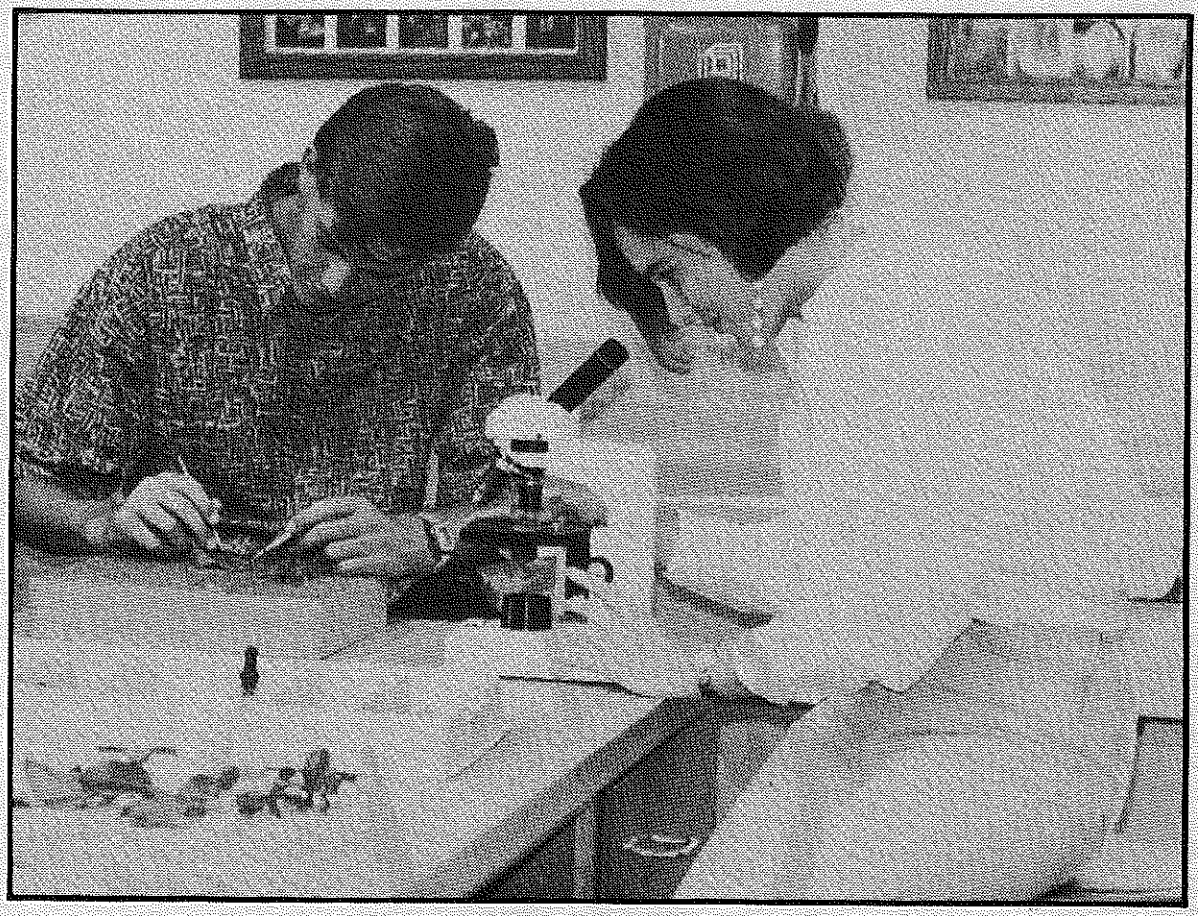
The
Agricultural Education
Magazine

January, 1992
Volume 64
Number 7



THEME:
Becoming More Than *Vocational* Agriculture

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PUBLICATION INFORMATION

THE AGRICULTURAL EDUCATION MAGAZINE (ISSM 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.

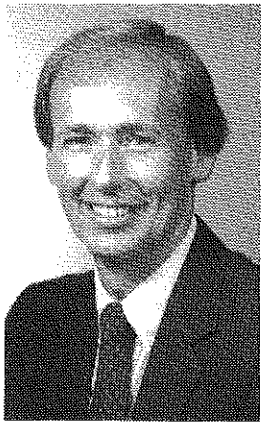
Second-class postage paid at Mechanicsville, VA 23111; additional entry at Henry, IL 61537.

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

Building New Bridges (without burning the old ones)



By ED OSBORNE, EDITOR

Dr. Osborne is Associate Professor and Program Chair, Agricultural Education, University of Illinois, Urbana-Champaign.

If you had the chance to take a vacation this summer and travel the roads of America, you probably became frustrated, like I did, with the tremendous amount of road construction (maintenance) that you encountered. But we all know that this work is necessary for a smooth, successful ride. Our roads in vocational education have been well travelled for many years, and some repairs have occurred along the way. However, the last major "repairs" affecting traffic flow in agriculture were completed nearly 30 years ago, and we have continued to travel many of the same roads for the past 75 years. Maybe it's time to build some new bridges.

The question looms overhead like a fierce thundercloud. Is agriculture in the secondary schools *only* vocational in nature? Can it *only* be vocational, or can it be something else *at the same time?* Can we have our cake and eat it, too? No doubt, we have begun to seriously explore these questions, and we even have several groups of architects dreaming of more prosperous days ahead. But progress is slow; this is no simple repair job but rather a new bridge that must be built.

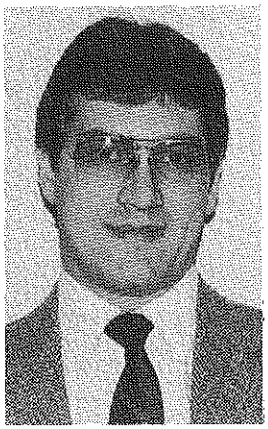
Perhaps we have come to a time in agricultural education where we can no longer depend solely on our vocational ancestry to ensure our wealth in the future. We have reached a position where continued classification as only a vocational subject has become restrictive. Agricultural educators across the U.S. at every level have begun to locate strategic points for building new bridges which have exciting, innovative, and wide-reaching designs. This is not to say that traffic will not/should not continue to flow on existing bridges and roadways. But in addition to this, we must expand our traffic flow into new territory yet unseen. We need the Gene Roddenberrys of agricultural education to step forward and pioneer these efforts.

We are clearly making significant progress in revitalizing agricultural education in the secondary schools. Some outstanding new curricula have been developed that loosens the grip vocational education has had on agricultural education for so many years. But the hold is still tight. These fantastic new products are being marketed through traditional methods. Innovation is being forced to fit into current, rigid molds that leave little or no room for new shapes and designs. The principle of best fit is being ignored. Diverse, new agricultural education curriculum materials for secondary schools have purposes that include, but go significantly beyond vocational education objectives. It's time we openly stated our purposes as *both* vocational and general (nonvocational). After all, anyone who has taught high school agriculture knows that this is exactly what we have been doing all along.

Oddly enough, at the university level we find ourselves in much the same predicament. Exciting ideas are taking shape which, if fully implemented, would make teacher education only one component of a comprehensive undergraduate program. When individuals ask what we do in our university programs, do we *start* with teacher education or do we *stop* with teacher education? The same applies to secondary level agricultural education. Do we describe ourselves by only starting with vocational education, or do we mention vocational education purposes and then stop? How can we get others to draw a complete sketch of what we do and who we are? Can we continue to only be affiliated with vocational education departments, AVA, etc.? Why can't we continue these relationships, where positive, yet establish new, meaningful relationships in other arenas?

Agricultural education today is much like Columbus in his quest to reach the New World. Like Columbus, our eventual destination is unknown. Untested waters must be travelled. With poor navigation and a lack of pioneering spirit, know-how, perseverance, means of travel, and necessary support (people and money), Columbus would have never reached the New World. Could we be on the brink of a major new discovery in agricultural education? The journey has already started. We must continue to guide our ships on a true and successful course, even when the odds stack up against us. It is not enough to merely set sail, we also have to be prepared to make the long and sometimes difficult voyage until we reach our destination.

A Parable on Destiny



By GEORGE WARDLOW, THEME EDITOR

Dr. Wardlow is Associate Professor, Agricultural Education, University of Minnesota, St. Paul.

A short time ago there was a very rare species of plant discovered in a previously-remote jungle. It seems that this plant may be the single source of a natural substance which has the potential for curing cancer. The unfortunate thing is that there are only some 10 or 12 of these plants in the only remaining patch in existence, and that patch sits directly in the path of a major roadway planned for the economic development of the region. In fact, the plants were discovered quite by accident by a construction worker who was an amateur botanist and only hours before they were to be plowed under. Not sure of what he had found, the worker called his discovery to the attention of a government bureaucrat who promptly posted a quite small and nondescript red flag at the site. The government worker then clipped off five or six of the plants as specimens, stuffed them into an envelope, and addressed them for shipment to his superior in the capitol city. Enclosed was a note that read, "Is this worth anything?" Being at a remote site, he threw the envelope in the back of his company car and promptly forgot about it when he got the car stuck on his way to the local cantina at the end of the day.

On cleaning the car out a week later in preparation to transport some friends to a personal function, he ran across the envelope. Fearing that he may be in trouble for his less than timely action on the matter, he placed the envelope on the ground and drove the car across it several times before he placed it in the hands of the mail carrier to make it look as if the delay were caused by someone else long after he had dispatched it.

Several days later a highly paid and underworked government employee charged with opening official-looking mail opened the letter and the now flat plants fell out. Upon reading the note he wondered if he accidently had become the middle man in some illicit trade and took it upon himself to keep two of the specimens and a photocopy of the note for safekeeping in case he later needed to clear himself. These he put in a plastic bag that he had left over from lunch and stuffed them in his coat pocket. As good bureaucrats then do, he wrote on the original something to the effect, "Beats me." He then placed it with the remaining specimens in the in-basket of his superior, who was out of the country at a professional meeting for a month.

That night he found himself among friends and in particularly good spirits at a neighborhood social establishment when he decided that he should buy the next round of refreshments for all of his associates. Upon reaching in his coat pocket to retrieve his wallet, he found it covered with a sticky plastic bag. Not in the mood to deal with the unplanned, he threw the bag on the table where it was soon covered with empty bottles and peanut shells.

Some hours later a waiter was cleaning up the table and discovered the odd-looking plants. Since his fiance' was a graduate student in plant sciences at the local university, he thought that it may be of some interest to her, so he took it home. Upon hearing his story she was delighted that he had been thinking of her as he sorted garbage, and she tossed the bag in the corner with the rest of her things. Later that week, being a procrastinator, she found herself facing a deadline for completion of her class assignment on producing a specimen board of plants from the genus Mundane. It was late at night, she was tired after serving as team captain for the intramural water polo championship game, and she was only one plant short. The professor would hardly look at the plants anyway and wouldn't notice one incorrectly identified. So she slipped in one of the specimens from the waiter's work.

Meanwhile back at the construction site, the workers had carefully moved around the little red flag as they are trained to do in earthmoving school and had left a nice column of soil some six feet across and five feet high squarely in the middle of their work. This they were determined to leave until the appropriate engineer would tell them to do otherwise. In the meantime the government official who had placed the flag was transferred and demoted for using his government car for personal business.

After class the next day as the professor carried all the specimen boards back to his lab he dropped them. Scattered all over the floor, he picked them up and the one with the rare specimen appeared on top. All the way down the hall he tried to remember if he had ever before seen the plant on the bottom left corner of the board labeled, "Mundanus agedicus (Linneus: Wardlow)."

Since he only had a faculty meeting scheduled that afternoon, he decided to look up this plant in his trusty manual entitled *Plants: From the Boring to the Really Weird.* Not finding it anywhere, he called a fellow researcher from the medical school who was internationally known for grinding up mass quantities of plants and force feeding them to rats to see what happened. It was a good relationship because the medical researcher got free plants for his experiments, and the professor was able to clean up his lab of all those class projects every quarter.

The researcher was unable to determine what the plant was. He determined that the best course of action was to take one of the two specimens, grind it up into a pulp and feed it to a rat. Unfortunately (or fortunately, depending on one's perspective) the only rat available was one that was quite inflicted with cancer from a previous experiment. Upon eating the plant, the lesions on the rat immediately began to disappear.

Realizing that they might have something that might result in a journal article or some outside consulting, the researcher and the professor set about the task of determining where the plant had come from. The original government employee who had written the note had done so on a piece of personal stationery with the heading, "From the desk of _____, but who cares?" Through this they were able to track down the original patch of plants which had, by this time become a planter in the middle of a village that had sprung up as a result of a bend in the new road. The centerpiece plant was a few specimens of the original, neatly labeled **Agricultural Education.**

The Moral

As you may have guessed by now, little of this is true but none of it entirely implausible. I have had this nightmare several times with different outcomes. Who knows what wonders of the world are eliminated by ignorance? Not everyone recognizes a good thing when they see it.

I believe that agricultural education has some wonderful cures for the ills of general education. For example, it has served as a vehicle to teach social values, love for and responsibility to community, cooperation, leadership and self-determination. All of these things are being widely identified as essential and yet they are missing in public education today. Work-specific technical skills associated with agriculture are not widely discussed as essential for the multitudes. Attention is on preparing our students for world challenges of tomorrow, not of today.

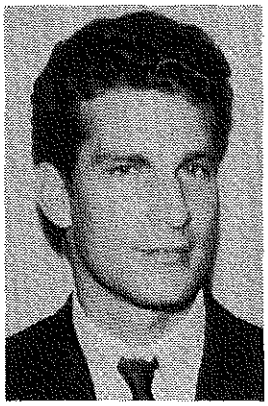
Agricultural education is a wonderful program, but in a very complex and serendipitous world it could get lost in the shuffle. So, who's job is it to ensure that this "cure" has the chance of being applied to some of the ills of education? Your's and mine. Uninformed people are making decisions about agricultural education. We cannot sit idly and let someone else determine our destiny. Neither can we let chance determine it. But before we can act, we must understand for ourselves what agricultural education is as a unique program. We cannot think of agricultural education in old contexts, because "new roads" are being built.

Following are several articles which emphasize that it is **both** the technical content of agriculture and the skills of life that make agricultural education a unique flower. Because of that, it is more than vocational.

About The Cover

Matt Conroy and Kari Nelson, Fullerton High School students, are conducting laboratory exercises which illustrate concepts in agricultural cellular biology (Photo courtesy of Greg Beard, Fullerton High School, Fullerton, California.)

The Race Toward Academics Through Agriscience



By CARY J. TREXLER AND SHEILA BARRETT

Mr. Trexler is Regional Specialist, Agricultural and Extension Education, Michigan State University, East Lansing. Ms. Barrett is an agriculture teacher at Fullerton High School, Fullerton, California.

In the mid-1980s, state boards of education began to respond to recommendations in the *Nation at Risk* (1983) report. As a result of their deliberations, graduation requirements for high school students became more stringent. In many high schools, students were required to take more courses in such academic subject matter areas as English, math, and science. Therefore, students had fewer opportunities to enroll in elective courses. As a result, vocational agriculture enrollments nationwide suffered. To counter declining enrollments, many states began to revise their vocational agriculture curricula. Alterations featured a scientifically based curriculum to meet secondary science graduation requirements through agriculture courses.

As agriculture curriculum revamping progressed, the National Academy of Science released its report *Understanding Agriculture: New Directions for Education* (1988). The report stated that:

> Ongoing efforts should be expanded and accelerated to upgrade the scientific and technical content of vocational agriculture courses. The "vocational" label should be avoided to help attract students with diverse interests, including the college bound and those aspiring to professional and scientific careers in agriculture. Agricultural courses sufficiently upgraded in science content should be credited toward satisfying college entrance and high school graduation requirements for science courses in addition to the core curriculum (p. 35).

Thus, the National Academy of Science fired the gun signalling the start of the agriscience curriculum race.

Within a short period of time, statewide programs shifted from vocational agriculture to agricultural education in an attempt to become more than vocational. To meet this goal, most curriculum developers followed a similar path; they examined statewide science objectives and compared them to existing objectives in agriculture. Most developers found inherent commonalities when comparing the science objectives with agriscience courses; this discovery validated the assertion that agriscience education could clear the academic hurdle. Because of progressive insight, many states have crossed the finish line, developing agriscience curriculum models for other states to follow. However, even as states have adopted these models for their own use, dramatic changes in science education have created further challenges for agriscience educators and for the new curricula they have been developing.

In 1988 national research prodded the agricultural education profession to change; today science education is being challenged. The American Association for the Advancement of Science (AAAS) released its landmark report *Project 2061: Science for All Americans* (1989). The project's implementation is expected to span a decade or more, and consists of three phases:

> Phase I developed a conceptual base for reform by defining the knowledge, skills, and attitudes all students should acquire as consequences of their total school experience, from kindergarten through high school.
>
> Phase II will develop a variety of curriculum models that school districts and states can use as they undertake reform of the teaching of science, mathematics, and technology.
>
> Phase III will set a foundation for collaborative efforts with scientific societies, educational organizations and institutions, as well as others interested in reforming science education. (p. 14)

The nationwide report recognized widespread deficiencies in our educational system and established a foundation for reform in science education. The report's major revelation was that "most Americans are not scientifically literate" (p. 13). This contention is startling, since our global economy has become increasingly dependent upon science and technology. If Americans are not scientifically literate, how will we compare in the world market? Furthermore, how will our nation's electorate make informed decisions about

future scientifically related socio-ethical concerns? Finally, how do these concerns affect the agricultural education profession?

As agricultural education becomes more than vocational, we can no longer justify running solo along a narrow track; rather, we must heed research in science education, adopt significant findings, and join our new teammate in running a relay race into the 21st century.

Agricultural educators should be cognizant of the report's findings because we must not only prepare youth for employment, but we must also educate students about the broader societal implications of agriculture. Further, because agriscience courses may, in some cases, be the only science courses in a student's curriculum, agricultural educators have an obligation to incorporate these broader dimensions in the classroom. As agricultural education becomes more than vocational, we can no longer justify running solo along a narrow track; rather, we must heed research in science education, adopt significant findings, and join our new teammate in running a relay race into the 21st century.

As agricultural education joins science education in the race toward scientific literacy, Project 2061's philosophical themes demand our attention now. Two of the report's four themes have the greatest immediate implications for agricultural education. Theme one contends that science curricula are inundated with facts at the expense of concepts. The second, and perhaps more important theme, stresses that most current teaching practices hinder, not help, student mastery of scientific concepts. Agriscience education, without immediate remediation, may follow this path and forsake its applied learning heritage. Therefore, agriscience educators should implement Project 2061's findings by re-evaluating curriculum and further modifying teaching practices; this will better position us to prepare our students for the future.

Theme #1

The Present Curricula in Science and Math Are Overstuffed and Undernourished. In order to meet science graduation requirements in many states agriscience curricula are based upon science objectives. As a result, many agriscience curricula have swelled to encyclopedic volumes of information. Many educators, instead of wisely editing course materials, have sacrificed judicious selection for expanded content.

Agricultural educators need to incorporate a philosophy that is slowly being implemented in science — "less is better." In other words, educators should determine the essential concepts students must learn and focus all efforts on teaching those concepts. *Science for All Americans* (1989) asserts that students learn best when "ideas and thinking skills are emphasized at the expense of specialized vocabulary and memorizing problems" (p. 4). Therefore, agricultural educators should make every attempt to incorporate activities that encourage students to apply knowledge, not just regurgitate information. Moving toward a "less is better" concept will not be a simple task, since present curriculum approval is based on content, not student mastery. To successfully prepare our students for lifelong learning, attention should be focused on specific concepts and proper teaching techniques. Agriscience educators must realize that "less is better" and "less means more learning."

Theme #2

Methods of Instruction, Far from Helping, Often Impede Progress Toward Scientific Literacy. To improve agriscience instruction, educational principles that assist students in mastering the art of learning should be utilized. In *Methods of Teaching Agriculture* (1986) Newcomb, McCracken, and Warmbrod suggested that what is to be taught and how subject matter is structured and organized are the most important factors in ensuring effective instruction. In addition, they pointed out, "teaching that is creative, interesting, and challenging to students . . . results in students achieving a high level of mastery . . ." (p. 26). To achieve mastery learning, teachers can incorporate three teaching practices: conceptual learning, connected learning, and discovery learning (Boyer, 1983; Sizer, 1985; Osborne and Moss, 1991).

Conceptual Learning

The first step toward advancing student learning skills begins with the curriculum. In the past, our content was based primarily on learning vocational skills. In today's agriculture classroom, textbooks or outdated course outlines often determine content. However, for effective learning, the curriculum should stress major concepts, not unconnected pieces of information. According to *Biological and Health Sciences: A Project 2061 Report* (1989), "the mode of teaching should not be

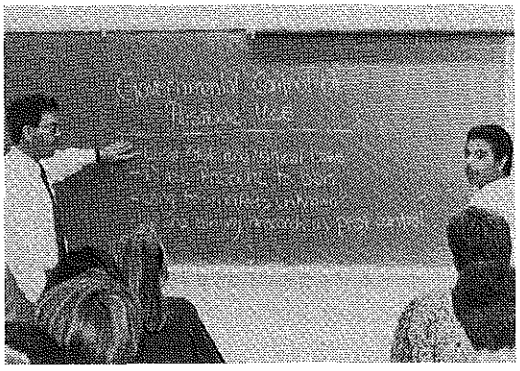
directed at their [the students] learning specific tasks to flesh out the framework, but rather at opening windows for them on facets of the living world" (p. 5).

Through conceptual learning, instructors break down course information into major concepts. They then organize concepts so they build upon each other. For example, rather than beginning the year learning how to measure and convert metrics, the students conduct feed analysis or water quality experiments where accurate measurements are essential. As a result, students learn metrics while conducting experiments. Rather than seeing science as one unconnected topic after another, students see it holistically and develop conceptual foundations where new information can build.

Integration of conceptual learning will take much work. Agricultural educators will need to take existing resources and reformat information so sequencing is based upon essential scientific concepts. Though initially time consuming, the result is improved student understanding. Through conceptual learning, students relate concepts to actual situations and master scientific theory.

Connected Learning

In addition to focusing only on major concepts, students must be able to connect new information to what they already know. Furthermore, educators should help students relate information to other disciplines. As agricultural education becomes more scientific, educators should not only stress inter-relationships between agriculture and science, but also technology and society. When teaching modern scientific technology, discussions on how society influences advancements would connect agriculture to societal concerns. For example, in the United States, societal pressures ban the use of many pesticides. Yet, in other countires, the same chemicals are extensively utilized. Through the integration of relevant examples, such as the contrasting restrictions in pesticide use, students interconnect semmingly unrelated subjects.

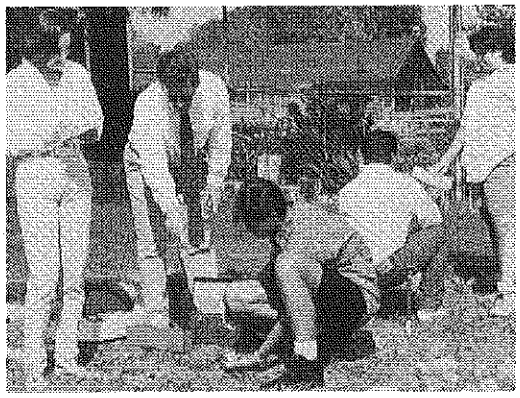


Michael Clifford, instructor at Fullerton High School, utilizes the connective learning strategy by including classroom discussions on governmental control of pesticide use. (Photo courtesy of Greg Beard, Fullerton High School, Fullerton, California.)

In addition to connecting to other curricular areas, we need to relate new concepts to what the student knows. For example, when students begin learning about animal nutrition, we should link our discussions to human nutrition. By connecting the concept to what the learner already knows, we increase student retention and comprehension.

Discovery Learning

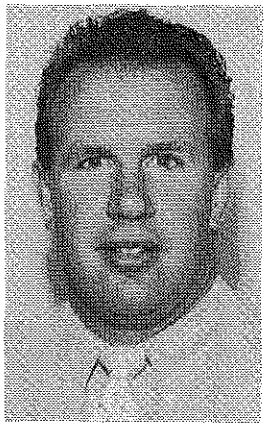
Through discovery learning, students learn concepts in laboratory activities. A technique incorporated into agriculture classrooms in 1917, teachers have slowly moved away from the use of this practice as content volume has increased. But, "children learn science best when they are able to do experiments, so they can witness science in action" (USDE, 1986, p. 24). Rather than educators telling students that salt water causes most agricultural plants to wilt, students should experiment with the effects of salt water on plants. Though classroom experimentation takes more time than lecture, students conceptual understanding increases significantly.



As part of their field research, instructor Michael Clifford and his students collect soil samples from throughout the community which will be analyzed for soil microorganisms in the classroom laboratory. (Photo courtesy of Greg Beard, Fullerton High School, Fullerton, California.)

Effective science instruction is dominated by laboratory activities. According to Mike Brugh, coordinator of secondary science in California, "at least 40% of class time should be spent on laboratory-based activities." As agricultural educators, we should follow this rule. However, our laboratory activities should differ greatly from typical science classrooms. In addition to classroom laboratory exercises, we can take our students into the field. There, whether it be in rural or urban settings, research experiments can be conducted that emphasize the application of physical and biological sciences to the management of agriculture and the environment. Through these activities, students gain an appreciation for discovering the world.

Landscape Horticulture at Anoka High School: More Than Mere Skill Development



By PETER D. TREMAINE

Mr. Tremaine is a landscape horticulture teacher at Anoka Landscape Center, Anoka, Minnesota.

As we approach the year 2000, agriculture is taking an entirely different perspective in terms of curriculum. Agriculture instructors looking to the future are making major changes in their programs to make agriculture more relevant for today's youth. Courses in horticulture, landscaping, natural resources, fish and wildlife management, small animal care, and leadership have been added in order to meet the wants and needs of students of the nineties. With the increasing number of students today pursuing postsecondary education, the program must be designed to meet individual needs and differences. Agricultural education cannot simply justify its existence on the basis of the employment needs of today. Teachers of agriculture need to keep an open mind and make the necessary changes for the good of the program and the students involved.

Course titles have also become an important consideration when restructuring a program. The word "vocational" must be eliminated. If not, the program is often perceived to lead only to blue-collar work, which creates peer pressure not to enroll. The enrollment at Anoka Senior High School in Minnesota changed drastically when the title "vocational agriculture" was eliminated and the landscape horticulture curriculum was created. With more parents urging their children to pursue higher education, agriculture programs must be promoted as more than simply "vocational" agriculture.

The landscape horticulture program at Anoka High School consists of a yearlong, two-hour block class, a one hour semesterized introductory horticulture class, SAE programs, and the FFA. Classes incorporate classroom instruction with a

(continued from page 8)

Sprinting Toward the Finish Line

As agriscience education races toward the 21st century, educators must ensure that students learn to think critically and creatively, while mastering essential content. To accomplish this, three essentials must be remembered.

(1) Develop curricular modules that focus on key concepts,
(2) Improve the teaching of science, math and technology in agriculture classrooms, and
(3) Develop a realistic understanding of what it will take to achieve reform.

Agriculture programs have always provided students a nonparietal education. Therefore, proven educational practices should not be discarded as advanced academic concepts are infused. Our next steps in continuing to become more than vocational are to adopt the "less is better" concept and work closely with science educators, thereby clearing the track as we join our teammate in the race toward academics through agriscience.

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variety of experiential activities which allow students an opportunity to experience education that is real, practical and useful. The program was designed with the basic premise that most students at Anoka High School do not see horticulture as a lifelong vocation. However, these same students see a definite use for horticulture in terms of avocational pursuits. The life skills that students gain throughout the landscape horticulture program are priceless.

Agricultural education cannot simply justify its existence on the basis of the employment needs of today.

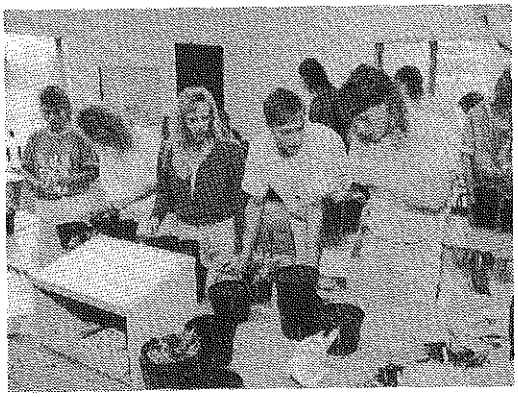
Students who enroll in landscape horticulture come from a wide array of educational, economic, and social backgrounds. Because this an elective course, many special program students are "mainstreamed" into the course. The curriculum must be adjusted to meet the needs of these diverse students. Group interaction and social skills take precedence over vocational skill development. Teamwork also plays an important role in the success of the landscape horticulture curriculum at Anoka High School. Many outdoor activities around the school building involve group interaction (teamwork). Students appoint a project supervisor and share in the duties necessary to complete the required task. The real-life experiences that students face often provide much more than simply vocational skill development.

Students are often confronted with a variety of problems while working on their team projects. Many of these problems can be found in any type of job. The landscape projects not only provide a work experience, they also allow students to demonstrate pride in their school and build a positive self-image.

The real-life experiences that students face often provide much more than simply vocational skill development.

Higher order thinking skills are encouraged throughout the program. Problem solving, case studies and research projects are all tools that have been used to explore the world of horticulture and at the same time give students the opportunity to build on the basic concepts. Cooperative learning is encouraged and plays a big part in the curriculum because of the vast background differences of the students involved. The students work in groups of two to four members; sharing ideas, expressing opinions, and making decisions. Individual marketing of one's self also is important. Demonstrations, résumé development, job interviews, and other job seeking skills help in the development of the "whole" student. These exercises help to promote self-confidence.

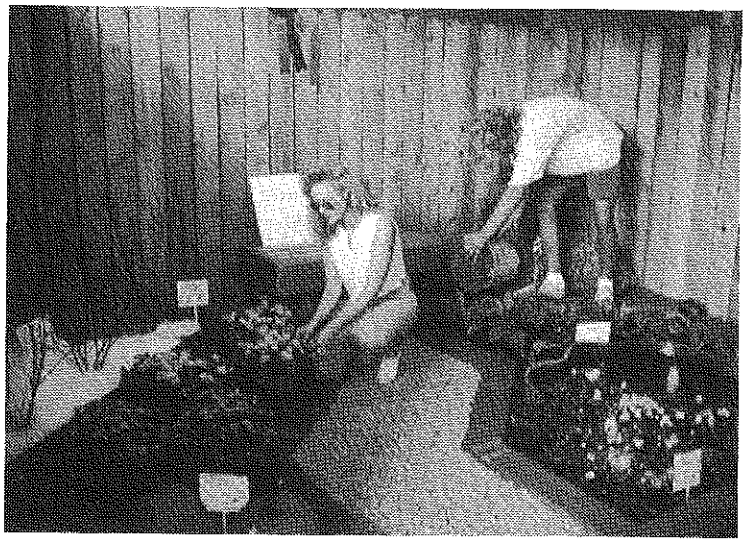
Journals and portfolios are a required part of the landscape horticulture program. Students are required to make daily entries in their journals, recording such things as what they did in horticulture on that particular day, what they liked about the exercise, and what they didn't like. This is often substituted as a measurement tool instead of using a traditional test. These portfolios give students an opportunity to display several pieces of their work each quarter. This provides them with a chance to tell why they felt good about a particular unit, what their role was in the unit, and any changes they would suggest. This encourages higher order thinking and at the same time serves as an evaluation tool. The SAE program at Anoka is built into the school day. Since SAE is centered around a lab simulation setting, journals are an important component of the monitoring process.



Cooperative learning in a lab simulation allows students to solve problems and answer questions together. (Photo courtesy of Peter Tremaine.)

FFA and landscape horticulture are intracurricular, so there are many opportunities for students to experience success and gain recognition. The many leadership activities that the FFA has to offer can also be used as a "stepping stone" for the development of the "whole" student. Several years ago, the Landscape Horticulture Club (FFA) was accepted for fine arts status within the high school. Thus, students who participate in the various landscape horticulture activities are eligible for a fine arts letter. This enables a student involved in the landscape horticulture program to receive the same recognition as a person partici-

pating in band, choir or drama. The Anoka Landscape Horticulture Club (FFA) also donates 1-2 scholarships each year. These are awarded to a student(s) who is enrolled in the landscape horticulture class, actively involved in club and community activities, and is pursuing some sort of postsecondary education. The program encourages higher education and doesn't discourage anyone.



Students caring for their award winning horticulture display at the Minnesota State Fair. (Photo courtesy of Peter Tremaine.)

Another key to the success of any agriculture program involves collaborating with the general education sector. The personality of the agriculture teacher plays a big part in the willingness of other academic areas to work together. There is a trust factor that must be established for cooperation to be successful. Agriculture lends itself to several core areas of study. Science probably has the closest tie with the landscape horticulture program. Anoka High School offers science credit for students enrolled in landscape horticulture. This approval was gained by establishing a close working relationship with the science department and informing them of the particular curriculum components. Several years ago, the school district rewrote the horticulture curriculum and allowed the agriculture and science departments to work together to fulfill each course's objectives and expectations. The two agriculture teachers are also a regular part of the monthly science department meetings and social functions. Classrooms and greenhouse space are shared by the departments. By working closely with the science department, the agriculture department has been able to establish a well-rounded curriculum which better meets the needs of the students enrolled.

Another key to the success of any agriculture program involves collaborating with the general education sector.

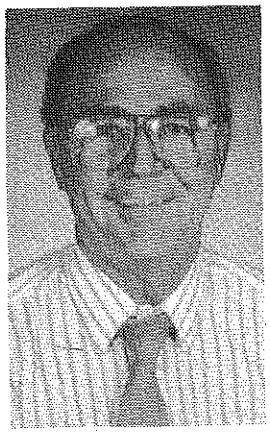
The math department is also tied in with the landscape horticulture department. Landscape horticulture students enrolled in business math are provided with problematic exercises that build on the concepts and theories covered in their landscape horticulture class. Square footage, cubic footage, and timber wall area calculations are just a few of the instructional areas that are explored. This enables students to experience more practical exercises in their business math class and, at the same time, reinforce mathematics concepts via landscape horticulture exercises. Much of the success that students have experienced in their math skills can be attributed to the close working relationship the agriculture program has established with the math department. Enrollment rosters are shared and assignments are developed so that students can receive a positive experience in both programs. The proverbial question of "Why do we study this?" now has a concrete answer through the integration of these disciplines.

Vocational and academic education must integrate. Together there is strength.

Social studies is another general education area which is integrated into the landscape horticulture curriculum. Students are required to bring in current events articles each week for discussion. The discussions are modeled after the methods used in the social studies department. This activity also encourages students to do some out-of-class reading and newspaper familiarization. A horticulture career unit was designed after working closely with a social studies teacher. The unit is similar to the career presentations that seniors are required to do in their senior social studies class. The insight that the social studies department has provided has been very helpful in the development and implementation of this program.

Other areas (i.e., English, art, etc.) can also be integrated with a little imagination and teacher coordination. The process simply requires instructors to work together. Why separate vocational and general education when our purpose as teachers is to educate the youth of tomorrow? Our school district's motto is "every student will learn." If this is to be ac-

Teaching Career Readiness



By DAN FLANDERS

Mr. Flanders is an agriculture teacher at Okemah High School, Okemah, Oklahoma.

Many have expressed their concerns that vocational agriculture classes will soon be a thing of the past, one of the many dinosaurs of our educational system that is no longer needed and cannot function properly in today's world of closely scrutinized curriculums. With all public schools carefully screening where and how their monies are being spent, this certainly should be a concern. In today's complex, modern world, the family farm has all but ceased to exist. Students can no longer be taught how to farm in a classroom environment. In school systems without school farms and farm equipment, the students who eventually farm as a career are, in most cases, more knowledgeable about today's modern farming techniques and equipment than the agriculture teachers hired to teach them. This does not mean that agricultural education needs to be dropped from the curriculum. However, nothing can continue to live and improve without change, and the name change from "vocational agriculture" to "agricultural education" is a step forward for several reasons.

First, the name change will help the program by removing the stigma that the word "vocational" too frequently carries in today's educational society. While administrators, counselors, parents, and even students often shy away from classes which include the word "vocational," they will readily admit the expansion of, and the need for, careers in agriculture — careers which usually require a college degree. Jumping this hurdle means more college-bound students enrolling in agriculture classes, and in many departments student numbers have been a concern.

Secondly, agriculture teachers can no longer teach "vocational" agriculture. In our fast paced technological world, what we teach today about agricultural methods may be outdated before our students even reach the job market. Techniques change too rapidly, new machines are introduced, or new materials become available. With public school funding facing crisis after crisis nationwide, the possibility of keeping updated equipment and training is nonexistent.

Also, many companies prefer to train their employees to do their jobs based on company standards and offer training sessions or courses for this purpose. They expect to train their employees on their equipment using their techniques.

So, what do we as agriculture teachers do? Start training for a new career? Do we have to change our entire curriculum?

(continued from page 11)

complished on a national basis, it's going to take a full-fledged effort by all parties involved. Vocational and academic education must integrate. Together there is strength.

I believe that integration is the key to success for secondary education as we approach the 21st century. Agriculture teachers must be willing to change and adapt to student needs. In order to successfully integrate agricultural education and general education, a close working relationship must be established with teachers, guidance counselors, and administrators. By integrating academic and agricultural education, we promote greater intermingling of students in both curricular streams. Because we have stressed more than simply "vocational training" at Anoka High School, a wide array of students has been attracted, most of whom go on to some sort of postsecondary education.

The program is more than a skills course. It contributes more to the life of the students than merely providing life-long horticulture skills. This integrated program makes the entire educational experience of all students enrolled in the agriculture program rich and meaningful. Agriculture is really integrated into the Anoka High School curriculum.

In spite of the fact that teachers of agriculture are being released from some programs, this program of integration has resulted in the addition of an agriculture teacher to the staff at Anoka High School. The key to success is developing a well-rounded program that focuses on more than mere skills development.

Definitely not! I propose a simple change of curriculum objectives. Instead of concentrating on teaching students how to farm, raise livestock, weld, or operate greenhouses, let's concentrate on teaching students to believe in their ability to perform, to think, to have good work habits, and to be willing to try. Whether college bound or career minded, agriculture students will benefit from these objectives, which will prepare them for college or for life.

. . . let's concentrate on teaching students to believe in their ability to perform, to think, to have good work habits, and to be willing to try.

Give these students job readiness skills for any type of job they wish to pursue. Improve their self-esteem and their confidence by using agriculture as the basis for the classes and the lessons. The agriculture classroom readily lends itself to these objectives and allows all types of students to excel.

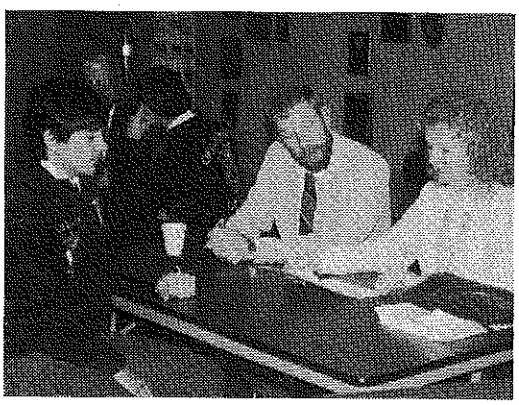
We must ask ourselves for what the students need to be prepared. Today's employers too often complain that new employees do not know how to work. They want employees who have good work habits, i.e. promptness, neatness, organizational skills, social skills, communication skills, pride in performance and achievement, the ability to cooperate with others, the ability to follow directions, responsibility, and a good attitude toward work and their workplace. Instead of vocational training, let's teach career readiness.

Instead of voational training, let's teach career readiness.

This can be done easily by using our current curriculum. For instance, while many schools do not have the equipment, materials, or space to teach a student to become a master welder, a laboratory class of any kind (whether welding, electricity, plumbing, or woodworking) offers students the hands-on experience of creating something for themselves. This experience cannot be duplicated, and unfortunately, many students in today's society of two working parents or single parent families seldom have the opportunity to build self-pride in this manner. This becomes apparent when pride blooms on the face of the students telling someone, "I made this". Self-esteem improves, confidence grows, and the activity teaches the importance of planning, the appropriate way to use equipment, problem solving skills, math skills, and self-expression.

The required SAE program offers a chance for students to learn and practice good work habits and responsibility on an individual basis. With teachers to guide and oversee these projects, giving positive or negative feedback as needed, the student learns in a non-threatening atmosphere knowledge and skills which can mean the difference between success and failure on the first job.

While SAE programs offer many individual opportunities, they certainly are not the only place in the agriculture program where work habits can be practiced and refined. Laboratory projects, classroom assignments, leadership activities, and group work all offer excellent opportunities for the teacher to promote the importance of good work habits. Often, students will work harder for, and relate better with, teachers of elective courses. Work habits learned here will inevitably carry over into other classrooms and other situations.



FFA students organize and conduct a Career Day for the entire high school. Students are responsible for polling students about what careers they are interested in, contacting businesses and making arrangements for speakers, greeting speakers and escorting them to classes.

A modern agriculture classroom also addresses the need for good communication skills in the workplace. All students should be required to give a talk (the word speech is frightening in itself) at some time during their school career. Overcoming the nervousness of standing before a group of people (especially peers) and communicating ideas requires determination and self-discipline. Every job requires expressing thoughts in a coherent manner, whether written or oral, and presentations provide good practice — practice which makes it easier the next time around, especially if the situation is less formal. Creed presentations, speech contests, livestock judging reasons, parliamentary

procedure teams, meetings, and many other instances require students to participate through communication. One activity I find particularly enjoyable for the students is the creation of a video. I ask my students to work in small groups to write, design, act-out, and film a commercial which sells the FFA. Communication skills improve, we have fun doing it, and we use commercials selected as the "best of the rest" to recruit in the middle school just prior to enrollment and to show at banquets, business breakfasts, etc. Students practice writing, speaking, and research skills. They become familiar with video equipment and editing processes, and at the same time learn more about the FFA organization and what it has to offer.

Opportunities abound in agriculture classes to train students in social skills. Group work in the classroom and lab, committee work, meetings, leadership activities, and community work are a few examples. Travel to contests, fairs, conferences, and conventions place students in situations where they have to meet and talk with new people. They learn from their peers and through trial and error what is accepted and what is not, and for many students, these opportunities are not presented anywhere else.

A modern agriculture classroom also addresses the need for good communication skills in the workplace.

Most importantly, agriculture teachers have a better opportunity than most teachers to affect a student's attitude. Students need an adult role model — someone they can talk to and trust in. The agriculture curriculum offers many chances for teachers to know their students. Many other teachers never meet the student's parents, do not know where the student lives, and do not have the opportunities to converse one-on-one with the student. I have often told new teachers that I do my best teaching facing a windshield. Try reaching out to these young people and you will be rewarded for your efforts.

As teachers we can and must instill a "can-do" attitude in our students. The belief that anything is possible with enough effort and thought can do more to change a personality than all the preaching and teaching in the world. This positive approach to work and learning can be taught. Respect for the student as a person, the willingness to help the student succeed, the expectation that the student can and will succeed, and the desire to know about the student's family, activities and wants all help the teacher to reach out to students on their levels and affect attitudes.

So, by teaching social skills, work habits, thinking skills, self-esteem, responsibility and attitude improvement using agriculture as the common factor in the curriculum, students emerge with enough knowledge for them to make an intelligent decision about whether they wish to pursue a career in the agriculture field. If not, for those who have the desire to work, the capacity to solve problems, the ability to think, and the ability to express their thoughts effectively, a job will not be hard to find.

. . . agriculture teachers have a better opportunity than most teachers to affect a student's attitude.

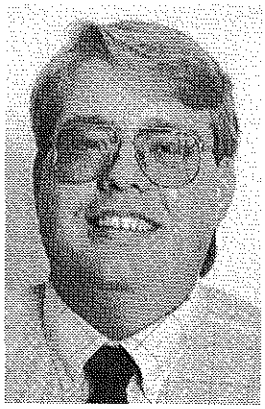
Is agricultural education a dinosaur, a thing of the past with no future? Certainly not! If anything, I view it as a major part of the educational system for a long time to come. It offers a chance for students to experiment with agricultural careers, a place for them to prepare for the workplace, and a place for them to get ready for life after the twelfth grade. Let's look at curriculum objectives and make the agriculture classroom the leader of the educational pack — a place where students prepare for success in life regardless of their chosen vocation.

Coming In February and March

February: Using Computers in Teaching

March: Physical Science in Agriculture — The New Ag Mech

The Agri-Business Magnet High School: A New Approach to Agricultural Education



By DAVID A. DWYER

Mr. Dwyer is an agribusiness resource teacher at East Environmental Science and Agri-Business Magnet High School, Kansas City, Missouri.

As the twenty-first century rapidly approaches, the field of education must prepare today's citizens for tomorrow's society. The field of agricultural education will definitely play a key role in the preparation of employable and productive citizens. With this in mind, some agricultural education programs have learned to be "flexible" in order to survive. Traditional vocational agriculture has made room for agricultural literacy and alternative/sustainable agricultural education is now being implemented in many classrooms and laboratories.

Education in agriculture (vocational agriculture) has expanded to coexist with its new sibling, *education about agriculture* (agricultural literacy). As teachers and teacher training institutions adapt and prepare for this new task, it is important to identify tools with which to accomplish the job. The continued growth and prosperity of agricultural education will depend on the balance of rural agricultural education and urban-oriented agricultural education. One of the newest arrivals to the latter is the East Environmental Science and Agri-Business Magnet High School in Kansas City, Missouri. This institution is the first of its type in the State of Missouri and the first which combines the two themes at the secondary school level in the United States.

Purpose and Rationale

What is an agribusiness theme magnet school? How and why was it established? What is the primary purpose of such an institution within the Kansas City Public School District? Webster (1971) defined "magnet" as being able to draw or attract; "to have appeal." This definition is most applicable to the East Environmental Science and Agri-Business Magnet High School.

A Site Task Force was the driving power behind the establishment of this new Agri-Business Magnet High School. A planning document was compiled in an effort to provide direction and guidance to all concerned parties. According to the planning document (1990), the mission of the school is,

> "The agri-business theme will use natural, applied and environmental science to provide a course of study that will be academically challenging and rich in applications. The theme will utilize academic subjects, basic skills development, and applied technology to assure that all students achieve at the highest level of their abilities.
>
> The theme will also offer individual, ethical, social and emotional growth by involving students in agri-business study and projects that excite their interests and challenge them to learn. From college preparation to career exploration, and from personal interaction to community involvement, the agri-business theme is intended to graduate students prepared to meet the challenges of the world" (p. 1).

To achieve this ultimate plan, various objectives have been identified in order to assure success. As identified in the Planning Document (1990), the magnet theme will serve agribusiness in the following manner:

1. The Agri-Business Magnet High School will prepare students for entry into an agribusiness career and/or continued education.
2. Agricultural education will increase the students' awareness, knowledge and understanding of the agricultural industry.
3. The Agri-Business Magnet High School will provide opportunities for leadership and personal growth through participation in local, state and national youth activities.
4. The Agri-Business Magnet High School will implement and update an infused academic curriculum emphasizing communication, mathematics, science, business and economics.
5. The Agri-Business Magnet High School will develop and maintain an extensive program that emphasizes the benefits created through multicultural interaction.
6. Students enrolled in the Agri-Business Magnet High School will receive in-

struction to allow their academic achievement levels and standardized test scores to meet or exceed national norms.

Since 1926, agricultural education has been a component of the Kansas City Missouri Public School District and its program offerings. East High School was originally created for this purpose. During the 1930s and 1940s, East High School supplied vegetables for student lunches, and from the 1950s through the 1970s supplied the school district with ornamental plants. With this in mind, it seemed logical to incorporate the already existing vocational agriculture program into this new Agri-Business Magnet High School.

The school is presently located on thirty-four acres with eighteen acres readily accessible for use by the magnet theme during the 1991-92 academic year. The eighteen acres will contain such items as a nature trail, an outdoor amphitheater, turfgrass research plots, livestock quarantine facilities, a nursery, a fruit orchard, and a vegetable garden for instructional purposes. An additional 100 acres near the main campus are currently being developed for agricultural and environmental research and experimentation purposes. These excellent facilities will provide students valuable experiences through problem-solving and hands-on instruction, which we call "transactional interactive education." This will carry over into their SAE programs. In excess of 1,000 Kansas City firms are now engaged in agriculturally related business and provide over 25,000 jobs in the Kansas City area, producing farm equipment, processed foods, chemicals, pesticides, pharmaceuticals, and health products. The needs and wants of the Kansas City agribusiness community will be positively supplemented as an end result.

Curriculum Development and Integration

A model curriculum has been identified by the Site Task Force as to the courses being taught, suggested course content, instructional objectives, and implementation. The five agribusiness resource teachers will have the responsibility of developing the core curriculum. This will consist of specific instructional lessons, technical content, teaching techniques, and laboratory demonstrations. The agribusiness teachers will assist all teachers with theme infusion activities and techniques.

Since the magnet theme is agribusiness, this implies that all students will be enrolled in agriculture course(s) and pursue strand specializations (secondary degree programs). Students will be allowed to select and pursue various areas of interest and "major" in an area. Students enrolled in this high school will be required to complete more stringent graduation requirements than the State of Missouri requires, in order to receive an agribusiness theme certificate. In like manner, students will be required to successfully complete from one to three units of an internship in their designated specialization strand prior to graduation. This employment experience may prove invaluable to future career endeavors. At the present time, graduation from this institution with a general high school diploma requires 22 units of credit. A college prep certificate requires 24 units of credit, and an agribusiness certificate requires 28 units of credit. All graduates will have successfully met minimum qualifications to attend postsecondary institutions.

Agribusiness is infused throughout all course offerings with examples and activities at the Agri-business Magnet School. Infusion allows mathematics, science, English and social studies to come alive through practical application. (Photo courtesy of Mr. Tom Mallot, East High School, Kansas City, MO 64127).

All students will receive instruction in agricultural computer applications, agricultural careers, and agricultural business applications prior to selecting their specialization strand. Some of these course offerings will be among the first such secondary agriculture courses implemented in Missouri. Food and fiber technology/processing, urban and exotic animal technology, hydroponics, aquaculture, agricultural research, agricultural entrepreneurship and management, and international agribusiness marketing are just a few of the course offerings available. Various combinations of required courses will, in turn, dictate the selected specialization strand tailored for the student. This will be supplemented by various production research activities conducted on the land laboratory, e.g., grass tonnage production, water quality, soil analysis, forestation, tree/grass/shrub identification, crop variety testing, numerous animal husbandry practices, and DNA splitting.

The agribusiness instructional staff will include certified personnel other than agribusiness resource teachers. These will be teachers of science, mathematics, language arts, social science, and all content areas. The agribusiness curriculum is designed to be "infused" throughout all course offerings. For example, a sophomore mathematics class may teach the concept of solving linear equations. An agribusiness application may consist of using two components to correctly balance a ration for a given animal. A sophomore language arts course may instruct the student to identify and explain cause-effect relationships. An agribusiness application may consist of describing what happens when agricultural products are improperly prepared for use by the retail consumer.

Numerous other examples exist for the crossover of agribusiness into all facets of the secondary curriculum. The infusion of agribusiness areas into all subjects will positively increase the student's awareness and knowledge of the application of life, earth, and the associated agricultural/agribusiness issues. This curriculum infusion will be a cornerstone in the success of the agribusiness theme.

The successful combination of multicultural diversity and agribusiness education in the Kansas City Public Schools will assist in meeting the demand for future agribusiness employees. (Photo courtesy of Mr. Tom Mallot, East High School, Kansas City, MO 64127).

Recruitment and Admission

The 1991-92 academic year has a projected 105 agribusiness freshmen in the student body for the East Environmental Science and Agri-Business Magnet High School. The enrollment in agriculture classes, sophomore through senior classes, will be comprised of approximately 180 students. A multicultural balance of 60% minority students is projected for the 638 member student body. The Kansas City Missouri School District is currently in the process of converting all secondary schools into magnet theme schools.

The entire student population of the Kansas City Missouri School District is eligible for enrollment in the Agri-Business Magnet School, as are non-minority students from adjoining districts who meet the identified level of academic performance adopted by the Kansas City Missouri School District. This will be based on the previously cited multicultural balance.

Conclusion

In an effort to achieve quality and relevance in and about agricultural education, the Kansas City Missouri School District has taken more than a few steps. It has taken a giant leap into education for the year 2000 as directed by President Bush. Once firmly established, the relationship of this magnet theme school with parents, community, business and industry groups will allow graduates to competently find suitable employment in a variety of agribusiness positions. This new breed of agriculturalist will help to ensure the prosperity of the agricultural industry for the future.

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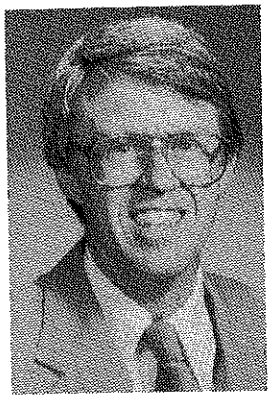
1992-93 Report: Assistantships and Fellowships In Agricultural Education



By JOHN HILLISON
Dr. Hillison is Professor and Program Chair, Agricultural Education, Virginia Tech, Blacksburg.

The 1992-93 survey of institutions offering assistantships and fellowships in agricultural education is provided by the Publications Committee of the American Association for Agricultural Education. This survey is published annually to assist those in the profession who are seeking information about graduate studies. Over twenty institutions reponded to a request for details concerning assistantships and fellowships.

Key To Understanding

The information is provided in the following order: nature of assistantships (number available); number of months available during the year; beginning month of employment; amount of work expected; monthly remuneration and other consideration such as remission of fees; whether aid is for master's, advanced graduate program, or doctoral students; source of funds; the 1992 deadline for application; and the person to be contacted. Slight variations in this pattern are due to the nature of the data provided by reporting institutions.

University of Arkansas

Research Assistantship (1); July 1; one-half time, 20 hours/week; $550-700 per month; full tuition and fees provided; master's or doctoral; May 1; Dr. Nolan Arthur, Department Head, Department of Agricultural & Extension Education, Agriculture Building Room 301-B, University of Arkansas, Fayetteville, Arkansas 72701, telephone (501) 575-2035.

Teaching Assistantship (1); September 1; one-half time, 20 hours/week; $550-700 per month; full tuition and fees provided; master's or doctoral; May 1; contact same as above.

Clemson University

Graduate Teaching Assistantship (1); 12 months; Agriculture in the Classroom; July through June; one-half time; $650-800 per month plus remission of out-of-state tuition and three-fourth fees; master or doctoral; SDE and/or instruction funds; May 1 or until filled; Dr. Glen C. Shinn, 112 Poole Agricultural Center, Clemson University, Clemson SC 29634-0356, telephone (803) 656-3300, FAX (803) 656-3608.

Graduate Teaching Assistantships (3); 10 months; August through May; one-half time; $650-800 per month plus remission of out-of-state tuition and three-fourth fees; master or doctoral; SDE and/or instruction funds; May 1 or until filled; contact same as above.

Graduate Research Assistantships (3); 12 months; July; one-half time; $650-850 per month plus remission of out-of-state tuition and three-fourth fees; master's or doctoral; instruction and/or Experiment Station funds; May 1 or until filled; contact same as above.

Colorado State University

Graduate Teaching Assistantship (half-time teaching assignment); academic year appointment; first day of Fall semester (August 24, 1992); Generally, the individual serving on the assistantship has been assigned responsibilities for teaching two courses per semester (half time teaching assignment). The content of these courses has traditionally centered upon basic agricultural skills, farm construction, and farm machinery. Additionally, the GTA has been encouraged to participate as a staff member in vocational agricultural education at CSU (serving on committees, assisting with the State FFA Judging Contest, co-advising the Alpha Tau Alpha, etc.). The award will carry a total compensation of approximately $6,000 (August 22-May 24) and a waiver of tuition for residents of Colorado. Recipients of this award are required to be enrolled in a graduate program; Active status in the Master of Education or Ph.D. program, Open until filled; contact Dr. David Whaley, Professor in Charge, Agricultural Education, School of Occupational and Educational Studies, Colorado State University, Fort Collins, Colorado 80523, telephone (303) 491-6884.

Cornell University

Teaching Assistantship (1); 9 months; September; 15 hours/week, $9,075.00

($477.64 bi-weekly); waiver of tuition and fees; doctoral, state funding, April 15. Dr. Arthur L. Berkey, Department of Education, 418 Kennedy Hall, Cornell University, Ithaca, New York 14853, telephone (607) 255-2197.

Research Assistantship (1); 9 months; September 1; 15 hours/week; $9,075.00 for 9 months ($447.64 bi-weekly); waiver of tuition and fees; master's and doctoral; Hatch Act and other research funds; April 15; contact same as above.

University of Florida

Teaching/Extension Assistantships (2); 9-12 months; August 1992; 14-20 hours/week; out-of-state fees waived; Master of Science; remuneration varies depending upon position; April 1; Dr. Carl E. Beeman, Department of Agricultural and Extension Education, 305 Rolfs Hall, University of Florida, Gainesville, Florida 32611, telephone (904) 392-0502.

University of Georgia

One Ed.S. (Specialist) or Ed.D. (Doctoral level); 10 months; September 1 to June 30; one-third time (approximately 13 hours per week); $838.00 per month; Waiver of Registration fees; 1-2 months additional possible through funded projects; Department of Vocational Education Funds; deadline for application June 1, 1992; Dr. M.J. Iverson, Head, Agricultural Education, The University of Georgia, 628 Aderhold Hall, Athens, Georgia 30602, telephone (404) 542-1204.

University of Illinois

Graduate Research Assistantships (3); 9-10 months; August; one-half time; $925 per month doctoral, or $700 per month master's; in- and out-of-state tuition and nearly all fees waived; April 1 or until filled; Dr. Ed Osborne, Chair, Agricultural Education, University of Illinois, 124 Mumford Hall, 1301 W. Gregory Drive, Urbana, IL 61801, telephone (217) 333-3166.

Graduate Teaching Assistantship (1); 9 months; August; one-half time; $925 per month; doctoral; in- and out-of-state tuition and nearly all fees waived; April 1 or until filled; contact same as above.

Iowa State University

Research Assistantships (4); 9 months; September; one-half time, 20 hours/week; $950 per month; fee reduction; master's or doctoral; Agricultural Experiment Station; March 1; Dr. David L. Williams, Head, Department of Agricultural Education, Iowa State University, Ames, Iowa 50011, telephone (515) 294-0241.

Fellowships (3); 12 months; September; 20 hours/week; $1,000 per month; full fees paid; master's or doctoral; March 1; USOE for Minorities and Women; contact same as above.

Michigan State University

Graduate Teaching and Research Assistantships (2); 9 months in duration September 15 through June 15, (summer extensions possible); 20 hours per week, $946 MS, $1,042 PhD; waiver of 6 credits of tuition; waiver of out-of-state tuition fees; additional graduate fellowships available for prospective candidates. Funds are from projects with Agricultural Experiment Station, Cooperative Extension Service, and General Education. Deadline for applications May 1; Dr. Carroll H. Wamhoff, Chairperson, Department of Agricultural & Extension Education, 412 Agriculture Hall, Michigan State University, East Lansing, MI 48824-1039, telephone (517) 355-6580.

University of Minnesota

Research Assistantships (2-5); 9-12 months; July or September 15; 10-20 hours; $884-1,086 per month (50%); tuition reduced by two times % time appointed; master's or doctoral students; University; April 15; Dr. Edgar Persons, Head, Division of Agricultural Education, 320 Vocational and Technical Education Building, University of Minnesota, 1954 Buford Avenue, St. Paul, Minnesota 55108, telephone (612) 624-2221.

Graduate School Fellowships in Vocational Education (2); 9 months; September 15; none, but full-time students; $1,500-2,000; master's or doctoral students of outstanding potential; Graduate School; April 15; Director of Graduate Studies; Department of Vocational and Technical Education Building, University of Minnesota, 1954 Buford Avenue, St. Paul, Minnesota 55108, telephone (612) 624-2258.

Mississippi State University

Research Assistantships (2); 9 or 12 months; July or August; $600-1,200; tuition waived; doctoral; March 1; Head, Department of Agricultural and Extension Education, Post Office Drawer AV, Mississippi State University, Mississippi 39762-5546, telephone (601) 325-3326.

Research Assistantship (1); 9 months; August; $600-1,000; tuition waived; master's, educational specialist, or doctoral; March 1; contact same as above.

University of Missouri-Columbia

Research Assistantships (2); 9-12 months; July and September 1; 20 hours/week; $700 per month; fees waived; doctoral; May 1, Bob R. Stewart, Agricultural Education, 121 Gentry Hall, University of Missouri-Columbia, Columbia, Missouri 65211.

Teaching Assistantships (1); 9 months; August 20, 20 hours/week; $700 per month; fees waived; doctoral; May 1, contact same as above.

Montana State University

Graduate Teaching Assistantships (2); 9 months from August 15 through June 15; 12 hours/week; $500 to $700 per month plus tuition fee waiver; master's candidate; grant budget appointment and/or department budget appointment; April 1 or until filled; contact Doug Polette, Head, Department of Agricultural and Technology Education, Montana State University, Bozeman, Montana 69717-0374; telephone (406) 994-3201.

University of Nebraska

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

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

University of New Hampshire

Approximately 4 fellowships for females for 2 semesters and possible summer funding beginning September 3 with 8 hours/week of work expected. Students receive in-state tuition and mandatory fees based on financial need. Total Value $4,000. Provides teacher certification as a part of the master's program. Source of funds - Federal Equal Access grant for State of New Hampshire for Preservice Teachers of Agricultural Education. Deadline is February 15, 1992; contact Dr. David L. Howell, Adult and Occupational Education Program, College of Life Sciences and Agriculture, 309 James Hall, University of New Hampshire, Durham, New Hampshire 03824-3589; telephone (603) 862-1760.

North Carolina Agricultural and Technical State University

Research and Graduate Assistantships (5); 9 months; August; 20 hours per week, $600 per month, Master's Degree, deadline July 1. Contact: A.P. Bell, (919) 334-7711.

North Dakota State University

Graduate Research Assistant (1); 12 months; July 1; one-half time; $660 per month; master's; School of Education; May 1; Dr. Michael Swan, Assistant Professor, Ag Education, 155 Home Economics Building, North Dakota State University, Fargo, North Dakota 58105, telephone (701) 237-7439 or (701) 237-7101.

Graduate Research Assistant (1); 12 months; July 1; one-half time; $660 per month; master's; grant funds (number and salary dependent upon funding); March 1; contact same as above.

The Ohio State University

Teaching Associateships (2); 12 months; July or later; one-half time; $930 per month; in- and out-of-state fees waived; doctoral; February 1, Dr. Kirby Barrick, Chair, Department of Agricultural Education, The Ohio State University, Agricultural Administration Building, 2120 Fyffe Road, Columbus, Ohio 43210-1099, telephone (614) 292-6321.

Research Associateships (4-6); 9-12 months; July or later; one-half time; $785-930 per month; master's or doctoral; February 1; contact same as above.

Administrative Associateships (2-3) with emphasis in Extension Education (same as above).

Teaching Associateship (1); 12 months; July or later; one-half time; $930 per month; in- and out-of-state fees waived; doctoral; March 1; Dr. Joe Gliem, Department of Agricultural Engineering, 590 Woody Hayes Drive, Columbus, Ohio 43210, telephone (614) 292-9356.

Research Associateships (3-6); 9-12 months; July or later; one-half time; $760-865 per month; in- and out-of-state fees waived; master's or doctoral; February 1; Dr. Ray Ryan, Center on Education and Training Employment, 1960 Kenny Road, Columbus, Ohio 43210, telephone (614) 292-4353.

Oklahoma State University

Teaching Assistantship (1); 9 months; starting September 1, 20 hours per week; remuneration, beginning at $880 per

month and possible increase second year; out-of-state fees waived, doctoral; partial fee waiver scholarships and competitve college fellowships available; application deadline August 1; duties would include: teaching undergraduate professional courses, working with state vocational-technical staff, assisting with undergraduate student advisement.

Teaching Assistantship (1); 9 months; starting September 1, 20 hours per week; remuneration, beginning at $880 per month and possible increase second year; out-of-state fees waived, partial fee waiver scholarships and competitive college fellowships available; application deadline August 1; duties would include teaching undergraduate professional courses, working with state vocational-technical staff, assisting with undergraduate students advisement, serving as assistant director of student teachers, supervising of student teachers in the field.

Research Assistantship (1); 12 months; starting September 1, 20 hours per week; remuneration, beginning at $880 per month and possible increase second year; out-of-state fees waived, partial fee waiver scholarships and competitive college fellowships available; application deadline August 1; duties would include: assistance in writing RFP's, computer programming, conducting literature searches, developing literature reviews for staff research, and assisting with a research design course.

Persons interested or requiring additional information concerning these assistantships should contact: Dr. Robert Terry, Professor and Head, Department of Agricultural Education, 448 Agriculture Hall, Oklahoma State University, Stillwater, OK 74078, phone (405) 744-5129.

The Pennsylvania State University

Teaching and Research Assistantships in Agricultural Education and Extension Education (4); 12 months; starting August 20; 20 hours/week; $4,360 per semester; remission of fees; out-of-state; master's and doctoral; applications due February 1; Dr. Blannie E. Bowen, Head, Department of Agricultural and Extension Education, 323 Agriculture Administration, University Park, Pennsylvania 16802-2601; telephone (814) 865-1688.

Purdue University

Teaching Assistantships (2); 10 months; August; one-half time; $775 per month; tuition and fee waiver; doctoral or master's; February 1. Dr. James P. Greenan, Chairman, Vocational Education, Purdue University, South Campus Courts F-25, West Lafayette, Indiana 47907, telephone (317) 494-7290.

Research Assistantships (3-5); 10-12 months; August; one-half time; $775 per month; tuition and fee waiver; doctoral or master's; February 1; contact same as above.

Southwest Texas State University

Graduate Assistantships (2); 12 months, September 1-August 31 begin at variable semesters depending on need; 20 hours per week plus 12 semesters depending on need; 20 hours per week plus 12 semester hours of enrollment; remuneration paid at rate of $3,000 each semester (2) and $900 each summer session (2), paid 1st week of each semester, out-of-state tuition waived; Master of Education in Agricultural Education (thesis optional); source of funds is Houston Livestock Show and Rodeo Graduate Fellowship; Application deadline, April 1.

Graduate Teaching/Laboratory Assistants (two available) areas of expertise preferably in ag mechanics, computers, 20 hours per week plus 12 hours of enrollment; remuneration (negotiable) paid monthly, out-of-state tuition waived; Master of Education in Agricultural Education, (thesis optional); University funding; Application deadline April 1.

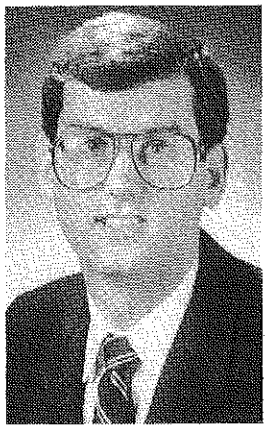
Contact Dr. Bob Davis, Chairman; Dr. Lon Shell, Agricultural Mechanics & Teacher Educator; Dr. John Dillingham, Head Teacher Education, Department of Agriculture, Southwest Texas State University, San Marcos, Texas 78666; telephone (512) 245-2130.

Texas A&M University

Assistantships: teaching (4), non-teaching (6), research (2); 9-12 months; generally July 15 or September 1 or January 15; 20 hours/week; $900/1,000 per month for doctoral, $550-650 per month for master's; out-of-state tuition waived for teaching or research assistantships; public (state) and private; April 1 for September appointment; Dr. Don R. Herring, Graduate Coordinator, Department of Agricultural Education, College of Agriculture and Life Sciences, Texas A&M University, College Station, Texas 77843-2116, telephone (409) 845-2951.

Fellowships: doctoral (2), master's (2); 12 months; generally September 1 or January 15; 20 hours/week; $900-1,000 per month for doctoral, $550-650 per month for master's; public (state) and private; April 1 for September appointment; contact same as above.

Laboratory Teaching



By DON JOHNSON

Dr. Johnson is Assistant Professor, Agricultural & Extension Education, Mississippi State University.

In the ideal agriculture laboratory, enough space and equipment would be provided so that all students could engage in the same activity at the same time. For example, in the ideal situation, if an agricultural mechanics class of 20 students is studying plasma arc cutting, then sufficient plasma arc cutting machines, safety equipment, and laboratory space would be available to allow all 20 students to develop this skill at the same time.

Unfortunately, few, if any, school districts have the financial resources necessary to provide this ideal laboratory teaching and learning situation. Therefore, the challenge facing agriculture teachers is how to optimize student learning using the equipment and facilities which are available.

One method of accomplishing this objective is rotational laboratory scheduling. The purpose of this article is to explain the "nuts and bolts" of this proven laboratory management technique.

What is Rotational Laboratory Scheduling?

Rotational laboratory scheduling is a management technique designed to maximize facility and equipment use and student time-on-task. Its use provides structure to student laboratory experiences and helps ensure that all students gain experience in all areas of laboratory instruction.

How Do I Implement Rotational Laboratory Scheduling In My Agriculture Laboratory?

Four basic steps are required in order to implement rotational laboratory scheduling. These steps are explained below.

Step 1. Identify skills and abilities to be developed. Teachers should carefully identify the skills and abilities most needed by their students. Informal or formal surveys, suggestions from program alumni or advisory committee members, state curriculum guides, and the teacher's own experiences

(continued from page 21)

Texas Tech University

Assistantships; teaching (2), research (2); 9-12 months; generally September 1; 20 hours/week; $700-800 per month; waive non-resident tuition and certain fees; master's; state and private funding; April 1; Dr. Paul Vaughn, Chairman, Department of Agricultural Education and Mechanization, College of Agricultural Sciences, Texas Tech University, Mail Stop 42131, Lubbock, TX 79409-42131; telephone (806) 742-2816.

Virginia Polytechnic Institute and State University

Graduate Assistants (2); 9 months; August 16; 20 hours/week; $960-1,030 per month; one Groseclose Fellowship available for summer which pays $2,000 for a 30 day internship at the National FFA Archives; master's or advanced degree; March 1; contact Dr. John Hillison, Agricultural Education, Room 223 Lane Hall, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0254, telephone (703) 231-8187, FAX (703) 231-3292.

University of Wisconsin-Platteville

Graduate Assistantships; (4-6) for 9 months, starting September 1 and (4-6) 12 months, starting July 1; 15-18 hours/week; $500-800 per month; some out-of-state waivers; MS only, in either Agricultural Industries or Education; March 15; Dr. Ralph Curtis, Director of Graduate Studies, 1 University Plaza, Platteville, Wisconsin 51818, telephone (608) 342-1393.

University of Wisconsin-River Falls

Graduate Assistantships (1-2); 9 months; September; 15-20 hours/week; $580-620 per month; remission of out-of-state fees; master's; state funding; April 1; Dr. Richard A. Jensen, Chair, Department of Agricultural Education, University of Wisconsin-River Falls, River Falls, Wisconsin 54022, telephone (715) 425-3555.

and observations can all be used to identify what should be taught.

Once these skills and abilities are identified, they should be grouped into logical units of instruction. For example, in agricultural mechanics, these units might include welding, power and machinery, electricity, etc. These unit groupings will later serve as the basis for organization of laboratory learning centers.

Step 2. Select student laboratory activities. The next task is to select appropriate learning activities for each unit of instruction. These activities should be based on the necessary skills and abilities identified in the previous step. Laboratory activity sheets should be developed (or purchased) for each laboratory exercise. Use of activity sheets allows each student to have a clear understanding of what is to be done and how to do it. This makes it much easier for the teacher to supervise student laboratory practice.

Step 3. Designate and equip laboratory learning centers. Once the units of instruction and the specific learning activities in each unit have been determined, it is time to designate and equip the laboratory learning centers. A separate learning center should be established for each unit of laboratory instruction. Each learning center should have its own tool cabinet(s), work bench(es), and designated floor space. Each laboratory learning center should be identified by means of a stenciled sign. Appropriate safety signs should also be posted in each area.

The teacher should carefully analyze the learning activities to be performed at each learning center to determine the tools, equipment, and supplies which will be required. Sufficient quantities should then be obtained for the largest group (usually 3-6) of students that will rotate through the learning center.

Step 4. Develop the rotation schedule. The final step in the process is to develop a schedule to rotate students through each learning center. This is done by dividing the class into groups of equal size. The optimum number and size of the groups will be influenced by the total class size, the number of learning centers, and the maximum number of students that can be accommodated at the smallest learning center. The following schedule (Table 1) was developed to rotate a group of 12 students through the metals and welding laboratory component of a basic agricultural mechanics course taught by the author.

Summary

Rotational laboratory scheduling is a proven method of maximizing facility and equipment usage, student time-on-task, and student learning in the agriculture laboratory. As such, it is a highly recommended teaching practice. Agriculture teachers not using a rotational laboratory scheduling system should carefully consider implementing one.

Table 1. Student Rotation Schedule

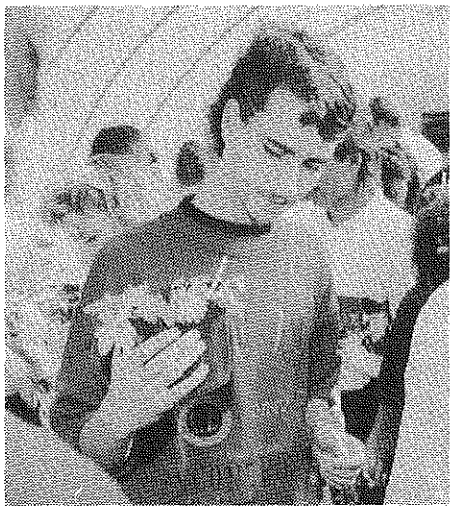
Student	Week Number					
Lab #	1	2	3	4	5	6
1, 2, 3, 4	Arc Welding	Arc Welding	Oxyacetylene Cutting	Hot Metal Working	Cold Metal Working	Soldering
5, 6, 7, 8	Cold Metal Working	Soldering	Arc Welding	Arc Welding	Oxyacetylene Cutting	Hot Metal Working
9, 10, 11, 12	Oxyacetylene Cutting	Hot Metal Working	Soldering	Cold Metal Working	Arc Welding	Arc Welding

Note from the Editor:

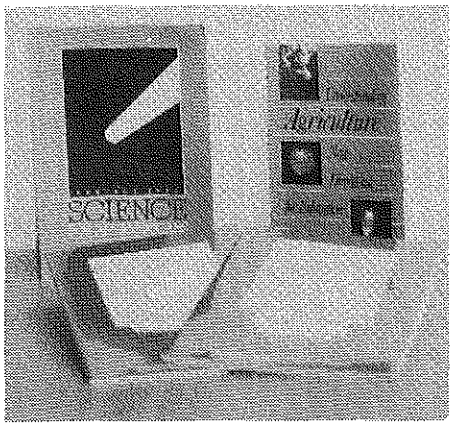
Agricultural educators at all levels are invited to share ideas that are working in their programs. If you are using a novel approach in any aspect of your teaching and/or program development, submit it for publication in *The Magazine*. Idea descriptions should be no more than 100 words. Be sure to include your name and address for follow-up.

Also, ideas and suggestions for improving *The Magazine* (themes, article topics, potential authors, layout and design, etc.) are welcome at any time.

Ed Osborne - Editor



Students monitor progress and gather data as part of a lab simulation SAE program. (Photo courtesy of Peter Tremaine, Anoka, MN).



Research findings in both science and agricultural education should be incorporated into future agriscience curriculum development efforts. (Photo courtesy of Greg Beard, Fullerton High School, Fullerton, CA).

Students set up and pot chrysanthemums as part of an on-going research project. (Photo courtesy of Peter Tremaine, Anoka, MN).

Upcoming Themes

Issue/Theme	Due Date	Theme Editor
April Laboratory Instruction	January 1, 1992	Dr. Tom Bruening Penn State University Armsby Bldg. University Park, PA 16802
May Teaching Agriculture in Elementary Schools	February 1, 1992	Dr. Gerry Fuller University of Vermont 104 Ag Engineering Bldg. Burlington, VT 05405-0004
June Advisory Councils	March 1, 1992	Dr. Robert Martin Iowa State University 201 Curtiss Hall Ames, IA 50011
July Collaborative Relationships	April 1, 1992	Dr. Gary Briers Dept. of Agricultural Education Texas A & M University College Station, TX 77843-2116
August Advising FFA Chapters	May 1, 1992	Dr. Max McGhee University of Florida 305 Rolfs Hall Gainesville, FL 32601
September Focus on Teaching	June 1, 1992	Dr. Jamie Cano Ohio State University 208 Ag Admin. Bldg. 2120 Fyffe Rd. Columbus, OH 43210-1099