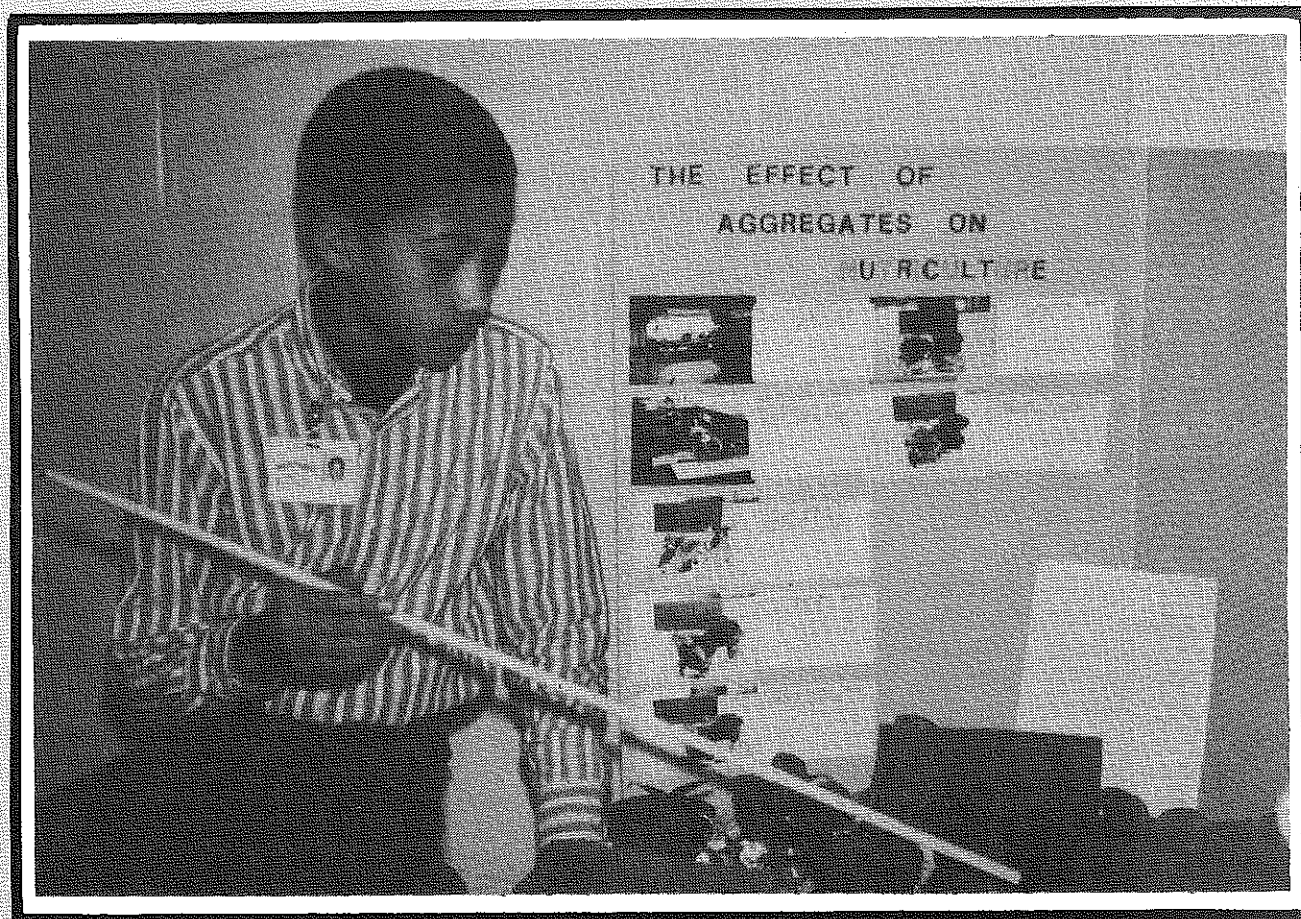


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**THEME: The Future of Agricultural
Education in Secondary Schools**

THE AGRICULTURAL EDUCATION MAGAZINE



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Table of Contents

	Page
Editor's Page	
Capitalizing on Strengths	Blannie E. Bowen 3
Theme: The Future of Agricultural Education in Secondary Schools	
Barriers to Change	J. Robert Warmbrod 4
New Wine in Old Bottles?	John A. Moore 5
A Model for Instruction in Agriscience and Agribusiness	Ellen S. Russell 7
We Are Ready for the 'Tip-Off'	Dale R. Butcher 9
Recommendations to Strengthen Vocational Agriculture	Monty Multanen 10
Book Review	11
The Future of Agricultural Education in Secondary Schools from the Perspective of the Land Grant	William P. Flatt 12
Global Agriculture: A Priority for Agricultural Education	Donavon C. Loeslie 13
Changing the Way We Think	Graham Boyd 15
Book Review	16
Agricultural Education: A Part Of or Apart From the Secondary School?	Anne Campbell 17
Education for a Better Agriculture	Ron Wilson 18
Shaping the Future of Vocational Agriculture	Don R. Herring and Richard J. Norris 19
The Future of Vocational Agriculture Programs: A View from the Outside	David L. Debertin and Lionel Williamson 22
Stories in Pictures	24

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

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Capitalizing on Strengths

World renown military leaders and great coaches share a philosophy that agricultural educators should emulate: **Winners operate from positions of strength and losers operate from positions of weakness.** History shows that few military leaders become great by operating from positions of weakness. Great leaders such as Washington, Grant, and Eisenhower became legends because their troops took the offensive and defeated the enemy. Countless leaders who subscribed to the — "I shall return!" — mentality met fates similar to Napoleon's Waterloo.

In sports, great coaches such as Bear Bryant, Jake Gaither, Woody Hayes, Adolph Rupp, and John Wooden never allowed their teams to operate from positions of weakness. They knew that playing catch-up would expend too much energy. All coaches know that it is common for one team to fall behind an opponent and then catch-up later in the game. However, the team that does the "catching-up" usually loses the contest because its players run-out of gas down the home stretch. Consequently, teams guided by great coaches grab a big lead, operate from a position of strength, and then protect the lead until victory is assured.

Playing Catch-up

Unfortunately, America's education community has been playing a game of catch-up during the 1980s. It has operated from a position of weakness. This situation resulted after countless reports said education must be "reformed" to regain that competitive edge the U.S. enjoyed for years. In virtually all of the reports, however, agricultural education was an unindicted co-conspirator because it was rarely mentioned. A few reports briefly cited weaknesses in vocational education. Unfortunately, not playing a prominent role in the reform movement meant that new standards and changes were implemented with little regard for agricultural education. But, alas, our time has come!

Agricultural education will be in the limelight once the National Academy of Sciences committee studying secondary agricultural education releases its report. Several members of that committee share their thoughts in this issue. Although their writings do not represent a consensus, one theme predominates. Even a cursory reading of this issue forces one to conclude that secondary agricultural education will change itself or be changed over the next few years.

Identifying Strengths

When assessing the articles as well as the Committee's forthcoming report, one must recall that the study was national in scope. As such, all in the profession must determine if the scenarios apply to their situation. Needless to say, each secondary instructional program must be evaluated on a case-by-case basis. Further, no reforms should be implemented without satisfactory data to support far-reaching decisions. In this respect, several questions must



By BLANNIE E. BOWEN, EDITOR

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

be posed. How will the data be collected? Who will analyze and interpret the data? Who will make the crucial decisions on what reforms to implement? Finally, who will implement the reforms?

As these painful questions are pondered, the profession must identify and then rely on its strengths. One obvious strength is the educational level of the profession. Most in the profession have or will obtain a master's degree as a minimum because salary schedules are usually linked to degrees. Fortunately, most master's degree programs require either a thesis or a research project. This requirement, if properly structured, should enable teachers to collect, analyze, and interpret data on which local decisions can be made. Such an approach should avoid chaos and "shoot from the hip" decisions.

A Position of Strength

Systematic inquiry conducted on the local level means that true strengths and weaknesses of programs will be known by those closest to the situation. With this approach, the profession can use its vast public relations experience to market and capitalize on the strengths inherent in quality local programs.

Another strength involves J. Robert Warmbrod, the theme editor for this issue, who is a member of the National Academy Study Committee. He is a premier researcher whose insights will prove enlightening as the profession moves from a defensive posture. This is the only course available if the profession wishes to operate from a position of strength and control its destiny.

About the Cover

Lance Sanders, a sophomore at the Chicago High School for Agricultural Sciences, explains his science fair project to a team of judges. He was one of three students who represented the school at the district science fair. (Photo courtesy of Ellen S. Russell, Principal of CHSAS.)

Barriers To Change

In industry and agriculture, "restructure" is not only a byword but reality. Its counterpart in education is "reform." A mood seems to be developing that reform of vocational agriculture in secondary schools is warranted, if not overdue. Surely that bent is evident from reading the articles in this issue.

My experience as a member of the Committee on Agricultural Education in Secondary Schools, National Academy of Sciences, convinces me that changes in purpose, clientele served, curriculum, and policy for vocational agriculture must occur for agricultural education to be a viable element in the public schools of the future. Change is seldom easy, even when the mandate is clear. When steps toward change are begun, we must be particularly alert to several perceived and real barriers to justifiable reform in vocational agriculture in the secondary school.

One barrier to significant and substantial change is the conviction held by some that any changes that are needed or possible must be made only within the current system of secondary school vocational education in agriculture. This stance emphasizes superficial rather than substantive changes in programs and clientele served with little if any alteration in purpose. This attitude is occasionally communicated by the phrase "If it isn't broken, don't fix it." Those who hold this point of view argue that current vocational agriculture programs can and will accommodate any necessary modifications, including a broadening of the purposes of instruction in and about agriculture.

A second barrier to reform is federal and state policy for vocational education. In a very real sense, agricultural education in the public secondary schools today is vocational agriculture, which is a part of a federal-state-local system of vocational education driven by federal legislation. As such, there is within that system no incentive, or perhaps more accurately, no possibility to broaden purposes and programs beyond vocational agriculture. Not only does the federally-dominated system of vocational education limit the purposes of instruction that can be pursued, but it also limits, for all practical purposes, the extent to which those in leadership positions within the system can provide leadership to implement policy or program changes that are not clearly within the restrictions imposed by the current vocational education system. It is interesting to recall that the major changes in vocational agriculture that occurred in the 1960s were mandated by federal legislation. Now, major reform in vocational agriculture could very well be impeded by strict adherence to federal policy for vocational education.

A third barrier to change is to mistake or misinterpret cosmetic alteration for substantive change. Changing titles of courses from vocational agriculture to agricultural science or agricultural technology, substituting the words



By J. ROBERT WARMBROD, THEME EDITOR

(Dr. Warmbrod is a Professor in the Department of Agricultural Education at The Ohio State University and a member of the National Academy of Sciences Committee on Agricultural Education in Secondary Schools.)

"agricultural education" for "vocational agriculture," and modifying the name, contests, and constitution of the FFA are attractive temptations. In the absence of bold and substantive changes in purposes, policies, and programs, vocational agriculture by any other name is "vocational agriculture." Likewise, only cosmetic alterations in the name, ceremonies, and creed of the students' organization does little to change either the perception or the reality of the "Future Farmers of America."

A fourth barrier to reform is the absence of dynamic and creative leadership. Innovative programs of public school education in agriculture that are broader than current programs of vocational agriculture will emerge only if bold and imaginative leadership appears. Leadership for reform must come from persons with a vested interest in agricultural education. Ironically, at present, these potential leaders consist almost exclusively of persons who are primarily vested in the current system of vocational education in agriculture. If significant and substantive change is forthcoming, those whose current allegiance is primarily to vocational agriculture — teachers; supervisors and administrators in local and area schools and in state departments of education; and teacher educators — must lead. However, leadership and support must also come from superintendents and

Editor's Note

Several articles in this issue are written by members of the Committee on Agricultural Education in Secondary Schools appointed by the National Academy of Sciences. The Committee's charge is to "critically examine vocational and technical education related to agriculture in the nation's public schools" and develop recommendations "regarding the goals for instruction in agriculture, the subject matter and skills that should be stressed in curricula for different groups of students, and policy changes needed at the local, state, and national levels to facilitate the implementation of new and revised agricultural education programs in secondary schools." (Quotes from statement of Frank Press, Chairman of the Research Council of the National Academy of Sciences, December 18, 1984.)

The authors' statements do not necessarily describe the views of the Committee on Agricultural Education in Secondary Schools and should not be construed to be the findings and recommendations in the report of the Committee that is to be issued yet this year.

principals, boards of education and state legislative bodies, personnel in state departments of education other than those directly involved in the vocational education enterprise, colleges and universities, teachers of courses other than agriculture, students, and the public at large.

If there is to be new and revitalized agricultural educa-

tion in the public schools, education in and about agriculture must be a function of the total school system. The prospects for a viable agricultural education program are not bright if instruction in and about agriculture is associated solely with a vocational education system that serves a limited proportion of those who enroll in the public schools.

THEME

New Wine In Old Bottles?

The metaphor of the Maginot Line comes to mind when one thinks about the function of vocational agriculture today and its prospects for the future. That massive bastion was designed to stop the hordes that never came just as the massive vocational agriculture educational establishment of today prepares students in ways that are ever-less relevant and for which there are ever-fewer career opportunities. The Maginot Line prepared for the past and to a considerable degree vocational agriculture does the same today.

This conclusion was pressed upon me when, in the testimony of a respected leader in vocational agricultural education, the question was asked, "What would be the effect on American agriculture if all vocational agriculture in the high schools was terminated?" The answer was, "None."

The Tradition

There is a clear reason for "None." The general pattern of vocational agriculture was set decades ago when American agriculture was based mainly on family farms, when one third (in 1900) of the labor force farmed, when farming was labor-intensive, and when the supporting technology was crude by today's standards. At that time high school vocational agriculture programs could play a vital role in introducing students to the burst of new information about improved agricultural practices.

Since those formative years, traditional American agriculture has been altered irreversibly. The United States is no longer the bread-basket for the world. The remarkable efficiency of American agriculture is producing vast surpluses that find no markets and remain in storage as great drains on the public purse. Well-to-do Americans are worried more about the safety of the food they eat than about its availability. Only a few in the labor force remain on the farms. Farming is being replaced by agribusiness, and one of our informants suggested that an MBA from Harvard is now the *sine qua non* for a successful career in agriculture.

In many ways traditional vocational agricultural education remains an anachronism. It rarely prepares students for other than entry-level jobs and we were told of some states where it is actually a block to advancement — those students who take a full vocational agriculture program are unable to meet the entrance requirements of their state universities since they do not have enough time for the required courses.

By JOHN A. MOORE

(Dr. Moore is a member of the National Academy of Sciences Committee on Agricultural Education in Secondary Schools and a Professor in the Department of Biology at the University of California, Riverside, California 92521.)

Today's Situation

School administrators, teachers, and parents should ask this question: "If there were no existing vocational agriculture programs, should one be started?" In some regions of the nation the answer will be "yes" — especially where the programs can be effective in dealing with local conditions and opportunities for employment. Our committee did see such a program; for example, one community has converted traditional vocational agriculture to a program dealing mainly with horticulture — a locally important industry and source of employment for graduated students.

But, I suspect, many vocational agriculture programs exist today mainly because they existed yesterday. These should be serious candidates for termination. Such terminations could help free resources for a new type of instruction.

Although what exists now as vocational agricultural education may seem of limited value, one can argue that there is a truly great need for something that could become a worthy replacement. My own feeling is that the emphasis must shift from vocational education in agriculture, now offered for a tiny percentage of students, to **agricultural education** for all students, broadly conceived and permeating the entire elementary and secondary school years.

And I mean **broadly** conceived. Students should come to appreciate that the species providing our food and fiber are part of a vast web of life that functions as an integrated whole. Every species of plant and animal depends not only on its physical environment but on the biological component of the environment as well. All living creatures are part of the same cycles of matter and energy. Thus, education will be incomplete unless students learn what is essential for the lives of our crops, animals, and plants. This will involve considerations not only of the general biology of animals,

(Continued on page 6)

New Wine In Old Bottles?

(Continued from page 5)

plants, and microorganisms but also of ecology, climate, landforms, and the nature of soil.

This study of the biology of food and fiber production should lead directly into a meaningful consideration of soil destruction, soil conservation, environmental consequences of pesticides, genetic and other methods of crop improvement, timber resources and their conservation, relation of population size to carrying capacity of the land, governmental controls of production and consumption, and freshwater and marine fisheries.

Agricultural education must continue with what happens to food after it is harvested. That will introduce the students to problems of the quality and safety of food, as well as with the preparation, preservation, distribution, and consumption of food. These are the activities that occupy most of the individuals in the food industry and, not surprisingly, are the sources of most jobs.

Other Considerations

Agricultural education must also provide information on good nutrition as a basis for well being.

Problems of food and fiber are international and students should be familiar with agriculture worldwide and the causes and consequences of insufficient food. The quest for food has been one of the driving forces of history.

In consideration of these vast and vital subjects, efforts should be made to enhance the students' ability to read, speak, and compute. These skills are perfected with greater pleasure and efficiency if they are related to matters that are of obvious importance.

Agricultural education, broadly conceived and presented, could be a unifying theme for much of the curriculum. There would be the **biology** of plants and animals; the **history** of the domestication of animals and plants and the evolution of farming from the Neolithic Revolution to the present; the **anthropology** of how the peoples of the world obtain their food and fiber; the **economics** of production agriculture, processing, and marketing of food and fiber; the **technology** of food and fiber production, processing, and distribution; the **politics** of legislation relating to food and agriculture; the **sociology** of those who work at all levels of the production and utilization of food and fiber; the role of food and fiber in **international trade and international relations**; the **literature** of farming and rural life; the ways that **artists**, with brush and camera, have portrayed farms and farmers; the

environmental problems raised by modern methods of food and fiber production; the **ethics** involved in such intractable problems as feeding the hungry of the world, in assisting those human populations that have grown to the point where they have exceeded the carrying capacity of the lands available to them, defining the "rights" of the wild creatures of the earth, and dealing caringly with domestic animals and pets.

In both elementary grades and in high school, there should be first-hand experiences with as many of these topics as possible in laboratory, field, and gardens. This is becoming ever more important as the increasing urbanization of our population cuts our traditional knowledge of, and ties to, the land that nurtures us. The Victory Gardens of World War II days remind us of how many people can become involved in raising food — and suggest what an important part of education they could become for a child.

Such a program, extending throughout the pre-college years and permeating the curriculum as a whole, could greatly assist students in that difficult passage from life in the home to life in that outer world.

Few instructors will be prepared to teach about food and fiber in the broad context just outlined nor are there adequate curriculum materials to support such efforts. A substantial effort must be made, therefore, to encourage colleges and universities, which educate all future teachers, to begin the necessary programs and to help in the production of adequate textbooks.

In Conclusion

Some may find my evaluation of vocational agricultural education unduly severe, but I believe that traditional vocational agriculture programs are now of minimal usefulness. In only a few regions of the nation and for only an ever-diminishing number of students can it lay the basis for effective life-long careers. It is becoming irrelevant — but that is hardly unique in American education. One does not have to be unduly perceptive to conclude that the American educational system as a whole has failed to educate its young to deal as effectively as it must with the personal, national, and international problems of the last quarter of the 20th century. In this respect our generation has served the next generation poorly.

The introduction of meaningful agricultural education for all students could be an effective step in general educational reform. There are few subjects so basic for life and happiness as the production and utilization of food and fiber. Isn't it time that we include such information in the curriculum for all students?

Letters to the Editor Encouraged

Readers are encouraged to send letters to the Editor to provide feedback about *The Agricultural Education Magazine*. Comments about specific articles or materials, the publication itself, or agricultural education in general are welcome. Letters will be published periodically on a space available basis

— BEB.

A Model For Instruction In Agriscience and Agribusiness

Angela wants to be a marine biologist or zoologist. Her first two years at the Chicago High School for Agricultural Sciences were difficult because she travels two hours each way to school on public transportation. A junior, Angela is glad she decided to persist. She was elected FFA Vice President, attended a State Leadership program, and is almost certain to receive a college scholarship when she graduates in June, 1989.

Dino is one of 15 children who also travels a great distance to school. Dino is talented in horticulture. In his first two years of high school, he won a number of individual and team awards. During the summer after his sophomore year, Dino was one of six students selected to work at the Chicago Board of Trade in an internship program that provides work experience in trading floor operations, public relations, economic research, and educational programs.

Tracey is a straight A student who served as FFA reporter, attended a State Leadership program, and participated in an eight week summer program with 11 other students at the University of Illinois in Urbana-Champaign. Tracey wants to pursue a Ph.D. in genetic engineering and feels her courses at the Chicago High School for Agricultural Sciences (CHSAS) will provide her with a fine foundation upon which to build.

The High School

The Chicago High School for Agricultural Sciences opened its doors in September, 1985. In just two years, the school's reputation has grown because of its zero dropout rate and 93 percent attendance rate. This is no small accomplishment considering that the new magnet high school is located on the far southwest edge of the city and serves students from every neighborhood in Chicago. The students are highly motivated and enthusiastic about a school that has no football or basketball teams, no study periods, an abbreviated lunch period, and a longer school day. Each September there are over 400 applicants for 120 freshmen places.

What is it that makes this school so appealing to urban teenagers? Parents would say it is the vast array of opportunities offered their children. There are over 200 agriculturally related careers which interest and excite parents and their children. Included in the list are careers in biotechnology, horticulture, food science, agribusiness, commodities trading, golf course and greenhouse management, landscape design, and animal science.

Innovative Curriculum

Parents, teachers, and students agree that another factor in the school's appeal is its innovative curriculum. The pro-



BY ELLEN S. RUSSELL

(Dr. Russell is a member of the National Academy of Sciences Committee on Agricultural Education in Secondary Schools and Principal of the Chicago High School for Agricultural Sciences, 3807 West 111th St., Chicago, Illinois 60655.)

gram is college preparatory and vocational at the same time. There are no tracking systems. Every student who enrolls in the school is required to take four years of English, four years of agriscience, four years of mathematics, three years of laboratory science, three years of social studies, two years of foreign language, as well as computer science, art, music, and physical education. Today's workplace demands students who have had more science, more math, and better communication skills than were required in the past. Tracking students does not serve their needs. The college-bound student graduates with little or no practical experience, while the vocational student often lacks the basic entry requirements for postsecondary education.

The school's curriculum is innovative in another respect. The so-called academic courses integrate agriscience and agribusiness concepts whenever and wherever appropriate. For example, in algebra and geometry, the teachers use problems from landscape design or land laboratory research projects. The social studies teachers highlight the role of agriculture in shaping the history of the United States as well as its importance in other countries and in economics.

This integrated, interdisciplinary curriculum requires constant dialog among faculty members in addition to assistance from the state's land grant university. The University of Illinois has been working with the Chicago Board of Education since 1983 to design the curriculum and develop goals for the school. Each summer the faculty spends a week at the University of Illinois Urbana-Champaign campus in an orientation to agricultural education. Visits to agribusiness are also part of the orientation.

Our Approach

Nonagriscience teachers are asked to obtain an agricultural science endorsement on their teaching certificates. The requirements for the endorsement include university courses in agricultural education and a written exam. Thus far, all of the faculty members who are not cer-

(Continued on page 8)

A Model For Instruction In Agriscience and Agribusiness

(Continued from page 7)

tified to teach agriscience have the endorsement or are in the process of completing it.

There are few curriculum materials and no textbooks in agriscience and agribusiness. Consequently, the teachers at the high school have begun to develop their own curriculum guides, course outlines, and instructional materials. Traditional programs in agricultural education at the secondary level have been concerned with teaching production agriculture to students from rural areas or small towns. Production agriculture is not overlooked at the Chicago High School for Agricultural Sciences; however, teaching about production is related to the consumer rather than the producer. Students learn about and appreciate what is required to bring the glass of milk, ear of corn, and slice of ham to their tables. This basic understanding and awareness of the agricultural enterprise is surprisingly absent not only among urban students, but also in the general population.

The emphasis at the Chicago High School for Agricultural Sciences is on the new fields of agriculture and the many careers beyond the farm gate. In the Chicago area, the number of white collar jobs is increasing in agribusiness, horticulture, and food science. In a study conducted for the school by the Chicago Board of Trade, the researchers recommended that the school continue to offer a college preparatory curriculum and continue to place students in summer internships in agribusiness.

Community Support

Another key to the school's success is the 31-member Agribusiness Advisory Council to the General Superintendent of Schools, which is chaired by Thomas R. Donovan, president and chief executive officer of the Chicago Board of Trade. He has been able to involve top business, government, and education leaders in promoting the school, providing work experiences for students, and making curriculum recommendations to Dr. Manford Byrd, Jr., the Superintendent of Schools.

Currently, the Agribusiness Advisory Council is working on an innovative proposal to construct \$14.5 million in facilities to complete the laboratories, classrooms, and site development of the land laboratory. If successful, this will be the first time that a public high school in this country would be built with private sector support.

Last, but certainly not least, is the issue of high expectations. Faculty and staff set high standards for themselves and for the students. As a result, students find themselves continually challenged and experience success in their achievements. They brag to their neighborhood friends about the rigorous program and the amount of work they are required to do. They sense that the difficulties they en-



Concepts taught in horticulture science are applied during FFA contests. Eric Berglind and Dino Rodriguez represent CHSAS in the horticulture contest. (Photo courtesy of the author.)

counter in travel to and from school, the longer school day, and the homework assignments every night will eventually pay off. And for the juniors who worked this summer in agribusiness or spent the summer on a university campus, some of the payoff has been experienced.

There are many agriculturally related careers in urban and suburban areas. We hope the Chicago High School for Agricultural Sciences serves as a model for curriculum design in the new fields of agriscience and agribusiness, a model for dropout prevention, and a model for integrating agriscience within other disciplines. The school is also a model for offering both a college preparatory and vocational program to every student.

In 1987-88 the Chicago High School for Agricultural Sciences will enroll 360 students in grades nine, ten, and eleven. Eighty five percent of the students are Black and Hispanic, and over half are female.

Summary

The Chicago Board of Education is to be applauded for its foresight in purchasing the land upon which the new high school is situated. Board members purchased the 72-acre farm over 100 years ago for 50¢ an acre! It is Chicago's "Last Farm" and a local historic treasure in the Mt. Greenwood community. The members of the Board of Education are also to be applauded for their vision in creating the Chicago High School for Agricultural Sciences in 1984 and supporting this new magnet school through its infancy and growing stages. The Board recently allocated \$1.3 million to construct an agriscience addition, which includes two food science laboratories, a horticulture laboratory, two agribusiness classrooms, and one agricultural technology laboratory for the study of aquaculture, robotics, embryo transplants, genetic engineering, and computer science. The new building will be dedicated in the fall of 1987 to General Superintendent Byrd.

We Are Ready For The "Tipoff"

The shrill sound of the referee's whistle pierces the air as an expectant crowd awaits the first movement of the players. Players take their positions around the center circle. The referee stands poised, ball-in-hand, for the center jump. The usual pre-game conferences with the coaches, captains meeting at center court, and introductions have been completed. The national anthem has been sung. Spectators and players alike have anticipated the game for months. Some players are easily recognized by every fan; others are unknown to everyone. So much rests upon the skills of such a small group. It could be the NCAA Final Four, the state high school finals, or the NBA championship. Often the outcome of the game doesn't live up to the pre-game buildup.

In a separate arena a second group of spectators await the first tangible action of another group of players. Their performance will be similarly scrutinized. A great deal of time, money, and effort have been spent attempting to insure this group's success. However, there is no guarantee. Too much emphasis placed upon long anticipated outcomes may have the same effect as too much pre-game buildup of an athletic event.

Action in the agricultural education arena is perilous because poor recent economic performances of both agriculture and education have made them easy targets for critics. Agriculture has suffered its worst economic recession since the Great Depression. The American education system has also been the target for critics. Educators have been unable to answer demands for specific data documenting the success of their programs. Combining the dilemmas facing agriculture and education creates a double-barreled set of very complex problems whose answers have eluded everyone. Few knowledgeable persons seem capable of making suggestions which could cure the problems facing agricultural education.

When the roar of the game is over and the final buzzer has sounded, only vocational agriculture teachers will be left to make sure the job gets done. I believe vocational agriculture teachers have the foresight to understand developments taking place in agriculture and that teachers are adapting local curricula to meet the needs of today's students.

Vocational agriculture instructors will continue to support positive program development. I have witnessed teachers applying the latest technology in computers, genetics, agricultural chemicals and conservation in their classroom instruction, test plots and, most importantly, with their individualized instruction with students in their supervised occupational experience programs.



By DALE R. BUTCHER

(Mr. Butcher is a member of the National Academy of Sciences Committee on Agricultural Education in Secondary Schools and a teacher of Vocational Agriculture at Benton Central High School, Oxford, Indiana 47951.)

Some may say that the changes haven't come fast enough. They may be correct. Experiences have taught us that we must temper the desire for change with the experience of the past to guarantee that our efforts will not be wasted. Traditionally, substantive proposals deemed to have promise and based upon sound educational practice have been adopted by the profession.

As a teacher of vocational agriculture, I have felt the sting of criticism directed toward vocational agriculture. I have frequently found myself defending my actions as a vocational agriculture teacher as well as defending the activities of the local vocational agriculture program and programs in neighboring schools. Personally, I have to guard against becoming overly defensive. It is often easier to be negative, dig in your heels and fight back than to be positive in your approach to answering pointed questions. The solution to the problems facing vocational agriculture is not a simple one. Vocational agriculture professionals must rely upon our strengths, take a positive approach, and keep in mind that instruction of students in agriculture is our number one priority.

Vocational agriculture's strengths are our program itself, built upon the foundation of student, parent, and local community involvement; our well developed relationship with state supervisors and teacher educators; and our exceptionally strong state and national vocational agriculture teachers' organization. Our program, vocational agriculture, is unique among education programs because we can communicate well on local, state, and national levels. Our program, vocational agriculture, may vary somewhat from school to school and region to region, yet there are more similarities between vocational agriculture programs than exist within other vocational areas and within most academic programs.

We can cooperate to accomplish any worthwhile goal. It is time now for all of us to call upon our strengths and work together for the betterment of vocational agriculture, our communities, and our students. Let the game begin!

Recommendations To Strengthen Vocational Agriculture

In their recent book, *THE HIGH TECH SOCIETY, SHAPING AMERICA'S ECONOMIC FUTURE*, Pat Choate and J.K. Linger call for the development of a high flex work force to help America meet the economic and technology challenges of the future. Each year large numbers of workers are displaced when their jobs disappear because of the technology application and international competition. At the same time, new jobs are being created through the creation of new technologies and new industries. It is predicted that such transitions will accelerate in the future. The agriculture sector of our economy and other sectors are facing this challenge of high technology and international competitiveness as never before.

This means that a new generation of agriculturalists — those on the farm and those in agribusiness — and a current generation of workers, many needing retraining, must effectively apply the new technologies and become much more sophisticated in economics, marketing, management, and planning. Some will need to lead the way and create policies allowing American agricultural products to compete profitably in international trade.

Secondary agricultural education plays a significant role in preparing this new generation; and, in certain situations, helping retrain the current generation.

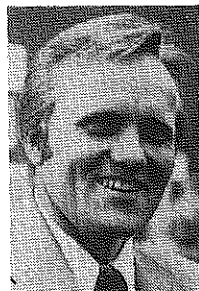
My Experiences

While considering the future of agricultural education in the secondary school, I reflected on my own experience as a student. There was a central focus on the individual. The purpose of the vocational agriculture program was to develop personal competence in each of us. Attaining technical knowledge and skill in agriculture was important. In the fact that was the stated objective of the program, but it took second place to the personal growth and development of the student. My interest in agriculture was used as a vehicle to get me involved with new experiences that reached beyond the classroom and school setting.

My agriculture instructor encouraged me to develop a greenhouse business, a new business for our small community. He challenged me to participate in FFA leadership and related community activities. These experiences developed skills and attitudes that have served me throughout my life.

Today's Education

Some educators have suggested that the agricultural education program should be primarily school based and limited to a series of elective courses. Teachers, administrators, and board members, take care! As you make changes, do not destroy the core components of a vital program which has enabled students to think critically, solve



BY MONTY MULTANEN

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real life problems, and develop self-esteem, and in numerous cases, become leaders and entrepreneurs. The development of critical thinking and problem solving are called for in most of the recent proposals for educational reform. They are also the foundation skills for the high flex work force of the future.

Core Components

The core components of any future secondary agricultural education program must include supervised occupational experience, leadership development through the FFA, a strong connection with the home, an effective interaction with agriculture and the related business community, and up-to-date classroom and laboratory instruction. Commitment to the core elements both in principle and practice by teachers, administrators, and board members is absolutely essential. In addition, taking action on the following issues will strengthen vocational agriculture.

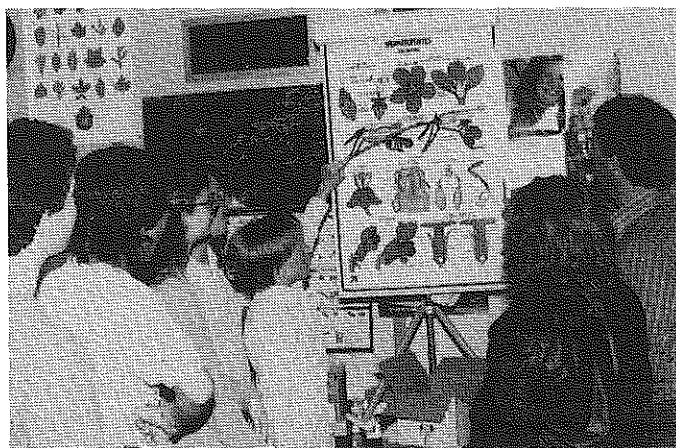
- Establish an on-going method for reviewing the program (including the FFA) and keep it current with the latest technology and policies affecting agriculture. A school board appointed review panel with broad representation from agriculture, business, and education is a starting point.
- Accommodate the full range of students — those planning to get a baccalaureate degree as well as who intend to go to work after high school.
- Create broad supervised occupational experience opportunities ranging from the traditional farm enterprise to being an agriculture resource person for elementary classrooms. The concepts of entrepreneurship need greater emphasis, not less.
- Develop instruction in agriculture studies which emphasize *practice* (and if necessary, instruction) in the skills of reading, writing, mathematics, speaking, listening, and problem-solving.
- Validate the applied science instruction in the study of soils, plants, and animals, so that agriculture students will be granted science credit for graduation. Explore this same validation process in other subjects such as mathematics.

- Assist students in relating their instruction to the full range of agriculture and related occupations, including a stronger commitment to job and college placement.
- Emphasize more strongly the study of economics, agricultural policy, and marketing.
- Expand the use of new instructional technology — computer simulation, computer networks, and interactive computer-aided video instruction.
- Allow more flexibility and creativity in scheduling and the use of time. Extended laboratory time is essential, but base it on instructional need rather than tradition.
- Market the agriculture program to future students, school officials, and the community.
- Assist in integrating agriculture study units in the general school curriculum, grades 1-12.

I believe that if core curriculum components are maintained and if appropriate action is taken on these proposed issues, vocational agriculture programs will provide an effective model for vocational education and all of education.



Computer assisted instruction is included in the Portland Public Schools' Operation Greenthumb Horticulture Program. (Photo courtesy of Portland Public Schools.)



"Operation Greenthumb" — Portland Public School Horticulture Program serves the district's many high schools. The program provides specialized preparation in nursery/greenhouse management, floriculture, and landscaping science. (Photo courtesy of Portland Public Schools.)



Portland School District's Operation Greenthumb Horticulture Program also provides enrichment for nine weeks to the 8th grade Honor Science program students. The Center is also used as a resource center for the district's elementary schools. (Photo courtesy of Portland Public Schools.)

BOOK REVIEW

STRUCTURE AND DEVELOPMENT OF MEAT ANIMALS, by H.J. Swatland, Prentice-Hall, Inc., Englewood Cliffs, NJ 07632. Copyright: 1984. Number of pages: 436. Price: \$38.95.

STRUCTURE AND DEVELOPMENT OF MEAT ANIMALS emphasizes the muscular and structural development of farm animals. It addresses the subjects of muscular growth, structure of carcasses, and properties of meat. The text details the growth and development of muscles with sections devoted to bones

and structural development.

Present situations indicate a need for improving the skills necessary for students to enter fields in animal husbandry. This text would be a good reference for individuals entering meat studies or veterinary science. The wording and terminology used in the book are probably best suited for college level students.

For high schools offering meat classes there are sections on slaughter, cuts of meat and grades of animal car-

casses with very detailed explanations. Through the use of this material a student could learn the principles of meat cutting and identification of muscles for commercial processing. This text would benefit students who are interested in meat cutting or animal science. It would make a good reference for the vocational agriculture classroom.

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The Future Of Agricultural Education In Secondary Schools From The Perspective Of The Land Grant Universities

Colleges of agriculture throughout the nation have a challenge — to train future generations of agricultural scientists, technical professionals, and managers for the food and agricultural system. In recent years there has been concern that there will be a critical shortage of college-trained agricultural personnel if the United States is to continue as the world's leading nation in agriculture. The plight was summarized in The National Association of State Universities and Land Grant Colleges (NASULGC) publication entitled "Human Capital Shortages: A Threat to American Agriculture." According to a 1980 USDA survey (Coulter and Stanton, 1980), the overall annual demand for college graduates with expertise in the food and agricultural sciences was predicted to exceed the available supply by 13 percent.

A more recent report entitled "Employment Opportunities for College Graduates in the Food and Agricultural Sciences" (Coulter, Stanton and Goecker, 1986) indicated that there will be a residual shortfall of college of agriculture graduates of approximately 10 percent each year for the next five years.

The USDA study also showed that there would be a surplus of qualified graduates in education, communications, and information specialists in agriculture, natural resources, and veterinary medicine. They note, though, that strong public interest in nutrition and health should contribute to expanding opportunities for educators and communicators with these specializations. Increasing use of information systems and computer assisted instruction is expected to provide continuing new employment opportunities.

Changes Needed

Future teachers of vocational agriculture in secondary schools will be trained, for the most part, in colleges of agriculture and colleges of education in the land grant universities. Knowledge of the science, economics, business principles, and global nature of agriculture will be needed by vocational agriculture teachers. They, in turn, will teach, inspire, and probably influence students to choose agriculture as a major in college. Their students will also be more likely to compete successfully if they go directly into any career — whether directly or indirectly related to agriculture.

What should colleges be doing to plan for and facilitate change in secondary schools? In my opinion, colleges must review the course requirements for vocational agriculture



BY WILLIAM P. FLATT

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teachers to ensure that they receive the training in biological, physical, and social sciences, economics, business, and other topics they will need to teach students these subjects. In the future, more emphasis will be needed on agribusiness and science than on traditional production agriculture.

Vocational agriculture programs should be made to match modern agriculture, and future vocational agriculture teachers should receive the kind of training that will enable them to do this effectively. Modern agriculture includes production, processing, marketing, and distribution of food and other agricultural commodities. For too long, the sole or primary emphasis has been on skills related to farming or production aspects. This needs to be expanded to include knowledge and skills of the other areas as well.

Shortage of Talent

Enrollments in colleges of agriculture have been declining for almost a decade. In addition, the academic aptitude scores of students entering agricultural college undergraduate programs have declined while scores have risen in other disciplines (RICOP, 1986). Both problems are serious, and our nation's land grant agricultural colleges can play a significant role in solving them. Both problems can be solved by doing a better job of training vocational agriculture teachers and enlisting their help in recruiting the best qualified students to pursue agriculture as a career.

In 1984, the U.S. Congress first recognized the serious erosion of expertise in the food and agricultural sciences and appropriated funds to establish the National Needs Graduate Fellowship Program. The success of this program has already been demonstrated. More than 300 excellent graduate students with very high Graduate Record Examination (GRE) scores were attracted to the food and agricultural

sciences. This shows what can be accomplished with adequate incentives. The same economic incentives can be used to attract more highly qualified students to major in a specific field such as agricultural education.

Summary

The future of agricultural education in secondary schools depends upon the extent to which changes are made to adapt to modern agriculture. More emphasis on biological, physical and social sciences, economics, and business will be needed. Land grant universities have a major responsibility to train future teachers of agricultural education. Colleges of agriculture could benefit from improved quality of agricultural education in secondary schools by having a larger pool of potential students as well as students who are better trained academically to pursue careers in modern agriculture.

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THEME

Global Agriculture: A Priority For Agricultural Education

Agricultural literacy must go far beyond America's domestic borders, including both written and spoken fluency in foreign languages. An understanding of the greatest industry we have known cannot be complete without the focus of American education on the world scene.

Production agriculture in a world economy needs the coordination between world class agribusiness infrastructure, sound fiscal and monetary policies, and secondary and higher education systems to be able to sustain agriculture's role of being the provider of over 20 percent of the nation's jobs. We are speaking about jobs of the future — jobs of biotechnology, jobs of government service and foreign service, international marketing and merchandising, and international banking. The USDA projects a 10 to 20 percent shortfall in qualified graduates available to the agricultural industry by 1990.

It has been noted, "We teach students agriculture — negatively in grades K-6 by showing the peasant in the rice paddies with a hoe in his hand." Conversely, we should incorporate the excitement of understanding the relationship between animals and plants into early reading, math, and science classes. Such a basic understanding will help prepare students for domestic research careers in such areas as weed science, genetic engineering, and nitro-alfalfa. These areas will address issues of environmental quality, the safe use of chemicals, and water utilization while at the same time providing nutritional and quality food and feeds.

Global Opportunities

But, many very important agricultural opportunities are really global. We have a basic need for gifted students in agricultural industries. It is difficult to attract these students



By DONAVON C. LOESLIE

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in today's atmosphere of budget deficiencies and the resulting pressures on curricula. To challenge them, we will have to emphasize better coordination of extension, vocational education, university, government, and industry efforts. An example is extensive teleconferencing on a variety of subjects. Production agriculture will need to demand basic and essential agricultural literacy, particularly when public education in grades K-12 is mostly financed by local farm property taxes.

However, the greatest concern of all is the lack of information in the teaching of students and teachers alike about the complex international trade scene. To stimulate "agricultural thinking" we must research internationally. John Lee of ERS states, "The rural economy is so integrated into the global economy, the entire ERS program is cast in a global prospective." However, policies and issues that cause crippling reductions in exports largely ignore currency exchanges and world debt. Each one billion dollars of exports created 35,000 jobs.

(Continued on page 14)

Global Agriculture: A Priority For Agricultural Education

(Continued from page 13)

A Global Economy

We talked about our lack of competitiveness on the world scene, yet the weakness of the dollar, along with other factors, played a role in the export increases in the 1970s, just as strength of the dollar plays a role in export decreases. Now some folks will argue that an import job equals an export job, but it really doesn't. An import job is bought and paid for by the U.S. marketplace and employs foreigners. An export job is bought and paid for by a foreign buyer and employs domestic workers.

These are some examples of the value of the dollar affecting trade patterns:

The decline of the dollar versus the Japanese yen has done little to help U.S. agriculture. That's because the dollar has been steady to stronger against the currencies of countries (i.e., Canada) that compete with the United States for markets such as Japan.

For West Germany in 1982, a bushel of soybeans at six dollars cost 10.2 Deutschemark. In 1984, that same bushel at six dollars cost 18.1 Mark — an 80 percent increase in two years.

Last year, during a five month period, the cost went from 190,000 to 262,000 Mexican pesos to purchase one ton of \$490 soybeans. This may reflect inflation in Mexico;

however, the net result of 190,000 to 262,000 pesos for our product becomes, in effect, an unannounced tariff.

For 25 years, it has been widely stated the U.S. growth market has been the developing nations. However, this is where the debt occurs internationally. If farm equipment dealers are to stay in business, they must sell farm equipment. But when a dealer calls on a prospective buyer and that buyer's debt is so extensive that he is paying 30-40 or 50-60 percent of his earned income for interest to the local lender, then no matter how badly the dealer needs to sell, or no matter how bad the buyer needs to buy, the equation will not and cannot work. International debt in the developing countries works the same way. When a country is faced with paying too much of its gross national product for interest to satisfy lenders, then available foreign exchange is insufficient to purchase food or develop trade.

In country after country, the debt is a culprit restricting trade between the U.S. and these markets. That trade interdependence even affects national security between the U.S. and these regions.

Summary

Agriculture plays a pivotal role within a global economy, with banking and finance, marketing, foreign policy, high-tech science, communications, and a multitude of other sectors of the work-force tied to the nation's largest industry. Accordingly, the literacy of our nation's educational system needs to reflect the changes, progress, and promise that remain in the production of food and fiber, in order to attract the high ability students this industry requires.

NEW PRODUCTS

The attempts of the fields of adult education and human resource development to develop an accepted body of knowledge, a set of competencies, and a program of professional certification are described in **PROFESSIONAL CERTIFICATION: IMPLICATIONS FOR ADULT EDUCATION AND HRD**, developed by the ERIC Clearinghouse on Adult, Career, and Vocational Education and available from the National Center for Research in Vocational Education. Authors Michael W. Galbraith and Jerry W. Gilley define professional certification as a voluntary process regulated by a profession to measure competencies possessed by its practitioners. The evolution of the concept of professionalization is presented from four perspectives: philosophical, nontraditional, characteristic, and developmental. Certification issues and positive and negative implications are examined and a nine-stage model for developing a professional certification program is presented.

Order **PROFESSIONAL CERTIFICATION: IMPLICATIONS FOR ADULT EDUCATION AND HRD**, 38 pp., (IN 307 — \$6.00), from the National Center for Research in Vocational Education, The Ohio State University, Publications Office, Box N, 1960 Kenny Road, Columbus, Ohio 43210-1090; or call toll free 800/848-4815 or 614/486-3655 inside Ohio and outside the continental United States.

CORRECTIONAL EDUCATION: PERSPECTIVES ON PROGRAMS FOR ADULT OFFENDERS, edited by Bruce Wolford, is a compilation of articles that examines issues in corrections education. Bruce Wolford writes of the difficulties of serving the large illiterate prison population; Osa D. Coffey provides administrative models for correctional education in the state adult corrections systems; Paul Moke examines equity and legal issues in correctional education; Robert B. Rutherford, Jr., and C. Michael Nelson discuss developing effective programs for the learning handicapped adult offender; John W. Waidley writes of vocational education, industries, and career education in corrections; and John Littlefield discusses the relatively new development of postsecondary programs for incarcerated populations. This publication is one of seven publications produced by the ERIC Clearinghouse on Adult, Career, and Vocational Education.

You may order **CORRECTIONAL EDUCATION: PERSPECTIVES ON PROGRAMS FOR ADULT OFFENDERS**, 53 pp., 1986 (IN 310 — \$7.00), from the National Center for Research in Vocational Education, The Ohio State University, Publications Office, Box N, 1960 Kenny Road, Columbus, Ohio 43210-1090; or call 800/848-4815 or 414/486-3655 inside Ohio and outside the continental United States.

Changing The Way We Think

Several challenges face vocational agriculture and the FFA in the immediate future. The decisions that are made and how they are handled will have a tremendous impact and long lasting effects. The issues are complex. The answers, if they exist, are not easy, and if implemented, may come slowly.

When the first atomic bomb was dropped, scientists gazed at the force of the blast and the unfolding mushroom cloud. Albert Einstein is reported to have made the comment, "Now everything has changed — except the way we think." For many of us, we have grown content with vocational agriculture programs and the FFA as we know them to exist today. And there is some reason for contentment based upon the quality and successful experience of vocational agriculture for 70 years and in the FFA for 60 years. However, if the FFA is to survive, "We must change the way we think."

Since 1917, vocational agriculture has been through many phases of change and improvement. Yet, too often the program still focuses only on the basics of production agriculture. In 1928, the vocational agriculture student organization, Future Farmers of America (FFA), was started. Since that date the FFA has expanded to meet a wide variety of needs for its members. However, there is now a need for program evaluation, which likely will point to the need for a number of changes and improvements.

Of course, vocational agriculture is the basis from which the strength of the FFA has developed. There can be no "real" FFA except as an integral part of a viable vocational agriculture program. During my travels as a National FFA Officer, and my classroom observations while traveling as a member of the National Academy of Sciences Committee on Agricultural Education in Secondary Schools, I often shared my concerns about how the FFA can best serve within vocational agriculture programs; identifying types of changes that must be made; the shortage of qualified vocational agriculture teachers; serving the students based on the right reasons for enrollment; and image of the FFA now and tomorrow.

Quality Instructors Needed

The key to almost any successful education curriculum is the presence and dedication of a qualified instructor. However, there has been a shortage of instructors for many years. Even though the shortage is now the lowest that it has been in the past 18 years, it is estimated that a minimum of 1,600 persons must be qualified to teach each year to fill vacancies. Too many good programs have closed for the lack of a qualified instructor. With the current emphasis on developing a more scientific and technical curriculum, these requirements will increase and the demand will grow even larger.



BY GRAHAM BOYD

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Teachers of high school vocational agriculture need to realize their role in minimizing shortages in the future. They have great personal influence on high school students who may be qualified to enter professional careers as agriculture teachers. For high school and college students, choosing a career is largely an art of role modeling. Thus, I believe that the high school teacher can serve as a most encouraging factor for new teacher recruitment. Much more must be done by professional teacher organizations, and especially universities, to capture students' interest in majoring in agricultural education and provide additional scholarships for potential students. Major efforts must be made to make teacher salaries competitive with other fields.

Not only should we train good vocational agriculture teachers, but "quality-concerned" FFA advisors as well. Again, I have often noted the connection between a quality FFA chapter and a well organized, highly motivated advisor. The role of a chapter advisor offers the teacher a tremendous amount of influential impact. My advisors at the chapter, state, and national levels probably had more influence on my decisions and ambitions than all the other educators combined over the years of my education.

Meeting Needs of Students

Currently, there are 420,000 FFA members compared to 580,000 students enrolled in vocational agriculture nationwide. While both areas of enrollment have decreased steadily over the past few years, there is still a great number of untapped potential FFA members enrolled in existing vocational agriculture programs. Granted, the FFA is not an organization for everyone. The FFA emphasizes quality over quantity. These two facts must always remain a basis for students enrollment while, at the same time, more has to be done to achieve 100% membership. After all, a vocational agriculture program is not complete without an FFA component. If the FFA is truly an *integral* part of the instructional program, *no* enrollee should miss that part of the instruction.

(Continued on page 16)

Changing The Way We Think

(Continued from page 15)

Unless more is done to recruit and maintain membership, the FFA will become weak. There is strength in numbers working toward one common purpose. The FFA needs to continue its news media broadcasts, sharing the message of a total agriculture organization. Chapters have to open new channels of communication in the community and provide the media with positive results of vocational agriculture and FFA activities. Countless public relations tapes, brochures, posters, Food for America programs, and FFA Center produced films go unused each year in too many chapters. We have the materials — let's take the time and interest to use them! Would you care to guess how many 8th grade students may have viewed the latest "National Convention Film," or the "Be All You Can Dream" production? Not enough, I'm sure. Thus, we potentially lose many potential students for our programs.

The FFA has done much in preparing students to meet changing needs in future agricultural occupations. The introduction of computer-based applications, the Ag Ed network, ACCESS, the Computers in Agriculture Award Program, and the 29 proficiency awards covering the many areas of supervised occupational experience are fine examples of the FFA's effort to stay on the cutting edge. These are also examples of the integral nature of vocational agriculture and the FFA. Unfortunately, vocational agriculture in many areas does not include an active FFA chapter.

Studies cite several reasons for a decrease in vocational agriculture and FFA membership during the past eight years: fewer students in school; depressed agricultural industry; the push for more "academics"; and the image of FFA as simply a farm organization. Each of these is quite valid and serious to the welfare of the FFA as we know it. In order

to shape tomorrow's FFA, "we have to change the way we think," and do something about those factors over which we have some influence.

FFA has to make every effort to represent vocational agriculture and vocational education in informing educators everywhere that vocational education is not a "competitor" with academics, but is "complementary". It is hands-on "learning by doing"; real life application of mathematics and English in a chosen profession. We could just as easily have established vocational mathematics or vocational chemistry "Vocational" means practicality and incentive — not slow and incompetent! The academic nature of vocational agriculture must be shown to administrators, counselors, parents, and potential students with academic credit made available to college bound students or we will lose some very bright minds. At the same time more economics, more science, and more history actually must be incorporated into vocational agriculture instruction, while keeping the production agriculture emphasis where it is really needed.

Options For Change

We must be *willing* to consider a number of options for change. Some have suggested that perhaps "vocational" should be deleted from the course description and replaced with "agriscience" or "Studies in Agriculture/Agribusiness". Possible name changes for the Future Farmers of America have been suggested along with changes in the emblem, ceremonies, degrees, and other areas. These are the changes that must be considered along with others. The impact that the FFA has on students dictates a hard look at possible changes.

Changing the curriculum, improving the image, and increasing membership will determine the mere existence of vocational agriculture and the FFA in the not too distant future in many local school districts. If we don't "change the way we think now," then everything will change — but not always for the good.

BOOK REVIEW

BONSAI, THE ART AND TECHNIQUE, by Dorothy S. Young, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1985, 423 pp., price unknown.

Bonsai is called "living sculpture" because it is a technique which combines art with plant science. Students have seen bonsai in the well-known movie, "Karate Kid" and this book contains information which will help them start their own bonsai. The author provides a "how-to" manual along with support explanations concerning this horticultural practice. The reader is given a brief history of bonsai, a detailed description of the elements needed to produce bonsai, a

list of suitable plants, locations of collections to visit, names of bonsai organizations, and list of reference material. Also included are practice exercises with good instructions and photographs to follow. A glossary is provided to aid understanding unfamiliar words. Although each chapter builds on another, one could obtain a quick look into constructing a bonsai by looking at one chapter — "Creating a Bonsai."

As a part of a horticulture library collection, this book could be used by teachers and horticulture students who wish to develop a horticulture project in a small area or investigate a non-

traditional horticulture practice. It could be used in self study for an independent project. Or, if a total unit is developed for bonsai work, the book is suitable as a textbook. It is well organized and written so it is understandable by high school, post secondary, or adult students. This book is simple, yet comprehensive and provides the information needed to incorporate bonsai into a course of study.

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Agricultural Education: A Part Of Or Apart From The Secondary School?

Agricultural education in secondary schools can be "a part of" or "apart from" the general secondary school program. The future of agricultural education in secondary schools will doubtless hinge upon the decisions made and actions taken in regard to forging new relationships and interactions between agricultural educators, the agriculture program as it exists today, and administrators of the general education programs. Reasons for a perceived rift between the two are not a new phenomenon in the annals of public education history. Particular organizational strategies of agricultural education that have contributed to that perception are external funding and rules and regulations; external curriculum development; and external advisory councils and relationships with the private sector.

First, agricultural education in secondary schools with its roots in the land grant institutions and a dominant agrarian society has traditionally been supported by the Federal Government. In this respect it was quite independent and set apart from the general secondary school program, which relied primarily upon local and state resources. The recently enacted Carl Perkins Act discontinued the maintenance subsidy that, in turn, pushed agricultural education into competition for local and state funds. However, due to the economic downturn, particularly in the agricultural sector, sources of financial support for the entire secondary school program have dwindled. Rules and regulations determined federally and adapted at state department levels have prescribed requirements on eligibility for the funds that prevent local districts from establishing uniform policies.

Second, curriculum development in agricultural education has been outside the purview of the regular channels of curriculum development as it relates to the general secondary school program. Needless to say, the so-called general subjects such as English, mathematics, science and social studies have not been shining examples of the shift from narrow specialization to the connectedness of content.

While rhetoric espouses the integration of agricultural education into the total curriculum, the process is an interdisciplinary operation of some magnitude. But does it not seem reasonable that general secondary school disciplines and agricultural education move towards a tenancy-in-common, arts and sciences theory and application of that theory? Very possibly, common ground could emerge through joint sharing of knowledge and skills. Agricultural education, in addition to content, has significant contributions to make through its problem-solving approach to learning and its ability in the development of leadership skills.

Third, agricultural education, due again to the nature of its origin, includes external advisory councils and cooperation with the private sector; an advantage of a special con-



BY ANNE CAMPBELL

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stituency to accomplish its purposes. Such private sector support is laudable but it has added to greater independence in agricultural education operations.

Very recently, the public schools have begun to solicit participation with the private sector to acknowledge the relationship between schooling and the needs of the society. On the one hand agricultural education has provided the model for that participation, while the model may have contributed to the perception of being apart from other programs. Missing from the model is the involvement of other school personnel. Perhaps, inadvertently, the advisory council/private sector connection has circumvented the active participation of the school governance and operational structure.

The future requires the rethinking of present practices, including curriculum content, in order to serve and prepare youth for the 21st century. Knowledge about agriculture is vital. It is the base for food, fiber, natural resources, the environment, the general health, and welfare of the nation's citizens. Therefore, all students should have an understanding of and an appreciation for agriculture. The secondary school program in agriculture should not be confined only to those seeking careers in the field.

To accomplish the desired goals for youth in the secondary schools, agricultural educators and the other secondary educators, with advice and counsel from multi-field experts, should begin a dialogue that identifies the areas of relatedness among the fields. Science and mathematics are obviously candidates for such discussion. To exclude the contributions of English and social studies to agricultural education and vice versa would be in error.

Communication with and involvement of boards of education, superintendents, principals, curriculum specialists, and counselors within the school system are essential for strengthening both agricultural and general education. The future depends upon such action.

How to facilitate the proposed change may evoke strong differences of opinions, but agreement and/or consensus can mean agricultural education becoming an integral part of the general secondary school program. James B. Hudak of Arthur Andersen & Company recently observed, "The future will not be just like the past."

Education For A Better Agriculture

Nearly 10 years ago THE ECONOMIST magazine published in London reported a cover story about the United States entitled "World Champions". The article was not about our football teams, Olympic athletes, or modern medicine. It was about American agriculture.

Today the world champion is battered and bruised. U.S. farmers have been placed in an economic crunch by inadequate farm prices, falling land values, cheap foreign production, and weak farm exports. Agricultural education programs, which were partly responsible for agriculture's earlier success, are battered and bruised also.

How can U.S. agriculture remain competitive in our current economic environment? At the same time, how can agricultural education programs deal with declining enrollments, a changing agricultural structure, and increased demands on teachers?

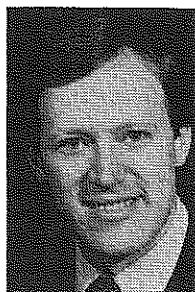
These are tough questions. The National Academy of Sciences' study is an effort to address the future of agricultural education programs in secondary schools.

I believe future changes should build on the great strengths of the FFA/Vocational Agriculture program. As a former FFA member, I know first-hand the tremendous benefits which the FFA had for me, and I know it can have many benefits for others. We must build on these strengths and create a dynamic program for these changing times.

There are three keys for the future.

1. **Agricultural literacy** — There is a need for education and awareness about agriculture throughout the public schools, beginning with the early grade levels.
2. **Broadened secondary agricultural education programs** — Future high school agricultural education programs need to be broad enough to serve the entire spectrum of agriculturally-related careers defined in the broadest sense.
3. **Updated production agriculture programs** — Production agriculture programs should also be strengthened. There is a need for increased emphasis on marketing, management, and financial skills, plus an understanding of the role of the global farm economy.

It is my desire that vocational agriculture programs strive and flourish in our public schools. To do so, they must generate public support and broaden beyond the traditional students. At the same time, programs that continue to serve farming areas need greater support and use of technology. Simply owning a computer is no magical solution. But, emerging technology is a reality. We must open our students' eyes — and minds.



BY RON WILSON

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What makes a farmer succeed or fail? Today it is more likely the financial management skills than the basic production skills that make the difference. Business skills and wise use of credit are more important than ever. Money may be the farmer's most important commodity. Teacher education at our land grant universities must respond to this need so that teachers are better equipped to teach the business side of agriculture.

The "excellence in education" movement has been used by some to promote more math and science at the cost of electives such as vocational agriculture. This is short-sighted and misguided. We must strive for excellence in all educational endeavors, including agriculture.

Specifically, I hope to see two positive changes result from the National Academy of Sciences' study:

1. Students in programs now considered vocational agriculture should not be "locked out" of pursuing a college education. In the case of FFA/Vocational Agriculture programs, "college bound" and "vocational" programs should not be mutually exclusive.
2. Students should receive math and science credit for their vocational agriculture courses, if those courses include financial management, supervised occupational experience, or biologically based information. In my experience, I learned more about how science works in the real world from my agriculture courses than anywhere else in school.

I commend the leaders of the FFA and secondary agricultural education for their forward-thinking work. At the same time, we must be careful to maintain the strengths of a program that has worked so well for so many of us.

Agriculture is so important that all students should be better informed about it. Agricultural careers should be defined in the broadest sense for purposes of our education programs. There is a need for teaching more business skills, and for a recommitment to excellence on the part of each of us. With increased support from school boards, administrators, teachers and supporters, U.S. education can help U.S. agriculture regain its rightful place as "World Champion".

Shaping The Future Of Vocational Agriculture

The year is 2010. Agricultural science is an important component of many curricula across the United States. The following is a sample of what could be a day's activities for a typical instructor of agricultural science.

8:00 to 8:50 a.m.:	Robotics in Agriculture
9:00 to 9:50 a.m.:	Computer Controlled Cultivation, Planting and Harvesting of Agricultural Crops
10:00 to 10:50 a.m.:	Foreign Contracting of Agricultural Products
11:00 to 11:50 a.m.:	Aquacultural Science
12:30 to 1:20 p.m.:	Outer Space Agriculture and Technology
1:30 to 2:20 p.m.:	Preparation Period*
2:30 to 4:30 p.m.:	SOEP Visitation Period
7:00 to 9:00 p.m.:	Adult Education Course — Applying Artificial Intelligence to Decision Making

*Lesson planning is accomplished using an international computer system which includes in the lesson recent developments in agriculture. Also, data about each student in the class, the community, and type of agriculture best suited to the area are analyzed and used by the computer system to develop the best plan for the upcoming lesson.

Not possible you say. This isn't agriculture! What happened to our standard production courses? Agriculture is changing in dynamic ways, and vocational agriculture must change also if the program is to survive. The truth is that much of what we know as vocational agriculture today will probably not exist in the near future. This notion should not be frightening, but exciting and challenging. We are on the verge of a new era in vocational agriculture, and today's teachers, teacher educators, and state staff personnel must shape the future of the program.

The Curriculum of the Future

Teachers of vocational agriculture have traditionally been expected to instruct students in a variety of areas. However, these areas often have been production oriented, designed to prepare students to return to the farm or ranch. In recent years, courses have been added to the curricula that have provided meaningful experiences for students in non-traditional areas in agricultural science such as horticulture and agribusiness. This trend away from traditional production agriculture must continue to be the way of the future



By DON R. HERRING AND RICHARD J. NORRIS

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if vocational agriculture is to survive in the secondary school systems across this nation. Today less than 3% of the population of the United States is involved in production agriculture (Burton, 1986). Newcomb (1986) asserted that over 50% of vocational agriculture students in most states are studying production agriculture, and argued that this "is at least five times as many as needed." If true, this means that the vast majority of our students need other routes towards jobs in the industry of agriculture.

Semester courses would allow each student an opportunity to specialize in such areas as **Renewable Natural Resources** (Energy and Environmental Technology, Wildlife and Recreation Management); **Agricultural Mechanics** (Agricultural Metal Fabrication Technology, Home Maintenance and Improvement, Agricultural Structures Technology); **Horticulture** (Landscape Design, Construction, and Maintenance; Nursery Plant Production; Greenhouse Plant Production; Fruit, Nut, and Vegetable Production); **Agricultural Production** (Specialty Agriculture, Plant and Soil Science, Animal Science, Animal Health Technology); and **Agricultural Business Management** (Entrepreneurship in Agriculture, Agricultural Production Management and Marketing, Personal Skills Development in Agriculture). These are but a few possible suggestions for courses that should be offered in departments of vocational agriculture in this nation. Newcomb and McCracken (1985) supported this notion by stating:

Semester, or even shorter, time-block offerings in grades nine and ten will provide a basic understanding of agricultural science. More specialized offerings in grades eleven and twelve will provide a basis for

(Continued on page 20)

Shaping The Future Of Vocational Agriculture

(Continued from page 19)

employment and advanced study in agricultural production, horticulture, agricultural mechanics, natural resources, and animal care. More students will opt to enroll for some courses and not for others.)

In effect, schools would offer a smorgasbord of courses designed to meet the individual and societal needs of their particular communities. Programs would be characterized by flexibility and adaptability, and would be based on the assumption that courses would be selected by students in accordance with their career goals and other educational interests. This means that sound career guidance must be provided to students on a continuing basis.

The emphasis in agricultural science should be on the development of broadly applicable, transferable skills and attributes useful to all students in a wide range of future occupations in agriculture. Priority should be given to the development of skills such as reading, writing, speaking, listening, working effectively in groups, computing, problem solving, critical thinking, and decision making (Pratzner, 1984).

Kunkel (1985), in addressing the curricula needed for the future, noted that:

The challenge to all of us in agricultural education, in vocational agriculture as well as in higher education, will be to put up-to-date realities of agriculture, high technology if you please, into the hands of young people so that they will learn that agriculture is more than dirt farming.

It is also critical that the curricula of the future focus on the global picture of agriculture. It is apparent that we are living in an increasingly interdependent and interrelated world in which agriculture is a vital part. Nelson (1987) stated that "Education in agriculture can no longer focus on just the situation in the community, state, or nation." It will be important to allow students the opportunity to explore ethical issues that are certain to be raised by the complex, global framework of agriculture.

The Teacher of the Future

What will this futuristic view mean for instructors of vocational agriculture? For one thing, they will have to be more aware of the total industry of agriculture than they have been in the past. Teachers of the future must be willing to embrace the new technologies being introduced into the agricultural industry as well as education. They must be flexible in thinking, ever aware of new innovations being introduced, and dedicated to continuing their education to keep abreast of the ever changing face of the industry.

With much of the delivery of information being done with computer and interactive video systems, the role of the teacher will take on new dimensions. More attention to individualized instruction will be a necessity. Further, Benson (1986) predicted that:

They (teachers) will spend more time diagnosing learning problems, prescribing educational treatments, and monitoring the learning process. They will also spend

much of their time developing curricula, selecting or writing software, arranging for media support, making their classrooms conducive to learning, and determining students' learning styles.

Vocational agriculture has a long history of teachers being dedicated to the students they teach, and the communities they serve. Teachers of the future must combine this dedication with an eye for innovation, change, and progress to keep vocational agriculture a strong part of the secondary school curricula.

The Student of the Future

And what of the students of the future? What will they be like? It is safe to say that just as our teachers and curriculum will have new characteristics, so too will the students being served by the agricultural science program. If the agricultural industry is to prosper once again, strong leadership will be needed during the transition years that lie ahead. Now more than ever, we need students with the ability, and more importantly, the desire to lead. Also, we need people who possess inquiring, scientific minds, and who are at the same time open to change and the adoption of innovations. No longer are we trying to attract a majority of students who will return to their family farms and live out their lives there, but those with a broad view of the global picture of agriculture and how to be a part of it. We must insist that students are as literate in their use of a computer as they are with other "tools." We must in fact increase the number of scholastically motivated students enrolling in agricultural science programs if we are to meet the challenge of solving the problems facing the food chain of this country and the world. At the same time, we must continue to serve the average students and students with special needs who also have important contributions to make in the world of agriculture.

It is important that we increase our efforts to attract students with non-traditional career goals, and this means increasing the enrollment of females and urban based students. Just as the vocational agriculture curriculum needs diversity to survive, the backgrounds and experiences of the students enrolled must be diverse as well. These students have much to offer agriculture, and their potential has barely been touched at this time.

Conclusion

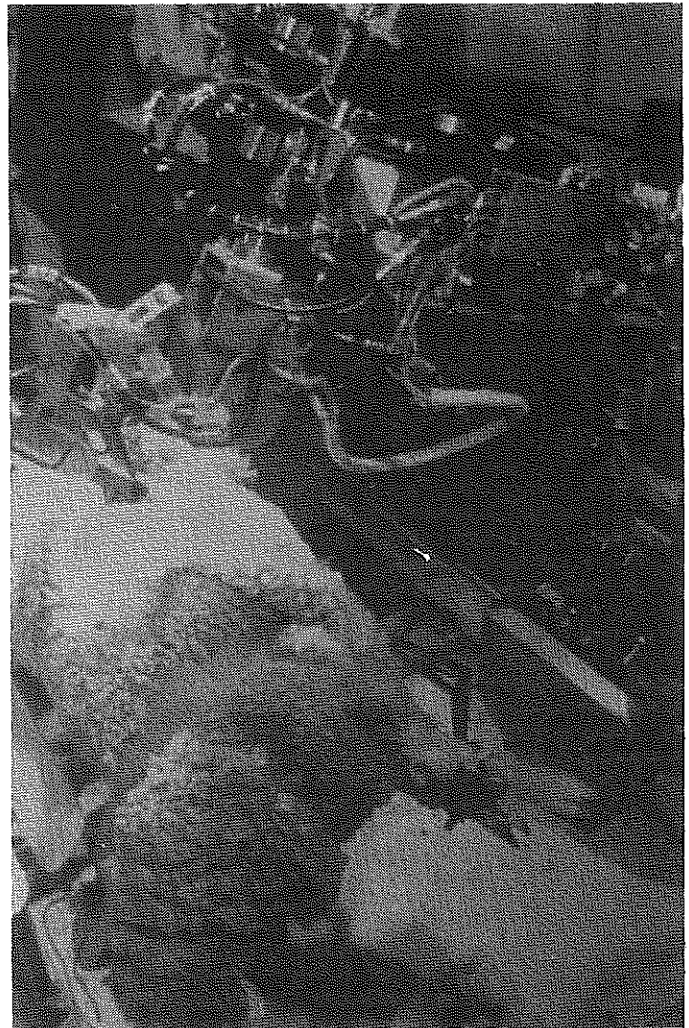
The face of vocational agriculture will continue to change. As more and more people find it impossible to continue the old ways of the family farm, as new technologies take over many of the day-to-day jobs once done by humans, and as more support businesses for agriculture are created, we may find vocational agriculture unrecognizable from the form in which we know it today. These changes should not be looked upon as threatening, but as challenging opportunities to reshape the program of vocational agriculture to meet the needs of the students of tomorrow. Newcomb (1986), addressing state leaders of agricultural education, issued the following challenge:

A profession grows or it dies; it changes or it faces atrophy, stagnation, and slow demise. These clearly cannot be viable options. The profession must become the hotbed of experimentation in education, not the guardians of the tombs of bygone success.

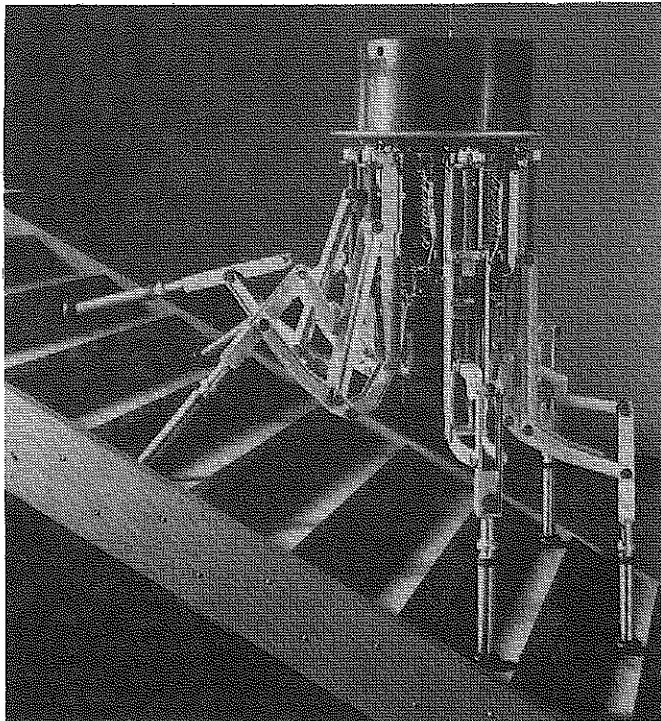
The challenge is clear. What will we do with it?

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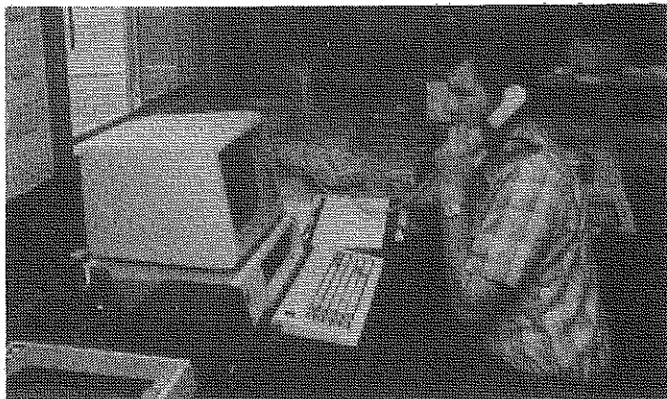
Robots will be developed to work in a variety of agricultural settings. This prototype robot, developed in Australia, is designed to shear sheep. (Photograph courtesy of THE FURROW, Moline, IL)



Robots, such as the world's first functionoid, ODEX 1, have numerous applications in agriculture. ODEX 1 can lift 2,000 pounds and can step into the cargo bed of a pickup truck. (Photo courtesy of Odetics, Inc., Anaheim, CA)



Robotics will play an increasing role in the agriculture of tomorrow. (Photograph courtesy of THE FURROW, Moline, IL)



Agriculturalists of the future will make greater use of computers and other management tools to aid in the decision making process. (Photograph courtesy of THE FURROW, Moline, IL)

The Future Of Vocational Agriculture Programs: A View From The Outside

The recent financial crisis in agriculture has made it more difficult than ever for young people to obtain needed credit to begin farming. Agribusinesses serving agriculture, such as farm machinery dealers, fertilizer and pesticide suppliers, and other businesses engaged in selling inputs to farmers, have also faced very difficult times. In many rural communities, there are few, if any, new employment opportunities for young people in these agribusiness or other agriculturally-related jobs. Vocational agriculture has traditionally provided vocational training for high school students who wish eventually to farm or find employment in agribusiness. This article examines some of the implications for vocational agriculture programs of the changes now occurring in U.S. agriculture.

It is very clear that opportunities for beginning farmers are likely to be very limited in the foreseeable future. Most of these opportunities will be situations in which the young farmer is able to take over part of the operation of the family's farm, or perhaps the farm of another relative. There will be very few instances in which vocational agriculture students will be able to begin farming after graduation from high school without considerable assistance from a parent or other relative. Most credit agencies are faced with difficult agricultural loan problems involving experienced farmers with excellent technical skills, and will probably be even less inclined than before to grant significant amounts of start-up credit to young, beginning farmers.

Given the weak financial condition of agriculture as a whole, there is little short-run potential for expansion of employment in businesses that serve farmers in most rural communities. This also suggests that agriculturally-related jobs for students coming directly out of high school will again be very limited. The good jobs that will become available will likely require technical skills beyond those learned in a vocational agriculture program, either additional vocational training emphasizing particular job skills, or frequently a college degree in agriculture.

An Expanded Role

If vocational agriculture is to survive and prosper under the current conditions facing agriculture, the objectives under which the program is conducted and marketed must be expanded and broadened. Increased emphasis will need to be placed on the development of skills that, while perhaps useful in employment, are not necessarily identified as purely vocational rather than college preparatory, nor necessarily purely agricultural in orientation. For example, most vocational agriculture programs traditionally have had strong emphasis on the development of public speaking skills. These

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skills are important in a broad array of jobs both in and out of agriculture and for students who wish to attend college as well as those who do not attend. Many, if not most, vocational agriculture programs in rural high schools perhaps do a better job of this than in any other part of the curriculum.

The emphasis through the FFA on developing an understanding of the group decision making process, the fundamentals of parliamentary procedure, and the like are equally important skills, perhaps even more important for college-bound students than for those who seek employment directly out of high school. Again, these skills are better learned through the existing vocational agriculture programs than perhaps anywhere else in the rural high schools.

The emphasis in most vocational agricultural programs on what might be termed "skills useful for living" is also important. Skills learned in project recordkeeping, in essence basic accounting skills, have applications for employment both in and out of agriculture. These skills are also important for personal finance, such as financial planning, checkbook management, and the making of a family budget. Many of the shop skills learned in vocational agriculture are useful not so much as skills needed for a particular employment opportunity, but are rather useful skills for an individual interested in maintaining a home, whether the home is on a farm or in a city.

Small engine repair and carpentry basics are two examples of manual skills of considerable value to both farm and city dwellers. Familiarity with pesticides, insect, weed and disease problems, and landscaping skills can be important to farm and city dweller alike. These are all skills that can be valuable for living on a farm or in a city even if a person goes on to college or finds employment outside of agriculture.

Finally, vocational agriculture plays an important role in providing students with a better understanding of U.S. agriculture as a producer of food and fiber. Some might call this aspect of the program "nonvocational agriculture," or simply "agricultural awareness." A case can be made that it is equally important for high school students to have an understanding of how the U.S. food and fiber system works as it is for students to understand American history.

The "Narrow" Mentality

The traditional narrow justification for vocational agriculture programs emphasizing employable skills for students coming directly out of high school in agriculturally-related jobs has, in many instances, become a burden to the program. The vocational label does not adequately communicate to policymakers and public school administrators the accomplishments of the program beyond the realm of vocational skills. This is important, in part, because opportunities in agriculturally-related positions are diminishing for students without a college degree in agriculture, or perhaps some other form of additional technical training.

Curricula in many high schools are becoming increasingly categorized as either "college preparatory" or "vocational." Students who are college-bound are not expected to enroll in vocational courses, including vocational agriculture. Yet, many of the identified skills learned in vocational agriculture courses are equally important, if not more important, to college-bound students, particularly students who intend to obtain degrees in agriculture. The imposition of additional entrance requirements for high school students, such as the new foreign language requirements for all students who enroll at the University of Kentucky (including those enrolled in the College of Agriculture) means that fewer students who elect college preparatory curricula will be able to include vocational agriculture in their programs.

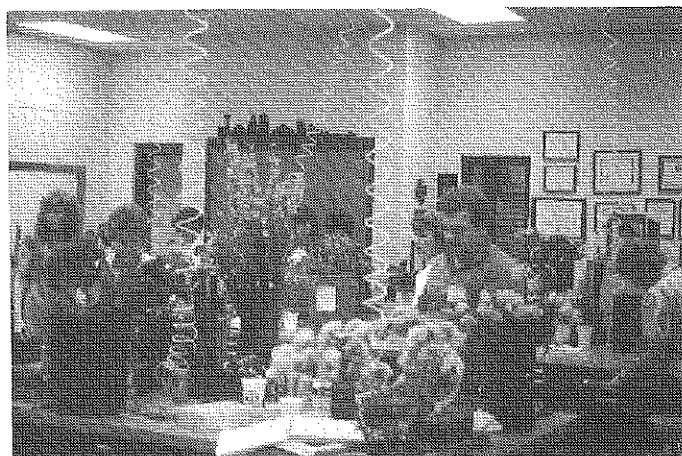
If vocational agricultural educators persist in marketing their program as one that provides only employable skills in agriculturally-related jobs for students coming directly out of high school, the future does not look very bright. The development of college preparatory curricula which exclude vocational agriculture will have detrimental impacts on the numbers of the best and brightest students who enroll in vocational agriculture. The continued expansion of the program hinges on the ability of educators to promote the program as far more than one which provides narrow, vocationally-oriented skills related to agriculture. In addition, the program should be marketed as one that provides a broad spectrum of skills equally important in the preparation for college and for students who will be employed in positions outside of agriculture.

Vocational Mandates

One of the reasons educators in vocational agriculture have not always promoted the successes of many of the broad-based, nonvocational aspects of the program has been because of the mandate for vocational training in agriculture outlined in the original Smith-Hughes legislation for vocational agriculture written in the early 1900s. U.S. agriculture has undergone enormous change since the original legislation was written. The rationale for the provision for state and federal dollars specifically earmarked for vocational agriculture has been tied to both the vocational and the agriculturally-related components of the program.

If teachers were to admit that the program served broader objectives, including the development of skills that met the needs of college-bound youth and students who ultimately might not be employed in some phase of agriculture, they were either admitting that they were teaching skills beyond

those outlined in the original mandate or that they were unsuccessful in providing students with the needed specific job skills for agriculturally-related employment. Given the current outlook for agriculture, perhaps it is time to revise and rewrite the legislation consistent with the skills currently being taught in vocational agriculture.



Skills for useful living are very important for all citizens. Modern facilities must be well equipped to give students such experiences. (Photograph courtesy of Michael McMahon, Graduate Assistant, Department of Agricultural Education, Texas A&M University)



Few vocational agriculture students will be able to "farm" even though machinery of the future, such as this computerized tractor, will enable producers to increase their efficiency. (Photograph courtesy of THE FURROW, Moline, IL)

Stories in Pictures

The Chicago High School For Agricultural Sciences



Computer science is taught as an interdisciplinary approach to agricultural science. Students learn basic skills as well as agricultural applications.



Sophomore students enrolled in advanced horticulture learn to mix soil for plant propagation.



Biology is an integral part of the science curriculum for beginning students. Some of the units in biology are taught concurrently with the agriculture department.



In horticulture, students learn every aspect of plant science and greenhouse management.

*(Photos courtesy of Ellen S. Russell, Principal of the
Chicago High School for Agricultural Sciences.)*