school, activities in the activities in the agricultural mechanics shop or land laboratory, and activities conducted at home but growing out of school-based experiences.

It follows, therefore, that a core curriculum is that body of intra-extracurricular experiences which provide the knowledge, skills, understanding, appreciations, attitudes, values, and ideals considered important for all students to possess irrespective of their sex, socioeconomic background, or particular vocational goal in agriculture.

A competency reveals a person's ability to perform beyond that level of simply demonstrating knowledge. Specifical- ly, competencies in vocational agriculture mean performing those tasks and skills and displaying those "...attitudes, values, and, in the curricula ..." that the student is held accountable for the demonstration of pre-

cisely specified competencies. The emphasis is on demonstrating knowledge and participation. Thus it is that the competency-based programs may be described as achievement-based while traditional programs are experience-based or activity-oriented.

A competency-based core curriculum is compatible with the basic philosophy in vocational education that the emphasis should be on a student learning "how to grow corn" rather than on a student learning "how to grow corn." It is realized of course that a prospective corn farmer needs to know how corn does grow in order to do a better job of growing corn.

The accompanying table compares a "typical" traditional curriculum and a competency-based core curriculum (CBCC). It should be remembered, however, that some threads of commonality exist between the two approaches. For example, in both curricula the common thread exists of developing a person's ability to think, a thread which underlies all American educational efforts.

Should A Competency-Based Core Curriculum Be Developed in a Local District?

In view of the description of the type of curriculum outlined above, it would follow that the components of a competency-based core curriculum would be best assembled by you, the local teacher, since you are in the captain's chair of being a director of a program of vocational agriculture and able to assess, consult, and juggle the three core components in a curriculum. Those components are the input (or student), teaching-learning experiences, and output (or graduate) of a curriculum. Curriculum planning is a problem-solving approach. You, the local teacher, are the one in the best position to solve the problem of deciding what is the best core of teaching-learning experiences for the students in your care since their needs change from year to year, month to month, and even from day to day. The late agricultural educator, Dr. Philip B. Teikso, pointed out that in designing a curriculum you have to ask four questions.

They are: (1) Where are my students? (2) Where do I want my students to be on completion of this curriculum? (3) How shall I help them effectively get my students from where they are to where I want them to be? and (4) How well are my students doing? You, with the help of your community and school board, are in a position to answer those four questions most effectively.

Should a statewide CBCC be designed for implementation by local districts, it would seem that two consequences might result. First, so much might be included in the competency-based core curriculum that it may become general and little time for "local" issues might be available for the local teacher to use to include those core topics essential because of the uniqueness of a particular group of students and community. Second, and most importantly, a state imposed core curriculum might effectively destroy the decision-making role of the teacher at the local level. As pointed out by Paulier, the teacher should be involved in making decisions about the curriculum if that curriculum is to be meaningful to the student, the learner.

However, it would be most appropriate, and feasible for a state or a region to provide materials that may be used by teachers in developing a competency-based core curriculum for their particular local situation. The precedent has been set for such undertakings by the activities of several of the curriculum materials development centers in their respective states.

Conclusion

A curriculum that emphasizes holding the student accountable for demonstrating competence in previously specified competencies needed for employment has a place in vocational education in agriculture. Such a curriculum needs to be given serious consideration.

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TABLE 1
Comparison of a "Typical" Traditional and a "Typical" Competency-Based Core Curriculum (CBCC) Program

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Traditional Program</th>
</tr>
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<tbody>
<tr>
<td>1. Competency to be demonstrated by the student:</td>
<td>a. Derived from committee consensus b. State in general terms c. May or may not be made public</td>
</tr>
<tr>
<td>2. Criteria to be employed in assessing competencies are:</td>
<td>a. Based upon general program objectives b. General with respect to stated levels of mastery expected</td>
</tr>
<tr>
<td>3. Assessment of the student's competency:</td>
<td>a. Use course grades as evidence of competence b. May or may not include performance as well as knowledge</td>
</tr>
<tr>
<td>4. Rate of student progress through program is determined by:</td>
<td>a. Pre-determined time of completion of course</td>
</tr>
<tr>
<td>5. Instructional program is intended to:</td>
<td>a. Facilitate the student's achievement of certain general program objectives</td>
</tr>
<tr>
<td>6. Instructional program is more likely to:</td>
<td>a. Emphasize group instruction</td>
</tr>
</tbody>
</table>

"Adapted from Finch and Hamilton, 1975, and Blum, 1971.

APRIL, 1980
Implementing A Competency-Based Curriculum

By Floyd G. McCormick
Editor's Note: Dr. McCormick is Head of the Department of Agricultural Education at The University of Arizona. He has been involved in numerous curriculum development activities in Arizona.

Why Implement?
The message is coming in loud and clear! "People do not know what kinds of occupational preparation programs are currently being offered in vocational agriculture." Of more consequence, they do not know what kind of product we are producing.

How would you answer these questions?
1. Are you producing an employable product as a result of your vocational agriculture instructional program?
2. Do employers look to your vocational agriculture graduates as potential employees?
3. Do your vocational agriculture graduates really know what they can do from a competency standpoint?
4. Do your students graduate with a list of actual agricultural and human relations competencies they can perform with some degree of mastery?
5. Do you really "have a handle" on what your students CAN DO as prepared manpower for the agricultural industry?

If you can answer each of these questions in the affirmative, you probably already have in operation a competency-based instructional program.

Value of Competency-Based Instruction
The obvious benefit of competency-based instruction is that it helps assure that we are providing vocational education as it should be — specifically designed for specific occupations. From a curriculum planning standpoint, it helps teachers make decisions relative to what to teach, when to teach it, how to teach it and how long to spend on it.

Vocational agriculture must become, and be recognized as, a viable delivery system for prepared manpower for business and industry. Competency-based instruction is one vehicle to help accomplish this goal.

How to Implement
Teachers, by and large, are not reluctant to approach the task of implementing a competency-based curriculum in their vocational agriculture programs. However, these teachers need assistance. The following are three steps toward why implement, (2) how to implement, and (3) what to use.

In actuality, implementing a competency-based curriculum amounts to little more than "putting into a package" what teachers of vocational agriculture already have available and what they have been using all along. Five easy steps are suggested along with why, how, and what to use.

Step 1. Set a goal and make a solid commitment to initiate a competency-based instructional program in your department in 1980-81.

Why?
Each of us must plan and deliver the type of instructional program which will equip our students with saleable/productive skills. We must plan our instruction in such a manner that a problem, decision, or "hands-on" activity, is the subject matter taught in the lesson. If properly utilized, these activities can become the competencies taught. We must tell the many publics (especially our own students) what you are teaching. Of more consequence, we must let students, parents, and employers know what competencies our vocational agriculture graduates possess as a result of our instructional program.

How?
1. Poll your students to determine what saleable skills they feel they possess.
2. Ask parents and key agricultural business in your community what they believe graduates from your department possess.
3. As a teacher, answer this question: "What kind of a product am I producing?" Document!
4. Discuss competency-based curriculum with school principal.
5. Discuss with advisory committee.
7. Identify competency-based instruction as one of the goals in the annual department program of work.

What to Use?
The statement of philosophy endorsed by the Agricultural Education Division, AVA.

The identified set of Standards for Quality Vocational Programs in Agricultural/Agribusiness Education.

Federal legislation emphasizing competency-based instruction.

Step 2. Identify a list of agricultural and leadership competencies you plan to teach in your course of study by years, Reproduce and distribute this list to students. Refer to this listing continuously.

Why?
1. To design and deliver a "true" occupational program in agriculture, you must base your instructional program, to a large degree, on employment opportunities in agriculture.
2. Competency-based instruction is one vehicle to help accomplish this goal.

How to Implement
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Implementing A Competency-Based Curriculum

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Step 4. Develop an evaluation scale for each competency taught which will indicate the degree of mastery of the specific competency.

Why?

The mere "checking off" of competencies taught or learned by students is not enough. A method which will provide an indication of the relative degree of mastery of each specific competency learned by a student must be developed. As competencies are completed, provisions should be made for students to record actual date of accomplishment. The teacher should then indicate the degree of mastery of the competency on the evaluation scale.

How?

• Incorporate evaluation scale on format (system) developed in Step 3.
• Involve advisory committee to assist in establishing evaluation scale.
• Include degree of mastery in performance objectives for instruction units taught.
• At the time students record actual competencies they have learned, date of accomplishment and degree of mastery should also be recorded.
• Establish time periodically to record teacher's evaluation.
• Use competency accomplishment to evaluate, in part, individual student's performance at end of each grading period.

What to Use?

• Select a suitable evaluation scale.

Example A — Experience-oriented

1. observed knowledgeable
2. exposed to how to perform
3. actually practiced in school setting
4. actual application made
5. experienced in real job situation

Example B — Achievement-oriented

1. excellent
2. good
3. average
4. lacking
5. poor

Step 5. Design a reporting system (or procedure) for recording and reporting actual competencies taught in your instructional programs by years.

What?

In order to communicate the instructional intent and outcome of your program, it is essential for you to synthesize a list of agricultural and leadership competencies taught your students in each class. Remember, there could be a distinct difference between what you planned to teach and what you actually taught. It is anticipated if taught planning took place, there will be a high degree of consistency between what was planned and what was taught. These competencies taught must be equivalent to the product concept and thus they are not the content to be taught. They must be the outcome or byproduct of the teaching/learning process. The items listed, therefore, are intended to describe the evidence relative to the kind of product produced by your vocational agriculture program. They should be placed in the individual permanent files of students.

Copies of actual competencies taught should be shared with school administrators, state departments of education, advisory committee members, parents, and employers. In addition, each program complete should have a list of those competencies they possess. Be sure that they "know" they have mastered these competencies.

How?

• At the conclusion of each grading period, synthesize a list of agricultural and leadership competencies actually taught students in each class.
• Periodically check individual student folders to determine whether students have recorded actual competencies taught.
• Use class time to check competencies taught (at least once each grading period).
• Place list of actual competencies taught with evaluation in each student's permanent file.
• Composite lists of competencies taught should be sent to school administration and the state department of education.
• Students should take folder listing competencies upon graduation.
• Department keeps one copy of the competency report form in a permanent file.
• Upon graduation, issue each program a certificate which indicates those agricultural and leadership competencies mastered.

Example 2 — Certificate of Competence

1. excellent
2. good
3. average
4. lacking
5. poor

Summary

The use of these five easy steps will provide a system for implementing a competency-based program in your vocational agriculture program. At the same time, it will provide objective evidence of what your students are actually taught. Accountability of the program, in part, will be in the recorded evidence. Graduates of your program, when asked, "what can they do?" will be able to share with potential employers what they can do as well as on the excerpt on how well they can perform each competency gained from the vocational agriculture program.

A little planning and some record keeping will do the job. However, there is one caution: Be sure your students can actually perform these competencies listed! It would be disheartening to imply that your students have mastered certain competencies when in reality they cannot "produce as advertised." Program and product credibility must be maintained, else we lose it all.

THE AGRICULTURAL EDUCATION MAGAZINE

APRIL, 1980

Pros and Cons . . .

Should We Adopt A Statewide Curriculum?

By PAUL MARTIN

Editor's Note: Dr. Marvin is Professor of Agri., Division of Agricultural Education, University of Minnesota at St. Paul.

Discussion concerning what should be included in a curriculum or educational program must begin with an examination of the foundation or philosophy for the curriculum.

In defining curriculum, the core or basic portion becomes a part of the definition and as such requires a pro and con consideration. While I believe the secondary programs of agriculture should have a common core, it is necessary to examine the con side to arrive at a rational decision. The purpose of this article is to examine those negative aspects of a common core curriculum. A purpose of education is to seek the truth. If we ever assume we have found it, we will very surely be in trouble.

Assumptions

Any curriculum based on a common core must assume that someone or some group of persons knows what the content of the core should be. My earliest experience with core content was in my first teaching position as a teacher in a rural ungraded school. Every teacher was given a course of study guide that specifically identified what should be taught in each subject at a given grade level. For example, the fourth grade should learn the multiplication tables through 9 x 9 and the sixth grade should be taught European geography. The number of weeks to be assigned to specified areas of geography was stated and the duty of the county superintendent of schools was to monitor the adherence to the core curriculum. I often wondered about the wisdom of the district to decide how much time should be assigned if the time were to be appropriate for all teachers and all students. In order to have some measure of how well the school followed the curriculum, the students were required to pass standard state-wide examinations in the seventh and eighth grades.

When I Taught

One of the advantages of common core curricula is that the beginning teacher knows precisely what the content of a course will be. While I was only 19 years of age, with one year of training beyond high school that first year in 1937, I was aware of what I had to teach and I have never had that level of confidence in any year since.

The rigidity of the basic program has since given way to the more flexible curricula which are now so flexible as to be considered by some to be disorganized or non-directional. In the minds of some professionals, agricultural education curricula in the secondary schools are today non-directional.

Today's Taxonomy

As we look at the taxonomy of programs, the following areas are listed: production agriculture, agricultural sup-

plies and services, agricultural mechanics, horticulture, agricultural resources, agricultural products, and forestry. Is there anything common to all of these that could be identified as core? The word agriculture appears in nearly all titles, but if we do in fact prepare at the secondary level for employment in all of these areas, the common core becomes difficult to identify. Gaye Scarborough, writing in the December, 1970, issue of THE AGRICULTURAL EDUCATION MAGAZINE, suggested that we should be looking at a broader program. He stated that if we continue to use the term "individuals engaged in or preparing to engage in agricultural occupations," we eliminate all of those occupations requiring bachelor, masters, or doctoral degrees. If we broaden the program, do we broaden the core or does the core become less contributory to many of the broadened occupational areas? The answer to these questions would tend toward less total content to be identified as common core.

Core Versus Individualized Instruction

The shift away from a rigid core curriculum was the result of instructors desiring to tailor curricula to better meet the needs of different communities and students. Instructors were taught, and in most states, still are, that the first step in planning an agriculture program is to "survey the community" so that the curriculum will fit the needs of the community and students of the school area. Agricultural instructors have long been proponents of individualized instruction. Core curricula and individualized instruction appear to be philosophically inconsistent. Theoretically the most effective individualized instruction would probably require each student to have a curriculum individually tailored. The recommendations for teaching the disadvantaged are advocating such a system.

In determining the percent of total course of study that might be in a common core, the inability to change the content of the program is considered. Much of the content in the field of agriculture is in a constant state of
flux. Changes in the core are likely to be delayed long after the core has become outdated. Even in the pure sciences of physics, mathematics, and soils, what was considered core and basic is being changed daily by new information discovered by research.

The atom was once defined as the smallest unit into which an element could be divided. I trust the core content of the physics curriculum was changed with a minimum of delay. Less dramatic discoveries are likely to occur and not be taught if the instructor doesn't assume full responsibility for keeping up-to-date in the field. The greater the portion of the curriculum that is first core, the more likely needed changes will be slow to reach the classroom instruction.

Earl Price, writing in the August, 1966, issue of the Agricultural Education Magazine, stated, "Only a poor curriculum never becomes obsolete." He further indicated that the vocational agriculture curriculum instead of offering a wide variety of production practices and skills, will offer particular courses in agricultural chemicals, ornamentals, horticulture, anatomy, and the like planned to provide knowledge and skills for a cluster of agricultural occupations. As specialization increases, the portion of a curriculum that is common will become smaller if it isn't destined for obsolescence.

Curricula with a great deal of commonality is a publisher's paradise. The difficulty with a textbook becoming the "core" is that the college is likely to require that the writer update his material. The American Farming series of texts (published by Webco Book Co., in 1941) is a case in point. Many teachers had a tendency to repeat the common core material in each of the grade levels, with little change being made for each year. I would guess that today this series of texts is considered obsolete, not only for its curriculum organization, but also for its content.

Why We Need A Core

Returning to the pro and con positions for a common core in the vocational agriculture curriculum, I come to the conclusion that at this time in vocational agriculture a common core can be useful. When we observe how far afield some of our secondary programs have gone in the name of agriculture, some mechanism is needed to help us define our discipline. Course titles, such as how natural resources, mounting fish and game, flower arranging, pet care, and so forth, can be found in many vocational agriculture programs. While specialization and local adaptation should be considered in developing a curriculum, I have difficulty finding much common instruction in these course titles. The common core is needed to help the beginning and many of the older teachers have some confidence in teaching the right thing.

A more clearly defined curriculum which includes all of those activities associated with the learning will help teacher education to develop a curriculum that will prepare instructors for the job they are expected to do. We may have less frustration of young instructors and an improved ability to attract and hold them in the field if the job can be more clearly defined.


tences and the subsequent development of instructional material.

The employment data was collected through the use of mailed survey instruments and direct contact through the use of the telephone. Two reports were prepared that could be used to document the findings to the appropriate client.

Phase II

In addition to gathering data used to quantify and describe employment needs, phase one was used by the researchers to establish a list of names and addresses of agricultural employers (both producers and agricultural persons) who could be contacted later to help identify and verify job competencies.

Job Titles. Job titles were prepared for each of the taxonomic group. The initial list of job titles was verified by interviewing a number of managers. Changes were made in the list of job titles prepared by the staff to coincide with the job titles actually being used by the employers in the field.

Competencies. An exhaustive review of previous research efforts, a search of the literature, and interviews with selected workers and managers resulted in an initial list of entry-level competencies needed by the workers in the various job titles. Several revisions and trials resulted in an instrument for each job title in the taxonomic areas in which each competency could be ranked depending on its importance as perceived by the workers and their supervisors.

The actual completion of the instruments was accomplished through personal interviews. An interviewer's manual was developed, interviewers were trained through a special training session and sent into the field to gather the competency data. At this point, vocational agricultural teachers were utilized along with other departmental and university interviewers. Some of the interviewers had been trained by the Department of Sociology at Montana State University and resided in several areas of the state. Workers and their immediate supervisors were interviewed.

After gathering the data was summarized and analyzed. Comparisons were made between the opinions of the teachers and their supervisors relative to the importance of each competency to the success of the worker. A weighted

value was given to each competency. A final report was prepared for each of the taxonomy areas containing the job titles and the competencies needed by each worker in the respective taxonomic area.

Competency Commonalities. Needless to say, the enormous efforts to identify needed job knowledge and skills resulted in the identification of some 3500 different competencies. Thus, the objective at this point was to analyze the previously identified competencies to determine if commonalities existed among the numerous job titles as identified by the initial studies. To accomplish this task, each statement was placed on a card along with its mean importance rating, and the job title to which it was related.

Of the 3500 statements used to each job title were pulled out. The remaining were then sorted into eight main cores: animal science, plant science, mechanics, clerical, leadership, business management and marketing, merchandising, and miscellaneous. This division was devised by Arizona State University in designating curricula for the core curriculum project. The eight main cores were further subdivided into sub-cores under each of the aforementioned categories. Completion of this step would be the responsibility of the teachers and the departmental staff to direct their attention to the feasibility of establishing programs in which there was overlap or commonality among identified job titles. These were used later to form the skeleton upon which teachers' curricular guides were prepared.

Phase III

With the agricultural competencies commonalities identified, commonalities in course curricula development effort was designed to involve selected vocational agriculture teachers. Fifteen teachers were selected from throughout the state in cooperation with workshops on the basis of their interest in the project. All districts of the state were represented by one or more teachers involved in the program. Teachers from Arizona, a state that had no program, was asked to consult with the teacher and teacher training staff.

Before moving ahead, a number of questions had to be answered. At this point, the teacher education staff step back into the background and let the teachers themselves seek the answers to these questions:

1. What kind of curriculum format would be most acceptable in the light of the Montana program?
2. In what way should the competencies be packaged to insure their inclusion in the instructional program?
3. How should the curriculum be packaged?

After much discussion with the consultant and in light of the long range program objectives, the teachers decided that the curriculum core would be designed to be able to be developed with specialized programs for the junior and senior years of high school. The core program for the first two years included animal science, plant science, agriculture mechanics, leadership, careers, and supervised occupational experience. Specialized programs were identified for the third year.

The teachers discovered that questions two and three could not be considered separately. The core would in

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A Competency-Based Core Program in Agricultural Mechanics

By Albert Pat Pruit
Editor: Pat Pruit is an Assistant Professor at Utah State University. His area of emphasis is agricultural mechanics education.

Recently a freshman college student who had taken a vocational agriculture specialized program in animal science took time to drop by my office at Utah State University wanting to know how to figure board feet.

Another instance, a student in a course I teach on the maintenance of tractors and agricultural equipment was asked to get a common hand-operated grease gun from the storage area. He returned and stated that he was empty. He was asked to fill it so it could be used. His reply was: "I don’t know how.” This student was a graduate of a vocational "hard labor" program.

To avoid problems like this there must be a common core of competencies vocational agriculture students need to know and be able to apply. Our goals in teaching have not changed. The change has been in the influx of students with non-farm experiences for which we must provide more thorough training. We cannot assume the student knows how to fill up a grease gun or hook up a tractor to a plow and operate it safely. Also, where does a student in a specialized program in animal science learn to figure board feet? Agricultural mechanics has been and will continue to be a major part in vocational agriculture programs for all students.

In the National Agricultural Occupations Competency Study (completed May, 1975), most of the occupations require skills in agricultural mechanics. However, the level of competency and the total number of skills needed varied depending upon the specific agricultural occupations identified. The careers that were identified required both technical knowledge and mechanical abilities.

Many articles and studies have reported the value of “specialized” programs for training students for placement in the agricultural industry following high school graduation. These programs are well and good, but is industry graduating and employees from these programs who ask basic skills? Some "specialized" programs in selected areas of agricultural mechanics at the secondary level have resulted to the point they can no longer be identified as an agriculture program. An example would be a program which stresses the production of trailers and trinkets. This often leads to a course which is little more than welding.

In agricultural mechanization, the teacher is constantly confronted with what and how much to teach. Five basic areas of agricultural mechanics should be included: basic skills, farm power and machinery, soil and water management skills, agricultural structures, and electrical power and processing. The skills learned must be useful to the student. As we look at the area of basic skills, the most popular unit of instruction would probably be welding, and as a result, this unit tends to be "out of balance" compared to instruction in the other units. If we take a close look at what industry expects of vocational agriculture graduates, welding skills rank low as compared to operating and operating equipment safely and performing preventive maintenance on tractors and equipment.

When employers complain that students (graduates of our programs) are inadequately trained and are not productive enough for job retention, the reason in many cases is that we may have failed to identify what the student needs on the job. It is not possible that a set curriculum could provide for the exact needs of every student but there is a need for a common core of basic agricultural mechanical skills and competencies needed by all students prior to enrollment in a specialized program. These can be provided through Agricultural I and II courses before allowing students to enroll in specialized programs.

There is little hope for uniformity in farm mechanics instruction. Indeed, local differences demand some differences in teaching techniques. It is the writer's position that a core approach emphasizing the five basic areas of agricultural mechanics should precede specialized programs that are designed to prepare students for specific agricultural jobs. The core program recognizes the level of career commitment present in freshman and sophomore students.

We need to see that the core is representative of appropriate breadth and that it adequately prepares students for the specialized portion of the program.

THE AGRICULTURAL EDUCATION MAGAZINE

APRIL, 1980
The agricultural industry in California is very diversified. Over 200 different agricultural commodities are grown and processed in the state each year. This diversity creates a challenge to teachers of vocational agriculture. It also presents a challenge to the development of curriculum for agricultural education programs. As one might suspect, the opportunities for employment in agriculture are nearly as various as the types of agricultural enterprises.

In 1971, O.E. Thompson and others at the University of California at Davis, conducted a study of future employment needs in agriculture in California. This study showed a significant decline in the need for employees trained in production agriculture and a significant increase in demand for employees in ornamental horticulture, agricultural mechanics, and agricultural sales and services. Based partially on the results of this study, the California Agriculture Teachers Association (CATA) in conjunction with the Bureau of Agricultural Education launched a vocational agriculture curriculum development project in 1972. The goal of this project was to develop a competency-based curriculum which would provide a common core of agricultural education material. In addition, the curriculum materials were to be developed which would facilitate the implementation of instructional programs in the taxonomy areas of production agriculture, agricultural supplies and services, agricultural mechanics, agricultural products and processing, ornamental horticulture, agricultural resources and rural recreation, and forestry.

Getting Teacher Involvement

A project steering committee was formed consisting of vocational agriculture teachers from each of the seven geographical regions of the state and representatives from the Bureau of Agricultural Education and teacher education institutions. This committee formulated the policies which were to guide this project in the succeeding years. Among the policies which were of major interest to the teachers was the provision that all curriculum materials developed would provide for flexibility at the local level. It was determined that one course consisting of units of instruction in each of the seven taxonomy areas, the FAA, and supervised occupational experience (stress training in agriculture) would be appropriate in any vo-ag department in the state. This course was to operate as a core course for one region. The local schools would have the option of selecting the instructional programs that most fit their specific needs. Instructional programs in each taxonomy area were to be from 2-3 years in length and designed to follow the introduction to agriculture course.

The next step was the formation of committees of vocational agriculture teachers and industry representatives for each of the seven taxonomy areas. Each of these seven committees was charged with the following responsibilities:

1. Identify job titles in their subject area.
2. Identify skills, knowledge, and attitudes required for the successful performance of the jobs they had identified;
3. Develop a topical outline identifying appropriate units of instruction for an instructional program in their taxonomy areas.

At the completion of the development of the topical outlines for each taxonomy area, instructional unit writers were identified with the aid of the CATA and state supervisors personnel. As was the case with the introductory core course, each unit of instruction was to be written by a vocational agriculture teacher with expertise in that specific area. To date, more than 150 vocational agriculture teachers have been involved in the writing of instructional units for the core course and the seven program components. The introductory course has been pilot tested, reviewed, and used in most of the high schools in the state. The curriculum guidelines for agricultural production, ornamental horticulture, and forestry are available and used in many local programs. The curriculum guidelines for the other instructional program areas will be available shortly.

Curriculum Acceptance

The acceptance of these curriculum guidelines by vocational agriculture teachers has been excellent. Teachers have cited the following reasons for their willingness to utilize these materials:

1. The design of the project (an introductory course followed by two to three years of specialized instruction in one or more of the taxonomy areas) is highly flexible and easily adapted to local needs.
2. The use of independent instructional units allows for increased flexibility.
3. The format of each instructional unit allows the instructor to teach directly from the unit without extensive modification.
4. The learning activities, suggested resources, and transparency masters in each unit of instruction improve the quality of instruction and provide valuable resources to the teacher.
5. The extensive involvement of vocational agriculture teachers in the development of the entire curriculum project kept the materials practical.
6. The ease with which FFA and SOE activities can be incorporated into each instructional program is helpful to the teacher.

Numerous in-service workshops have been held around the state in utilizing the curriculum guidelines in the local school system. All five teacher education institutions have incorporated the use of the CATA curriculum guidelines into their preservice teacher preparation programs. Further development and revision of the curriculum guides continues under the direction of curriculum specialists at the University of California-Davis.

Summary

The primary objective of the CATA-Bureau of Agricultural Education curriculum development project was to develop instructional programs in agricultural education which were consistent with the current career opportunities in California agriculture. An additional objective was to develop instructional guidelines for the core course and the instructional program areas based on competencies required in the various taxonomy areas. A final objective was that vocational agriculture teachers be involved in the development of the structure and content of the curriculum and in the development of all teaching materials to implement it.

The utilization of the curriculum guidelines by vocational agriculture teachers, as measured by their purchase of these materials, is widespread. Whether or not vocational agriculture programs using these materials have undergone the desired changes must be determined after all the guidelines have been available for a sufficient period of time. The fact remains, however, that in order for agricultural education programs to meet the needs of vocational agriculture students and the employment demands of agricultural industry in California, secondary vocational agriculture programs must adopt a competency-based curriculum which provide for specialized instruction in the appropriate taxonomy areas.

Using a Programmable Calculator in Vo-Ag

A new teaching tool that is becoming increasingly popular is the programmable calculator. This aid has found its way into the classroom, laboratory, and field trips of many vocational agricultural instructors. The highly versatile calculator can be used by students to solve agricultural math problems and adult farmers to solve production and financial management decisions. This article will highlight the use of the programmable calculator, its capabilities, and possible uses by a vocational agriculture teacher.

By Larry D. Truss

Programming Examples in Agriculture

Several agricultural programs for the Texas-Instrument TI-59 calculator have been written by agricultural specialists at Iowa State University. Specialists in the technical agricultural fields of agronomy, animal science, farm management, and agricultural engineering have written programs that can be used by vocational agriculture teachers to illustrate and/or demonstrate a specific point in a teaching unit. Each program is designed to solve a specific problem. Examples include analyzing a beef feedlot ration, analyzing the nutritive value of feedlot rations, costs, estimating farm machinery costs, and calculating interest and principal payments. Logically, the livestock ration programs can be used to teach nutrition and rations courses. The basic calculator program will show whether a particular ration meets the nutrient requirements and determine that ration's cost. The division program is written to compare the allowable depreciation for each depreciable method on a particular piece of equipment. This comparison method can be used to make tax purposes.

Several programs have been written to examine break-even prices for purchased feeder livestock — feeder cattle, feeder pigs, and feeder lambs. The calculator will determine the price necessary on a market animal to break even after taking into account all costs of production. Variability exists in that program so that by changing prices and costs, different break even prices will be determined. Therefore, a vari-

(Continued on Page 18)
Agricultural Education In India

By HEMANTH RANJAN
Father's Name: Mr. Pratap Singh, a native of India, is teaching agricultural education in Trissur, Tamil Nadu, High School, Trissur, Tamil Nadu.

In India, the three levels of education are: primary, secondary, and higher education. The agricultural education system in India is based on these levels. Agricultural education in India is provided at the primary, secondary, and higher education levels. The current education system in India is based on the primary, secondary, and tertiary education levels. The agricultural education system in India is based on the primary, secondary, and tertiary education levels. The agricultural education system in India is based on the primary, secondary, and tertiary education levels.

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TEACHING TIPS

Selecting The Right Grinding Wheel

By Jack M. McHargue

Editor's Note: Mr. McHargue taught vocational agriculture at Brookville, Idaho, prior to retirement and is currently in his second position as a teaching assistant in Agricultural Engineering at the University of Idaho.

Cemented-tungsten-carbide cutting tools must be ground on either silicon carbide or diamond grinding wheels.

Position 2 — GRAIN SIZE. Grain refers to the size of the abrasive particles used. The grains are graded according to size by allowing them to pass through a series of screens. The grain size is indicated by a number which refers to the number of mesh per square inch. For example, a 36-grain wheel is one made of particles of abrasive which just pass through a 36 mesh screen, which will be retained on a 46 mesh screen. A 36 mesh screen has 36 openings per linear inch, or 1266 openings per square inch.

A fine grain wheel is preferred for small diameter work and for grinding hard materials since they have more cutting edges and, therefore, cut faster than coarse grain wheels. Coarse grain wheels are used for rapid metal removal on softer materials and for grinding large work pieces. Grain size should be selected by the type of material to be ground, the desired finish, and the amount of metal to be removed.

Position 3 — GRADE. Wheels from which the abrasive is readily worn are termed "soft grade." Wheels that retain the abrasive over a considerable period of use are called "hard grade." Grade is indicated in all bonds by two letters in the alphabet, ranging from A (the softest grade) to Z (the hardest grade). Hard grade wheels are generally used for grinding soft materials such as mild steel. Soft grade wheels are generally used for grinding hard metals such as high carbon steel. A wheel which constantly glazes should be replaced with a wheel of a softer grade. The glaze is removed when the particles are released fast enough so that the wheel does not clog with metal chips.

Position 4 — STRUCTURE. The structure of a grinding wheel refers to the spacing between grains, or porosity of the bond. The structure is rated by manufacturers with numbers ranging from 4 to 15 (open). The rate of metal removal usually is greater for open-grain wheels; however, these wheels generate more heat usually produce a finer finish.

Position 5 — KIND OF BOND. The vitrified bond ("V") is used on 75% of all grinding wheels and is the preferred general grinding. Vitrified-bonded wheels are strong and porous. They are not affected by oils, acid, water, or rapid changes in temperature. The bond is formed when special clays are mixed with an abrasive grain and heated to a high temperature. The mixture forms a molten glass which cements the grain together.

A resin bond ("R") produces wheels with high strength and shock resistance. They are used for large and heavy-duty, high-speed wheels and for rough grinding involving rapid stock removal on comparatively hard work. A rubber bond ("B") produces wheels that are elastic in nature, very strong, and shock resistant. This bond may be used for very thin wheels, such as cut-off wheels. A rubber bond is used for grinding and produces a good finish.

A silicon bond ("S") produces a soft wheel that breaks down readily, thereby exposing new sharp grains. Silicon carbide bonded wheels are used for grinding edge tools, drills, reamers, milling cutters, and similar tools.

A shellac bond ("E") produces wheels that are elastic in nature, resilient, and cool cutting. They produce a very fine finish. They are used for milling rolls, camshafts, and fine cutters.

In the agricultural mechanics lab, an A60M5V1E stone is used for tool sharpening. For grinding carbide cutting tools, the 80C8M6V52 stone is generally used.

Conclusion

Using the right wheel for the job is an important concept to teach vocational agriculture students. We as agricultural educators can help reinforce this principle and make our agricultural mechanics lab a safer place to work by simply choosing the correct grinding wheel to use. We need to educate our students about the standard marking system and to change wheels when the bond in use is not the most appropriate for the job. While this is only one small aspect of an overall agricultural mechanics safety program, such consideration may help prevent that one accident that results from a grinding wheel being shattered in the shop.

BOOK REVIEW


This book is designed as an introductory text in the area of agribusiness management. The author has attempted to help clarify some of the problems facing managers, to provide prospective employers with a better understanding of what their responsibilities are when taking a job, and to assist agribusiness firms in developing personnel training programs.

The text is divided into 16 chapters. It contains a definition of management and a discussion of management, management responsibility, and approaches to management. It is divided into large and small business, financial management, and management controls. Following these chapters, there is an examination of management, management, and financial records as management tools. The final chapter is devoted to the organization of a business, credit, and management controls.

The writing style is simple and straightforward. The book has been more than useful in the application of abstract concepts to an understanding of management.

The author, Dr. Walter J. Willis, is a professor in the Agribusiness Economics Department at Southern Illinois University in Carbondale. The book is in its second edition, with the first one published in 1973.

This book was specifically planned and written as a class text for high school and first-year junior college students. It may also be used by the practicing agribusinessmen for a review and reminder of the basic management functions.

J. Dale Oliver
Virginia Polytechnic Institute and State University

Annual Research Meeting Planned

The Seventh Annual Agricultural Education Research Meeting is scheduled for December 2-3, 1980, in New Orleans, Louisiana. Dr. L.H. Newcomb of The Ohio State University is serving as Program Chairman.

Individuals who wish to submit papers for consideration should do so by June 6, 1980. Additional information is available from Dr. Newcomb at The Ohio State University, 208 Agricultural Administration Building, 2120 Pyffe Road, Columbus, Ohio 43210.
Using A Project Supervision Record Form

By Robert R. Jensen
Editor's Note: Mr. Jensen is a vocational agriculture teacher with the Box Elder County School District in Brigham City, Utah. This article is based on his entry in the Ideas Unlimited competition sponsored by the National Vocational Agriculture Teachers Association.

IDEAS UNLIMITED

For many years, a major strength in vocational agriculture programs has been the close relationship between the instructor and the student under his or her supervision. The traditional on-farm supervised work made by teachers and students has provided a close tie between the farm, home, and school adding purpose and meaning to classroom instruction. More recently, programs in vocational agriculture have expanded to include agribusiness, horticulture, and placement programs in a wide variety of agricultural areas. These efforts have been considered by school administrators to be "ahead of their time" in providing accountability to programs in vocational agriculture.

In recent years, it has been felt in the state of Utah that the student involved in the agricultural program has not fully realized his or her role in the supervision process, and that supervised experience is an extension of the classroom with high priority in the program. Supervised experience is the "homwork" of the agricultural class and that "homework" needs to be completed by the students and made a part of their class work.

In order to provide a better tie between the student and instructor and experience supervision, the vocational agriculture teachers in the Box Elder (Utah) School District, have developed a system of accountability using a Project Supervision Record Form. The form is used as follows:

1. The form is completed by the instructor and student during each farm or agribusiness supervisory visit. (Four copies are made using carbon paper.)
2. The instructor describes and comments on the student's supervision visit and signs the form for completion.
3. The instructor and student discuss and agree upon improvements which need to be made and these are listed on the form under "suggestions for improved performance.
4. The form is signed by the student and instructor as an agreement that the student will make the improvements suggested and the form will assist in these improvements.
5. Copies of the form are kept by students in their agricultural journal or occupational experience record book. Copies of the form are returned to the instructor upon the next visit.

As a vocational agriculture instructor, I have found the FFA to be the most interesting and valuable resource available to promote and develop my instructional program. When I think of my vocational agriculture program, the FFA comes to mind. The FFA is so unique. In fact, if it weren't for the active FFA program in our school, I would either be teaching at another school or be employed in some other less challenging, but more lucrative occupation.

Integral Part

Some teachers of agriculture do not use the FFA organization as an integral part of their vocational agriculture program. All agricultural educators must make the choice to be an FFA advisor or not. For more than 20 years, the FFA has helped me as a member of a chapter advisor and now as a New York State FFA District Trustee. I feel teachers are missing an important and exciting part of their vocational agriculture program if they are not actively involved in the FFA. I can do nothing more than state this without hesitation or mental reservation because I have seen what the FFA organization can do for students in developing attitudes, citizenship, and leadership abilities.

Statements to the effect that the FFA won't work in vocational agriculture programs because students don't want to be associated with it or the administration is against having an FFA Chapter in some cases might be true. To win approval and support from the administration and get the students motivated to be active FFA members, the vocational agriculture teacher must first be interested in the FFA organization and must secondly be willing to devote a lot of extra time without monetary compensation.

Reasons for Success

At the Box Elder County, Snyderville Tioga BOCES Center, we have five active FFA mini chapters consisting of agricultural mechanics, conservation, production and management, general agriculture, and ornamental horticulture. The reasons why they have been successful are:

1. They are an integral part of the educational system. The FFA activities are a combination of the classroom instruction, outdoor laboratory activities, and the supervised occupational experience program.
2. The chapters have been important to our students. They participate in FFA activities such as the Greenhand Degree, Chapter Farmer Degree, and Sub-District Degree. Students participate in local, sub-district, and state contests. Other activities include demonstrations, citrus sales, State and National Conventions, and the FFA-Farm Bureau Governmental Seminars. This participation gives the members the opportunity to learn by doing. It develops leadership through public speaking, working with others, and the discovery of talents.
3. The FFA chapters have been important to the agriculture teachers. Advisors have benefited along with the students by motivating students to use their supervised occupational experience programs to achieve FFA degrees and rewards. Preparing for competition motivates the student to do additional studying.
4. The impact on the school and community has been one of the most rewarding experiences of my teaching career. I know that my role as FFA advisor has helped students in agriculture and that I have helped build a good rapport with the students.

(Continued from Page 19)

deal with problems which require their expertise.

Overcoming Illiteracy

The present program of agricultural education has been proven to be successful in providing an education for the illiterate. The high illiteracy rate of adults, educational progress is slow and on a one-to-one basis. The success of India's efforts to reduce illiteracy will have a profound impact on the developing countries of the world, on Indian agriculture, and on agricultural education in India. With increased literacy, it will be much easier to introduce new agricultural practices.
Honors for Agricultural Education

Members of the agricultural education profession are dedicated to their careers. Awards are made to some of those who serve in an outstanding manner. Several recent award recipients are shown here.

1. Glenn Lewis, retired State Supervisor in Maryland, is shown receiving a Certificate of Merit Award in Agriculture from Robert L. Glucksman, chancellor of the University of Maryland. The presentation was made during an Agricultural Forum held at the University. (Photo courtesy of the University of Maryland.)

2. Honorary Life Membership in the National Vocational Agricultural Teachers' Association is granted to select individuals who have made outstanding contributions to the profession. Recent honorary life members include (left to right): Robert L. Kelley, Kentucky; Ralph W. Edwards, Idaho; and Floyd J. Doering, Wisconsin. John Mundt, NVATA past President, is shown presenting the memberships. (Photo courtesy of NVATA.)

3. Ray Wiegand (left) of Evansville, Wisconsin, is shown being presented with the NVATA Agriculture Teacher Recognition Award by F.J. Koebich, Director of Marketing Services for Pfizer Agriculture Division. The award was presented because Mr. Wiegand advised the National FFA Swine Production Proficiency Award Winner. (Photo courtesy of NVATA.)

4. The six recipients of the NVATA Outstanding Young Member awards are shown here with Robert E. Rowe (right) of the U.S. Steel Corporation. The recipients are (left to right): Richard S. Callahan, Tennessee; Gary Kubicek, Nebraska; J. Larry Every, Oklahoma; Julius A. Fraley, Missouri; Darwin McKay, Idaho; and Bobby K. Waddell, Virginia. (Photo courtesy of NVATA.)