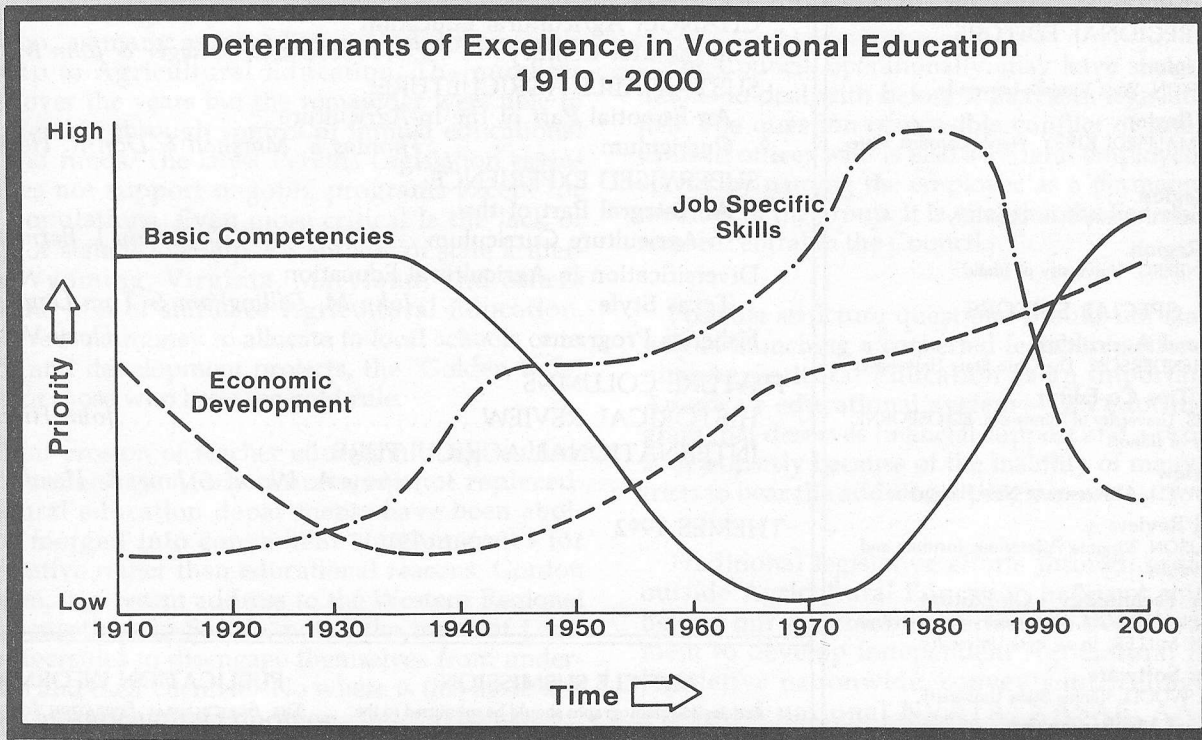


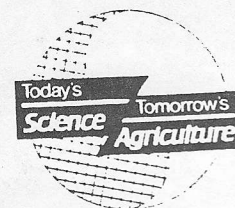
The
**Agricultural
Education**
Magazine

July, 1991
Volume 64
Number 1



THEME: In-Agriculture Curriculum

THE AGRICULTURAL EDUCATION MAGAZINE



July, 1991

Volume 64

Number 1

MANAGING EDITORS

Editor

PHILLIP ZURBRICK, 232 Forbes Building, Dept. of Ag Ed, The University of Arizona, Tucson, AZ 85721

Editor-Elect

EDWARD W. OSBORNE, Agricultural Education, 67 Mumford Hall, University of Illinois, Urbana, IL 61801

Business Manager

GLENN A. ANDERSON, 1803 Rural Point Road, Mechanicsville, VA 23111

Consulting Editor

BLANNIE E. BOWEN, Ag & Ext. Education, Armsby Building, Pennsylvania State University, University Park, PA 16802

REGIONAL EDITORS

Eastern Region

STACY GARTIN, West Virginia University

Southern Region

BARBARA MALPIEDI KIRBY, North Carolina State University

Central Region

ROBERT MARTIN, Iowa State University

Western Region

LOU RIESENBERG, University of Idaho

SPECIAL EDITORS

International Agriculture

JANET L. HENDERSON, The Ohio State University

Teaching Tips Co-Editor

ROSE JONES, University of Minnesota; ED OSBORNE, University of Illinois

Book Review

DAVID HOWELL, University of New Hampshire

Historical Review

JOHN HILLISON, Virginia Polytechnic Institute and State University

Computer Technology - Co-Editors

NATHANIEL JAEGGLI, University of Arizona; W. WADE MILLER, Iowa State University

Computer Software

JEFFREY A. WOOD, Illinois State University

Agricultural Mechanization

JOE HARPER, Clemson University

The Council

JOHN POPE, The National Council

EDITING-MANAGING BOARD

Chairman

Stacy Gartin, West Virginia University

Secretary

Blannie E. Bowen, Pennsylvania State University

Editor

Phillip R. Zurbrick, University of Arizona

Members

Glenn A. Anderson, Virginia Department of Education

Larry Case, U.S. Department of Education

Merle Richter, NVATA, Bloomer, WI

Frank Tropme, NVATA, Daphne, AL

Robert Graham, NVATA, Alexandria, VA

Tom Parker, NVATA, Casper, WY

William G. Smith, Rutgers University

Table of Contents

	Page
GUEST EDITORIAL	
Chart Our Own Future! Clifford L. Nelson	3
THEME: IN-AGRICULTURE CURRICULUM	
From Crossroads to an Expressway Jack Elliot	4
Key to Success Randy Showerman	5
CHANGE: Agricultural Education in the 21st Century David Krueger & John Mundt	7
SUSTAINABLE AGRICULTURE:	
An Essential Part of the In-Agriculture Curriculum Thomas E. Marshall & Don R. Herring	10
SUPERVISED EXPERIENCE:	
An Integral Part of the In-Agriculture Curriculum Randy J. Bernhardt	13
Diversification in Agricultural Education — Texas Style John M. Dillingham & Tom Dayberry	15
Fisheries Programs Flory Vinson	19
FEATURE COLUMNS	
HISTORICAL REVIEW John Hillison	17
INTERNATIONAL AGRICULTURE Jeffrey A. Wood & Janet L. Henderson	21
THEMES 1992	24

ARTICLE SUBMISSION

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

PUBLICATION INFORMATION

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

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

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

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are \$7 per year. Foreign subscriptions are \$20 (U.S. Currency) per year for surface mail, and \$40 (U.S. Currency) foreign airmail (except Canada). Student subscriptions in groups (one address) are \$4 for eight issues. Single copies and back issues less than ten years old are available at \$1 each (\$2.00 for foreign mail). All back issues are available on microfilm from Xerox University Microfilms, 300 North Zeeb Road, Ann Arbor, MI 48106. In submitting subscriptions, designate new or renewal and address including ZIP code. Send all subscriptions and requests for hardcopy back issues to the Business Manager: Glenn A. Anderson, Business Manager, 1803 Rural Point Road, Mechanicsville, VA 23111. Publication No. 73246

Chart Our Own Future!

The wisdom and foresight of the Agricultural Education leadership was evident when the concept and reality of the "Council" was developed. It marked the recognition of the profession that we were no longer "prisoners of the law" and had a right and professional obligation to chart our own path and have input in determining our destiny. The Council has remained in the forefront of innovation and development in Agricultural Education. Could they do more or would it be appropriate for them to modify their focus?

Before these questions can be answered, it might be helpful to assess the current state of the profession, ominous trends that seem to be developing and where the "good life" still exists. The Federal presence in Vocational Education is greatly diluted. Under Smith-Hughes Legislation, as many as nine Federal employees gave leadership to Agricultural Education. The numbers declined over the years but the remainder were able to offer leadership through control of limited educational thrusts and funds. The latest Perkins Legislation essentially does not support ongoing programs except for special populations. Even more critical is the lack of funding for state leadership. Recent loss of state leadership in Wyoming, Virginia, Maryland, and others reflects the loss of status of Agricultural Education. When there is no money to allocate to local schools or to inservice and development projects, the "Golden Rule" prevails, or those who have the gold rule.

A similar erosion of teacher education in agriculture appears underway. Many retirees are not replaced. Agricultural education departments have been abolished or merged into convenient conglomerates for administrative rather than educational reasons. Gordon I. Swanson, in a recent address to the Western Regional Research meetings in Seattle, noted the trend of Land Grant universities to disengage themselves from undergraduates and their clientele. No where is this more evident than in Agricultural Education.

It is apparent that for Agricultural Education to survive, focused legislative activity must take place at national and state levels. Those states that have developed and passed agricultural education legislation typically have not been terminally crippled by the latest Perkins Act. It is also apparent that the profession needs



BY CLIFFORD L. NELSON, GUEST EDITOR
(Dr. Nelson is Professor, Department of Agricultural Education, Washington State University.)

a coordinated legislative effort. The Council, created as an umbrella organization for Agricultural Education, is the logical entity to take leadership in this effort.

The Council, operationally, may have structural limitations to deal with before it increases legislative activities. The question of possible conflict of interest for a Council officer who is also a Federal employee could be solved by naming the employee as a permanent liaison member of the group. It is vital that the Federal presence remain central to the Council.

Possible structure questions should not stand in the way of launching a concerted legislative effort to recognize Agricultural Education as an important part of America's educational system — an educational program that deserves financial support and a program that is in jeopardy because of the inability of many local districts to bear the additional program costs.

Traditional legislative efforts through organizations outside Agricultural Education have not significantly helped our program. If we feel the need and commitment to develop independent Agricultural Education legislative nationwide, convey your feelings to your state and national NVATA, NASAE, AAAE, FFA Alumni and Young Farmer leadership. These five organizations have made substantial contributions to our past legislative activity. However, their charge is much broader than legislation and their officials are legislatively limited in the amount of time they can devote to legislative efforts. Our future as a profession is dependent upon our actions.

From Crossroads to an Expressway

"We now stand at the crossroads in Vocational Agriculture." Does this statement look familiar? It should. Written by J.A. Linke, Chief of Agricultural Education Service in the office of education, it appeared in the July 1937 issue of the AGRICULTURAL EDUCATION magazine. The theme has frequently recurred in one form or another during the past sixty years and is closely associated with the chart (Rosenfeld, 1987) on the cover of this issue. The "in" agriculture or vocational agriculture component of agricultural education has experienced many crossroads in the past. The recommendations from UNDERSTANDING AGRICULTURE: NEW DIRECTIONS FOR EDUCATION stated, "A broader definition of vocational agriculture is needed because technological and structural changes in agricultural industries have enlarged the scope and number of careers."

Webster's Seventh New Collegiate Dictionary defines crossroads as "a crucial point, especially where a decision must be made" or "a road that runs cross-country between main roads." Both definitions are applicable when discussing "in" agriculture curricula. Does the emphasis on "the basics" that is sweeping the educational community suggest we are again at another crossroad? Do we need to exit the crossroads and build an expressway that accommodates modern high speed curricula? A look to the past will assist our view of the future.

The Journey Begins — Developing the Vocational Purpose: Volume 1, 1929

The vocational emphasis in agricultural education began with the passage of the Smith Hughes Act twelve years before the publication of the first issue of AGRICULTURAL EDUCATION. By the time volume one was published, agricultural educators had embedded a deep rut in the pathway of vocational agriculture. The objectives of vocational agriculture appeared rather clear, to improve agriculture and rural living conditions.

In the 1920's, Vocational Agriculture was well established throughout the country, but evidence was surfac-



By JACK ELLIOT, THEME EDITOR

(Dr. Elliot is Assistant Professor, Department of Agricultural Education, Michigan State University.)

ing about non-farm outcomes of vocational agriculture graduates. Although the profession continued to favor farming as the major vocational route, Vocational Agriculture leaders recognized the existence of other outcomes for students, and the decrease of future jobs in farming.

A Well Traveled Road — Farming is the Objective: Volume 20, 1947-48

Two decades later, the profession celebrated the recently passed George-Barden Act of 1946. Agricultural educators preached traveling that road, and emphasized that only a minimum amount of effort devoted to non-farming activities would be tolerated. Very few authors in this era alluded to the fact that vocational agriculture offered something more than preparation for farming. The primary function of agricultural education was to teach farmers to use the best available tools and apply the most modern scientific knowledge to their needs.

Why did this generation cling so earnestly to farming as the only outcome of vocational agriculture when evidence showed that other outcomes existed, and that the number of farms was declining? Perhaps agricultural educators were sacredly adhering to the letter of the law. Pursuing college was not even mentioned in this volume — Agricultural Education tolerated few outcomes aside from farming.

(Continued on page 9)

About the Cover

The figure traces changes in priorities over time, which in turn have determined what programs have been considered exemplary models to be emulated and to drive policies. The figure, based on Rosenfeld's review and interpretation of historical documents and records of congressional debates and testimony, is a rough estimate presented to illustrate the relationship between macroshifts in priorities and economic and social conditions. The ordinal scale reflects, in part, balances between agricultural and industrial programs, which have often had different aims, and between programs for adults and for youth (Rosenfeld, 1987, p. V-59).

Rosenfeld, S. (1987). Determinants of excellence in vocational education. DESIGN PAPERS FOR THE NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION, p. V-60.

Key To Success

Imagine taking a family vacation over the 4th of July! The weather forecast is excellent, and this is the first family vacation you have experienced in years. The car is loaded with camping equipment and essential personal items for the upcoming week. It's time to leave and everyone is excited. As the family heads out, everyone has a different idea about where to camp and how to find the campground. You open the glovebox to pull out the map, but it isn't there. As the drive progresses, the children start asking questions about the vacation and why this part of the country has been selected. You hesitate as you try to find an answer. All become restless as the drive continues. You soon realize that a major mistake has occurred; the family has not been involved in planning the vacation. You have made all the decisions. That evening a family pow wow is held to "map out" the rest of the trip.

This story is one you may have experienced. It is critical to "map out" a plan for all major ventures that are undertaken. The map will provide essential directions and communication to others. "Mapping out" a family vacation is much like developing a plan for future programming in Agricultural Education. If meaningful change is to take place in Agricultural Education, a plan of action must be embraced by all involved. That plan of action must be driven by a shared philosophy statement.

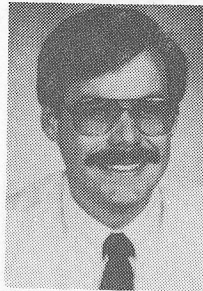
Purpose

A philosophy, understood and shared by all, will provide purposeful direction in curriculum and program development. The philosophy is a prerequisite to serious change. It clarifies goals and objectives, defines program components, outlines course content and guides curriculum improvement. It is also a crucial communication tool. Just as an engineer designs a blueprint, educators formulate a philosophy to promote learning and growth.

Too often in education a clear philosophy does not exist. When this happens educators become reactive instead of proactive. Agricultural education is in a time of rampant change. In order for change to occur systematically, it is critical that a plan be created that is driven by a contemporary philosophy statement.

Development

When developing a philosophy statement, agricultural educators must determine the focal points of the program. This process of "mapping" entails reviewing the past and envisioning the future. Educators will be required to clarify their beliefs, goals and values regarding Agricultural Education. It will be essential for educators at all levels to make value-laden judgments on key components of the curriculum and program. Some questions to be answered include:



BY RANDY SHOWERMAN

(Mr. Showerman is Instructor, Department of Agricultural Education, Michigan State University.)

1. Why should Agricultural Education exist?
2. What should be taught?
3. What are the essential components?
4. What is the role of the teacher, student and community?
5. How will the program deal with future change?
6. How will the program encourage diversity of students?
7. How will the program encourage diversity of teachers?

THE STRATEGIC PLAN FOR AGRICULTURAL EDUCATION offers a vision of the future for Agricultural Education in the United States. It is designed to articulate the beliefs and values for revitalizing educational programs in and about agriculture.

From this foundation, each state is challenged to create a philosophy that collectively represents the beliefs and values of local instructors, university faculty, state department of education staff and agribusiness leaders. It is essential that the philosophy statement be a joint effort and not mandated from the top down. Collaboration in the development of a philosophy will establish ownership and articulate understanding.

As new philosophy statements are generated, they must be reviewed and updated to reflect the spirit of the new initiatives at local, state and national levels. The philosophy must focus on key components of the program.

Key Components

As a philosophy statement is being "mapped out," key components or focal points must be established. Value judgments and compromises will be required to prepare a statement that will direct the revitalization of Agricultural Education. Key components to include in the philosophy are:

1. Global statement defining Agricultural Education;
2. Levels of Agricultural Education and brief description of each:
 - a.) agricultural library;
 - b.) secondary programs;

- c.) adult education
3. Roles of the FFA and Supervised Experience;
4. Roles of administrator(s) and community;
5. Areas of emphasis based on the real world;
6. Emphasis on "Learning by Experience;" and
7. Role of the Agricultural Education programs in the school and community.

Other areas may be identified during the development process.



Michigan: A Case in Point

In 1988 Agricultural Education's leaders (twelve agriscience teachers and three state and university staff) in Michigan developed a philosophy statement. The philosophy was designed to provide a framework for curriculum improvement and programming restructuring. "Mapping out" the philosophy required vision and the willingness to change. The end result was a contemporary philosophy statement.

Michigan Agriscience and Natural Resource Education Philosophy Statement

Agriscience and Natural Resource Education is an organized program of instruction designed to offer career exploration, self-fulfillment and career preparation. The Agriscience and Natural Resource Education program is an integral part of the total educational program in the community for students, K-12 and adult. Agriscience and Natural Resource Education includes Agribusiness/Production, Agricultural Mechanics, Natural Resource Management and Ornamental Horticulture.

Kindergarten through eighth grade Agriscience and Natural Resource Education programs create student awareness of and appreciation for agriculture and natural resources and related career opportunities through the infusion of concepts developing agricultural literacy.

Secondary Agriscience and Natural Resource Education programs offer instruction and practical experiences for students who are preparing for entrepreneurial opportunities, skilled and/or technical occupations or post-secondary education in the agriculture and natural resource industry. Agriscience and Natural Resource Education programs provide opportunities to develop the technical, interper-

sonal, and lifelong competencies needed for successful career development.

The FFA student organization is an essential, intercurricular component of the Agriscience and Natural Resource Education program that enhances the application of skills learned and develops leadership, citizenship and cooperation.

Adult Agriscience and Natural Resources Education programs provide for entry into, upgrading, retaining or advancement in skilled or technical occupations and vocational interests in the agriculture and natural resource industry.

School administrators, other faculty/staff and local advisory committees assist the Agriscience and Natural Resource Education instructor(s) in program development and implementation. The program provides instruction, practical experiences and entrepreneurial opportunities in the agriculture and natural resource industry by integrating activities at the school site and throughout the community.

The Agriscience and Natural Resource Education program is unique due to the individualized instruction, program coordination and interaction with the agriculture and natural resources industry that requires additional planning and supervision beyond the traditional school day/year. The dynamics of the agriculture and natural resources industry require continual updating and inservice of personnel involved in the delivery of the Agriscience and Natural Resources Education Program.

The Agriscience and Natural Resource Education programs are also articulate with other agricultural and natural resources services, agencies, institutions and educational associations.

The Michigan Agriscience and Natural Resource Education Philosophy Statement has been adopted by the Michigan Association of Agriscience Educators, Michigan State University and Michigan Department of Education.

Conclusion

Developing a philosophy statement is a process that involved many phases. No set "recipe" will work for all situations. The "mapping out" of a philosophy does not happen by chance. It is a lengthy process that involves taking a critical look at the present and "mapping out" the future. As new programming efforts are developed in agricultural education, fresh ideas must be incorporated into the philosophy. These new ideas form a conceptual framework for local program restructuring. The philosophy statement is a critical process for determining the future direction of agricultural education.

References

- Wiles, J., and Bon, J. (1989). CURRICULUM DEVELOPMENT: A GUIDE TO PRACTICE. Columbus, Ohio, Merrill Publishing Company.
- Newcomb, L.H., McCracken, D.J. and Warmbrod, R.J. (1986). METHODS OF TEACHING AGRICULTURE. Danville, Illinois, The Interstate Printers and Publishers, Inc.
- Phipps, L.J., (1972). HANDBOOK ON AGRICULTURAL EDUCATION IN PUBLIC SCHOOLS. Danville, Illinois, The Interstate Printers and Publishers, Inc.
- THE STRATEGIC PLAN FOR AGRICULTURAL EDUCATION: A NATIONAL MOBILIZATION PLAN FOR REVOLUTIONARY CHANGE IN AGRICULTURAL EDUCATION, (1990). Alexandria, Virginia, The National Council for Agricultural Education.

CHANGE: Agricultural Education in the 21st Century

From the school reforms of the 1980s to the restructuring of our schools in the 1990s, the wave of change continues. In this nation we have come to the realization that increasing high school graduation requirements, increasing course requirements in math, science and English have not worked. In essence, more of the same has been a miserable failure. Yet, change goes on and change we must. The words of Thomas Jefferson inscribed on the memorial dedicated to him in Washington, D.C., reflect a basic philosophy and change in our nation. The words are as follows:

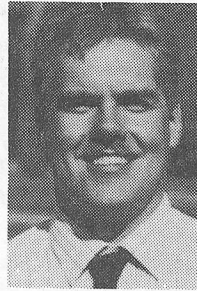
I am not an advocate for frequent changes in laws and constitution, but laws and institutions must go hand and hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered, and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times. We might as well require a man to wear the coat which fitted him when a boy as civilized society to remain ever under the regimen of their barbarous ancestors.

Change requires an element of risk and an attitude to be proactive participants in the process, as opposed to reactive observers. We have changed and we must continue with the process. It is never ending. The fast pace of our changing nation and world requires that we change or get out of the picture.

National Goals for Education

In February of 1990, President Bush and the nation's governors announced six national goals for education. In essence they are, by the year 2000:

- All children in America will start school ready to learn.
- The high school graduation rate will be at least 90%.
- American students will leave grades 4, 8 and 12 having demonstrated competency in challenging subject matter, including English, math, science, history and geography; and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning and productive employment in our modern economy.
- Students will be first in the world in mathematics and science achievement.
- Every adult American will be literate and will possess the skills necessary to compete in a global economy and to exercise the rights and responsibilities of citizenship.
- Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.



By DAVID KRUEGER AND JOHN MUNDT

(Mr. Krueger is Graduate Student, Department of Agricultural Education, Michigan State University.)

(Dr. Mundt is Assistant Professor, Department of Agricultural and Extension Education, University of Idaho, Boise Center.)

The question is, then, how does vocational education and, specifically, agricultural education fit into the picture? Do we fit? Can we fit? The answer is yes.

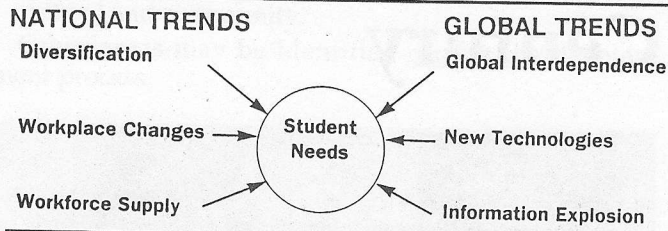
The new Carl Perkins Vocational and Applied Technology Act, whether we like it or not, targets special populations, which was essentially the reason for the passage of the Smith Hughes Act of 1917. In addition to the targeting of special populations, the act also gives specific impetus to the integration of academic and vocational education through coherent sequences of courses so that all students achieve both academic and occupational competencies. The act also emphasizes tech prep as an avenue for linking learning in high school with two year post-secondary education. The new act has implications and opportunities for those of us involved with Agricultural Education. Changes must continue to be developed and adapted into curriculums of Agricultural Education in order to meet student needs of the 21st century.

Student Needs

What are the needs of our students? National and global trends are affecting all of us, especially our students. Our programs of education in the public schools must be a reflection of those trends and the needs of students. Changes in the workplace are requiring a higher level of competence, which was previously required of only those planning for college. A changing and diverse student population and the changing workplace offer challenges and opportunities.

According to PREPARING FOR IDAHO'S FUTURE, THE IDAHO EDUCATION PROJECT, students and teachers of

tomorrow must have the capacity to deal with a variety of changing issues including cultural diversity, a global society and global interdependence. Additionally, a highly technological world and the continuing information explosion provide a context for change.



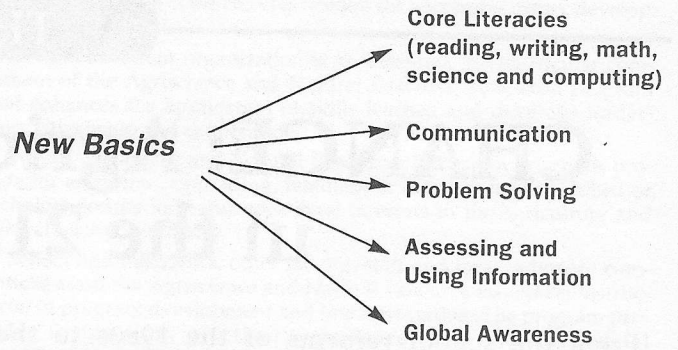
Note: From PREPARING FOR IDAHO'S FUTURE (p. 3) by staff, 1991, Boise, ID: Berman, Wieiler, Associates, copyright 1991. Reprinted and adapted by permission.

A Window of Opportunity

The mood of the educational community is changing. The reforms of the past have not worked. A recent issue of the *Phi Delta Kappan* devoted an entire section to the "Rebirth of Vocational Education." The basic tenants of vocational education are now being espoused as solutions to some of the problems faced by education. Examples include the ability to think critically, to solve problems, and the integration of vocational and academic education. Vocational education provides a context for understanding and applying the principles of math and science in an applied setting. Recent studies give renewed credence to basic education, can-do attitude, collaborative ability and adaptability. These are many of the very tenets which we have held to so dearly over the years.

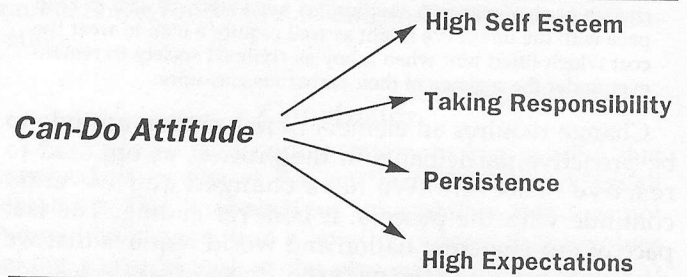
In evaluating the need for change, PREPARING FOR IDAHO'S FUTURE, THE IDAHO EDUCATION PROJECT essentially says it is imperative that we expect higher levels of skill and a solid background in traditional subject matter. Students will need to be able to write effectively and express themselves with clarity. Exhibiting a positive attitude, adaptability and a collaborative effort are also desirable traits which business and industry see as a must. These abilities are the "new basics" which have been taught in principle through our Agricultural/FFA programs all along, but must be emphasized more strongly and taught more than ever as we approach the 21st century. When evaluating these basics, we have to expect students to be articulate with their language, be literate in science and math, and be comfortable with problem solving in both work and in life situations.

Our youth will be expected to solve problems by knowing how to reason through complex steps to an effective conclusion. This critical thinking ability will develop their leadership skills and enable them to be successful. It is also important for students to be able to access information — not to be crammed full of facts. Students will need strategies for finding the information they need expediently.



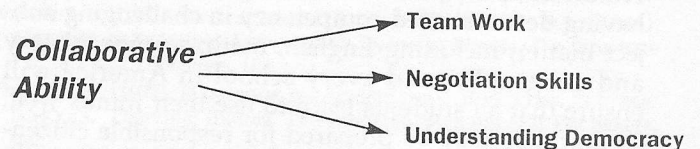
Note: From PREPARING FOR IDAHO'S FUTURE (p. 6) by staff, 1991, Boise, ID: Berman, Wieiler, Associates, copyright 1991. Reprinted by permission.

Students need to develop a "can-do attitude" where they hold high expectations for themselves and possess strong self-esteem. When students participate in education they should develop competence, confidence, persistence and the ability to deal with set-backs, discouragements and failures. We have always said the greatest rewards will go to those who demonstrate initiative, accept responsibility for their own actions, exert leadership and bring out the best in others.



Note: From PREPARING FOR IDAHO'S FUTURE (p. 6) by staff, 1991, Boise, ID: Berman, Wieiler, Associates, copyright 1991. Reprinted by permission.

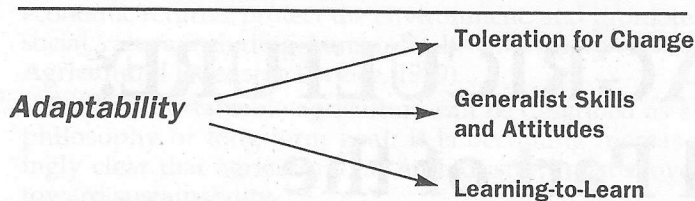
Our system should encourage each student to develop collaborative ability — the ability to be a team player, a person who can cooperate on a task. Our society will need people with finely honed skills in negotiation and deeper understanding of the principles of democracy.



Note: From PREPARING FOR IDAHO'S FUTURE (p. 7) by staff, 1991, Boise, ID: Berman, Wieiler, Associates, copyright 1991. Reprinted by permission.

And finally, the educational system must encourage adaptability. In a fast-paced, ever-changing world, there must be a tolerance for change. Learning will be life long, so students must be taught how to continue to learn and adapt to change. In order for students to be successful in that process, they must possess broad

general skills and attitudes which allow for the challenge of a changing world.



Note: From PREPARING FOR IDAHO'S FUTURE (p. 7) by staff, 1991, Boise, ID: Berman, Wieiler, Associates, copyright 1991. Reprinted by permission.

Agricultural Education — The Model

Agricultural Education provides an excellent model for dealing with the changes needed for the 21st century. The discipline of agriculture provides the context for relevant instruction about our world. Agriculture is science, it is business, and it is technology. The discipline of agriculture provides the vehicle to solve problems, integrate principles of math and science, and

a context to provide a broader and more meaningful understanding of our nation and the world. The Agricultural Education model, additionally, involved students in the FFA and supervised agricultural experience which are hands-on "learning by doing" experiences — experiences which cut across all of the aspects highlighted in this article.

Current leadership in education offers other avenues for improving our current delivery of education, including — extended contracts for all teachers, home visits by teachers, and increased parental involvement in the education of their children. We in Agricultural Education already have these components in place. We have changed in the past, and we must in the future. We have an opportunity to be a part of the change of education for the 21st century and the opportunity to continue to make a positive contribution. Let's get on with it!

References

- PREPARING FOR IDAHO'S FUTURE, THE IDAHO EDUCATION PROJECT (1991). Boise, ID: Berman, Wieiler Associates.
- Gough, P.B. (Ed.) (1991). The Rebirth of Vocational Education [Special section]. PHI DELTA KAPPAN, 72 (6).

From Crossroads to an Expressway

(Continued from page 4)

A Stop Light is Added — Questioning the Vocational Rationale: Volume 40, 1967-68

The broadening purposes of the Vocational Education Act of 1963 changed the scope of vocational agriculture. It was like a giant stoplight being placed on the crossroad. A red light signified the end of preparing farmers as the primary purpose of vocational agriculture. The green signal meant expansion, development and creation of programs centered around agricultural occupations. The yellow caution light warned the profession of the need to consider targeted populations.

Volume 40 of THE AGRICULTURAL EDUCATION MAGAZINE, published four years after the passage of the 1963 Act, carried articles that voiced the need to change the role of Vocational Agriculture. The enthusiastic determination of the profession's decision to enact change contrasted with earlier generations' unyielding efforts to perpetuate only farming in vocational education. The profession attempted to charter a course conducive to the new law and the wants of the profession. The next generation would determine if the chartered course had succeeded in leading vocational education to its selected destination of preparing students for careers in farming and agricultural occupations.

Planning the Expressway — Moving Beyond the Vocational Mission: Volume 60, 1987-88

Unlike the past, the profession appeared to be seeking direction from sources other than legislative mandates.

Individuals of the past four generations predicted the decrease in the number of farms and ultimately the number of farmers. Agricultural educators were slow to accept the fact of a declining farming population. It was not until the passage of the 1963 Act that any reported substantive changes occurred in Vocational Agriculture.

Several noticeable differences warranted recognition. Many female authors submitted articles to the magazine. An entire issue focused on recruiting urban and minority students. The use of computers and other electronic gadgets, unavailable twenty years earlier, dominated many articles. Dr. David G. Craig reported that 645 secondary Vocational Agriculture teaching positions ceased to exist since 1980, and a weakened image of agriculture was cited by Dr. Rosemarie Rossetti as the main reason programs fail. An entire issue was devoted to the buzzword of the 1980s, "excellence." The FFA sought to portray a more contemporary image by adding programs to accommodate students of the 80s.

The most refreshing issue, number four, presented articles written by members of the Committee on Agriculture Education in Secondary Schools appointed by the National Academy of Sciences. Two major directions emerged as recommended routes to travel in Agricultural Education. The traditional vocational route, called education "in" agriculture, would accommodate those seeking agricultural occupations, usually students in grades 11 and 12. Education "about" agriculture emphasized agricultural literacy, and would be incorporated in grades K through 12. Divorcing the old vocational system appeared to be a major decision at the crossroads; one that many agricultural educators seriously questioned.

(Continued on page 23)

SUSTAINABLE AGRICULTURE: An Essential Part of the In-Agriculture Curriculum

In recent years, environmental issues in agriculture have been a major concern of the consuming public. The use of Alar in apple production was banned because of public outcry. Beef implanted with growth hormones was banned from European markets. Pollution of ground water by agricultural production practices has become a major environmental concern. Animal rights activists have disrupted animal research and exposed "inhumane" animal production practices. Through the media, we are confronted with these kinds of issues daily.

As agriculturalists, how should we respond to all of this? As educators, our primary responsibility is the transfer of knowledge. As students of agriculture prepare to take their place in society, knowledge of critical issues facing agriculture will be essential. We must include "sustainable agriculture" in the curriculum.

What is Sustainable Agriculture?

Determining an exact definition of sustainable agriculture is no easy task. Poincelot (1986) defines it as the elimination of agriculture's consumption and pollution of limited resources. He also states that other terms often used in conjunction with sustainable agriculture have been biological agriculture, conservation farming, ecological agriculture, environmentally sound agriculture, organic farming and agriculture, and regenerative agriculture. The National Research Council (1989), uses the term alternative agriculture and defines it as "any system of food and fiber production that systematically pursues the following goals:

- More thorough incorporation of natural processes such as nutrient cycles, nitrogen fixation and pest-predator relationships into the agricultural production process;
- Reduction in the use of off-farm inputs with the greatest potential to harm the environment or the health of farmers and consumers;
- Improvement of the match between cropping patterns and the productive potential and physical limitations of agricultural lands to ensure long-term sustainability of current production levels; and
- Profitable and efficient production with emphasis on improved farm management and conservation of soil, water, energy and biological resources."

The new JOURNAL OF SUSTAINABLE AGRICULTURE (1990)



BY THOMAS A. MARSHALL AND DON R. HERRING

(Dr. Marshall is a Teacher of Agriculture, Portal High School, Portal, Georgia.) (Dr. Herring is Professor, Department of Agricultural Education, Texas A&M University.)

defines it as a system in which: 1) resources are kept in balance with their use through conservation, recycling and/or renewal, 2) practices preserve agricultural resources and prevent environmental damage to the farm and offsite land, water and air, 3) production, profits and incentives remain at acceptable levels, and 4) the system works in concert with socioeconomic realities.



This cross-slotted grain drill is great for sustaining the soil. It has serrated coulters that cut the soil, enabling fertilizer and seed to be placed below the soil. Then, angled wings on the coulters close the slot and pack the soil. (Courtesy AGRICULTURAL RESEARCH.)

A task force of the Texas Agricultural Extension Service (TAEX) has defined it as the application of scientific knowledge to produce acceptable long-term economic returns, protect the environment, and promote social values including human health and safety (Texas Agricultural Extension Service, 1989).

So then, sustainable agriculture can be described as a philosophy or long-term goal. It is becoming increasingly clear that agriculture, as an industry, must move toward sustainability.

What is the Scope of Sustainable Agriculture?

When terms such as sustainable agriculture, alternative agriculture, or organic farming are used, what image is conjured up in your mind? Is it of a small group of "environmentalists" protesting against agricultural practices? Is it of a group of "hippies" living on a commune and growing their own "natural" food? Is this really what sustainable agriculture is all about? What is the scope of this philosophy? Let's look at some examples of what is going on nationally.

In 1985, Congress passed the 1985 Food Security Act. A part of this Act, the Agricultural Productivity Act, provided authority to conduct research and educational programs in alternative agriculture. In 1987, Congress appropriated federal dollars to begin work under this act (National Research Council, 1989).

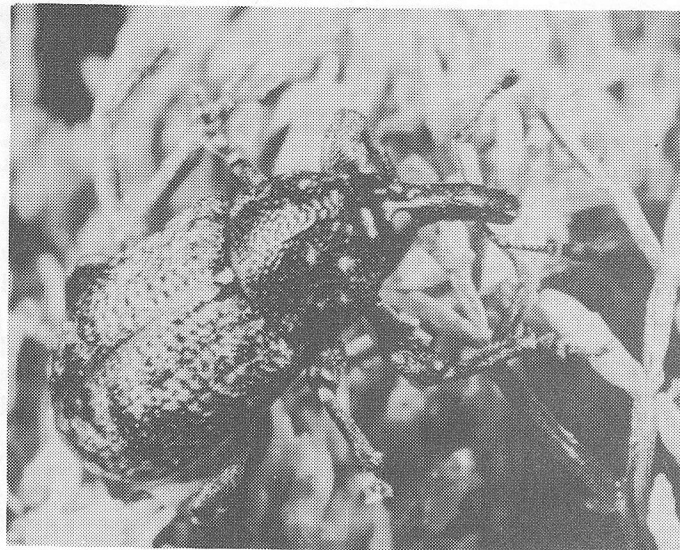
The concept of sustainable agriculture is an integral part of the 1990 Farm Bill. A summary of the Bush Administration's proposal for the Bill (United States Department of Agriculture, 1990) states:

"Environmental and health issues are emerging as some of the highest priority issues which must be addressed by agricultural producers and consumers. USDA provides leadership for research in national interest areas, including food safety, water quality, global change and environment and natural resources education. Sustainable agriculture practices are recognized as a means to address certain environmental concerns and the Administration will seek to more effectively integrate them into the land-grant system."

At Texas A&M University, a scholarship was established by a concerned foundation in the spring of 1990 for undergraduate students wishing to study and conduct research in sustainable agriculture. A symposium and a series of seminars were conducted on issues in sustainable agriculture and an undergraduate class was offered in the fall of 1990. In fact, many universities are now offering classes in sustainable agriculture.

In Iowa, the Leopold Center of Sustainable Agriculture was established by the Iowa Legislature with a charge to develop and provide agricultural systems that combine responsible stewardship of natural resources with farm profitability (Iowa State University, 1989). An off-campus class in sustainable agriculture was offered via satellite in Iowa. That same course is now being offered nationwide through the satellite network AGSAT.

At present, a national task force headed by Dr. John Ikerd of the University of Missouri is developing a financial planning computer program for farmers that takes into account sustainable variables. The program



This South American weevil is being used successfully to control mosquito, saltcedar and snakeweed without chemicals. (Courtesy AGRICULTURAL RESEARCH.)

considers simultaneously the aspects of resource conservation, environmental protection, productivity, and profitability and is due to be released in August, 1991 (J.E. Ikerd, Personal Communication, July 17, 1990).

Technical research on sustainable agriculture is being conducted in universities, experiment stations, agricultural industries and governmental agencies nationwide. Areas of study include biological pest control, genetic engineering, water conservation and quality, multiple cropping systems, energy conservation, soil conservation and waste management. The Rodale Research Center, a private enterprise in Pennsylvania, is considered a pioneer in sustainable agriculture research. Established in 1972, the Center is involved in research in agronomy, entomology, horticulture and new crops (Rodale Research Center, 1990). The goal of the Center is to "develop regenerative agronomic and horticultural systems that replenish and enhance rather than deplete natural resource productivity" (Rodale Research Center, 1988, p. 1).

Sustainable agriculture is perhaps the issue of greatest concern in agriculture today. It is being discussed and debated by professors and deans of colleges of agriculture college presidents, state and national senators and representatives, agriculturalists nationally and internationally, and even the President of the United States. Agricultural educators must meet the challenge of educating future generations of agriculturalists concerning the vital and important issue.

What are Some Issues in Sustainable Agriculture?

Now that we have defined sustainable agriculture and examined its scope and importance, let's look briefly at some issues currently being researched and debated.

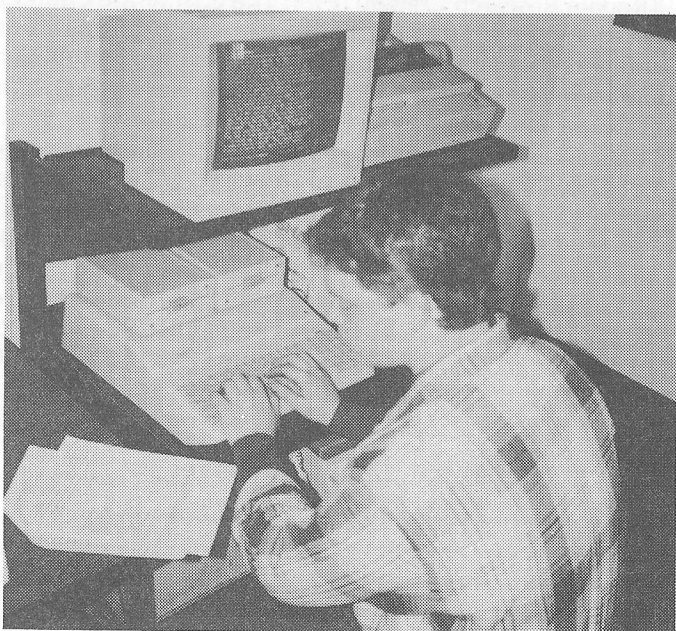
Energy Use and Conservation. Energy is a major expense to the producer. All processes in production, processing and distribution require the use of some form of energy. How can energy consumption be decreased in

all phases of agriculture? Can energy consumption be decreased while maintaining production levels? Are there alternative sources of energy for agriculture?

Water Quality and Conservation. Agriculture is the largest single nonpoint source of water pollutants, including sediments, salts, fertilizers, pesticides and manures (National Research Council, 1989). How can this situation be resolved? How can farmers know whether or not they are polluting the water? What new methods and materials are being discovered that would reduce the use of pollutants from the farm?

Soil Quality and Conservation. The National Research Council (1989) states that "soil erosion remains a serious environmental problem in parts of the United States, even after 50 years of state and federal efforts to control it." What can be done to alleviate this problem? The conservation of soil remains a key issue in ensuring future productivity of agriculture. New methods of cultivation and management as well as supportive governmental policies must be devised and implemented.

Pest Control and Chemical Use. There are many problems associated with the use of chemicals in agriculture. As already mentioned, recent public attention on the use of chemicals is perhaps the greatest. The effect of agricultural chemicals on human food and water supply, and on fish and wildlife are of major public concern. Hundreds of insects and diseases have become resistant to existing chemicals. What are alternative methods of pest control? Will these methods sufficiently control insects and diseases so as to maintain productivity and profitability? How can we control insects and diseases effectively without polluting the environment and contaminating the food supply? A biologically based integrated pest management (IPM) offers the most promise in resolving this issue. This includes biological control, host plant resistance and cultural management (Frisbie, 1990).



A well maintained file of information on sustainable agriculture provides excellent reference material for student papers and speeches. This student prepared his senior English paper on issues in sustainable agriculture. (Photo by Tom Marshall.)

Animal Production Issues. Do animals have rights? Are intensive confinement operations inhumane? What about waste disposal? What new techniques in waste management are being developed to ensure that the environment is not polluted? A major area of public concern is the use of chemicals in animal production. Should the use of growth promotants be banned? What about antibiotics? Are they getting into the food chain in amounts damaging to humans? These questions must be answered to the satisfaction of the consuming public.

Sustainability and Profitability. A vital issue in all of this is that of individual farmer profitability. Can the farmer adopt alternative methods of production and maintain necessary levels of profitability? While the aspects of sustainability are important, the producer cannot adopt alternative practices if adequate profitability is not maintained.

This brief discussion does not exhaust the list of issues and concerns in sustainable agriculture. These do, however, seem to be the major ones. These issues are at the forefront of education, research and governmental policy in agriculture. Future agriculturalists will have to deal with them in one way or another.

Conclusion

The inclusion of sustainable agriculture in the curriculum is essential. This will probably not occur, at least at the secondary level, as a separate course. Rather, as units in agriculture are taught, discussion of these issues should be integrated. This will result in a generation of graduates knowledgeable of the critical issues facing agriculture in the 21st century.

The concept of sustainability is a timely one. As we move into the 21st century and the population of the world swells, we must adopt sustainability as a philosophy — not just in agriculture, but in every aspect of our lives. We must develop sustainable systems in agriculture and in industry if we are to conserve and preserve our natural resources.

References

- Frisbie, R.E. (1990). Integrated pest management systems in sustainable agriculture. Presented at Forum on Issues in Sustainable Agriculture, College of Agriculture and Life Sciences, Texas A&M University, April, 1990.
- Iowa State University. (1989). OFF-CAMPUS PROGRAMS OFFER SUSTAINABLE AGRICULTURE. A pamphlet produced by the College of Agriculture and the Leopold Center for Sustainable Agriculture.
- Journal of Sustainable Agriculture. (1990). Binghamton, NY: The Haworth Press.
- National Research Council. (1989). ALTERNATIVE AGRICULTURE. Washington, DC: National Academy Press.
- Poincelot, R.P. (1986). TOWARD A MORE SUSTAINABLE AGRICULTURE. Westport, CT: AVI Publishing Co., Inc.
- Rodale Research Center. (1988). 1988 ANNUAL REPORT. Emmaus, PA: Rodale Press, Inc.
- Rodale Research Center. (1990). RESEARCH REPORTS CATALOG. Emmaus, PA: Rodale Press, Inc.
- Texas Agricultural Extension Service. (1989). SUSTAINABLE AGRICULTURE. A paper prepared by the Sustainable Agriculture Committee of the Texas Agricultural Extension Service, December, 1989.
- United States Department of Agriculture. (1990). 1990 FARM BILL: PROPOSAL OF THE ADMINISTRATION. Washington, DC: Office of Public and Visual Communications.

SUPERVISED EXPERIENCE: An Integral Part of the In-Agricultural Experience

As we approach the twenty-first century, the United States population continues to become more and more urbanized. Today, three-fourths of the total population reside in large cities, suburbs or towns with at least 2,500 people or more. As agricultural technology has advanced, the workforce needed on farms has declined.

However, as agricultural technology has increased, human capital needs have also increased in the areas of agricultural business, technology and research. With the decrease in the rural population, many are looking to urban populations as a source of employees for the industry of agriculture. If the agricultural industry is to have a well-educated workforce, urban students need to receive an education in agriculture.

Some schools have taken upon themselves the challenge of educating urban youth in agriculture. Educators must realize that most urban students have no agricultural knowledge whatsoever. Only a handful of these students have limited agricultural experiences. The "In-Agriculture" curriculum for urban students has to include practical agricultural experiences. Supervised experience programs (SE) must be an integral part of the "In-Agriculture" curriculum for urban youth.

The concept of supervised experiences (SE) is a major focus of the "In-Agriculture" curriculum at the Chicago High School for Agricultural Sciences (CHSAS). Because of this emphasis, the faculty expanded the definition of SE. Factors influencing the direction of SE at the Chicago High School for Agricultural Sciences (CHSAS) include:

1. CHSAS is both a vocational and academic magnet school. It was therefore necessary to develop opportunities in both employment and research in order to provide meaningful educational opportunities for students.
2. Being an urban program, the school designed SE taking into consideration the limitations of agricultural production in the city. Livestock or crop projects were not a realistic SE for most of the students.
3. Since students have very little experience with agriculture before attending the school, SE provides basic experiences that supplement a rigorous agricultural science classroom instruction.

As freshmen, students initially have a supervised horticulture program. They enter the program and learn recordkeeping skills, the importance of planning a project and the value of completing it. Through the use of the Illinois FFA Recordbooks, students learn how to set goals, establish budgets, observe and remedy



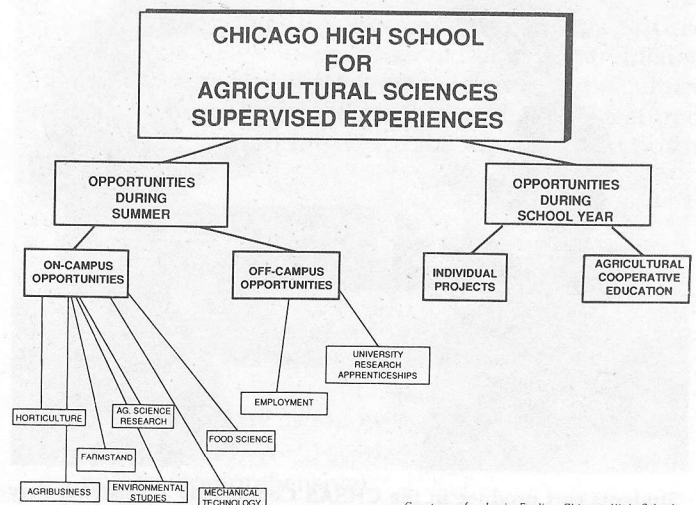
By RANDY J. BERNHARDT

(Mr. Bernhardt is Agriculture Science Instructor, Chicago High School for Agricultural Sciences.)

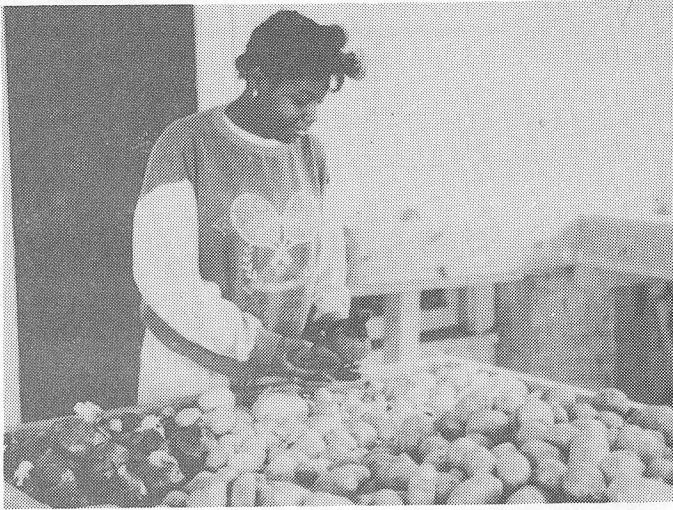
problems, and prepare personal financial statements. Students are encouraged to further develop their SE's in horticulture. As students progress through school, they are encouraged to develop SE's in other agricultural science areas including— vegetable production, food science, mechanical technology, landscape design and maintenance, placement in agricultural occupations, aquaculture and animal science.

On-Campus Supervised Experiences

Upon completion of their freshman year, the opportunities for students involved in SE increased tenfold. Students under the age of sixteen usually opt for on-campus SE summer opportunities; students age sixteen and over may also participate in on-campus SE. On-campus opportunities in SE differ each summer to allow



Courtesy of: Louis Eaglin, Chicago High School for Agricultural Sciences, Chicago, IL



Students erect produce displays that are appealing to the customers. This is one of the many important business skills learned through the farmstand supervised experience. (Photo courtesy of Samuel E. Hall, Jr., Chicago, IL.)

students a diversity of agricultural experiences. A partial listing of SE opportunities include — horticulture, agricultural science research, environmental studies, food science, agribusiness, mechanical technology and farmstand.

The CHSAS Community Farmstand is one of many unique opportunities for students to develop skills through SE on-campus experiences. Students are responsible for all aspects of the business.

The students begin by conducting market research. They survey local businesses for produce prices. Through the use of these survey results, the students develop a projected budget and set prices for produce. They also create a consumer survey to see if the business meets the needs of the customers who patronize the farmstand.

The students also research advertising concepts. They create attractive produce signs indicating the type of



Students sort produce in the CHSAS Community Farmstand. They make certain all produce sold is of the highest quality. (Photo courtesy of Samuel E. Hall, Jr., Chicago, IL.)

produce and price per pound and erect attractive, appealing produce displays.

Customer and employee relation skills are studied and developed by the students. Peer training of farmstand employees has proven to be the most effective method in developing customer relation skills.

Finally, all records are organized by students on computer. They input daily expenses and receipts. Students perform all duties associated with the payroll. Income and expense statements, net worth statements and cash flow statements are all developed on computer.

The Community Farmstand and other on-campus SE experiences accomplish three major objectives:

1. Provide young people an exceptional opportunity to develop a wide range of skills.
2. Expand students' backgrounds and knowledge of agriculture. Students apply agribusiness concepts in a functioning business.
3. Employ students under age sixteen, develop employability skills and earn a respectable salary. Students also earn one credit of agriculture toward graduation.

Off-Campus Supervised Experiences

Students age sixteen and over have summer off-campus opportunities in employment and university research apprenticeships. Students who are employed at local agricultural businesses can earn one credit of agriculture towards graduation. They must keep track of the income they earned, hours worked and skills learned. Students are employed at the Chicago Board of Trade, Chicago Park District, United States Department of Agriculture (USDA) and other agricultural businesses. Students must submit a resume and interview for the available positions. They work in various phases of these agricultural businesses and gain outstanding experiences.

Other students have the opportunity to obtain off-campus SE experience at several universities. Students apply and are interviewed for research apprenticeship positions. Universities currently offering apprenticeships include — Illinois State University, Lincoln University, Michigan State University, Purdue University, University of Illinois and University of Wisconsin. During this six-week program, students collaborate with university professors in colleges of agriculture and conduct research.

Students have conducted research in diverse areas. Some research has included — the hardiness of what varieties, research in international agricultural economics and the palatability of legumes in beef cattle. Students receive a stipend ranging from \$2,500 to \$3,000 along with complimentary room and meals. They also receive one credit of agriculture towards graduation. They must maintain records of hours worked, income earned, duties performed and skills learned.

Finally, as seniors, students have an opportunity to be a part of the Agricultural Cooperative Education (ACE) program. Students enrolled in the ACE classroom further develop their employability skills. The class finely tunes job search skills, instructs students on how

(Continued on page 18)

Diversification in Agricultural Education — Texas Style

Diversified Agriculture; Fruit, Nut and Vegetable Production; Wildlife and Recreational Management; Aquaculture. Do these titles sound like segments from the soundtrack "Alamo" and bring up memories of John Wayne, dusty cattle trails and traditional Southwestern agriculture? Probably not, and for good reason — teachers of secondary agricultural science and technology in Texas have diversified their curriculum and teaching methods, as well as their students' perspectives by presenting "in-agriculture" material to both traditional and non-traditional students.

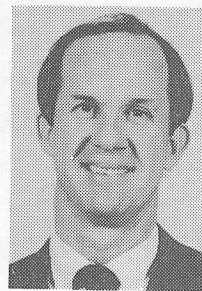
Transition from traditional teaching of agriculture to the "In-Agriculture Curriculum" in Texas has been successfully met headlong by teachers, state staff and teacher educators. Led by State Agricultural Education Director, Mr. Jay Eudy, a task force began the transition process in 1984. Teaching agriculture has evolved from teaching year long courses to semester courses, from "cows and plows" to food technology and agribusiness, from production projects to applied activities, and has changed from decreasing student enrollment to renewed student interest in agriculture.

New Requirements for Secondary Teachers

Additionally, promotion and pay raises have evolved from a seniority promotion system to a merit system based on a career ladder concept. This system recognizes superior teaching performance, experience, job-related education, advanced academic training (AAT) and job assignments. Teachers enter the "ladder" at one level and must achieve at least satisfactory performance during either of the first two years of teaching (TAC, 1988). To enter level two, teachers must have completed 135 clock hours of "AAT" or nine semester credits of post secondary job-related education. An additional 90 clock hours or six semester credits must have been completed for each additional level sought on the career ladder. To date, most teachers have opted for the AAT clock hours to update their training for the "in-agriculture" innovative curriculum.

Meeting the Advanced Academic Training Demand

AAT has been the key to implementing the semester course concept in agriculture. The "in-agriculture" curriculum has been scrutinized by 1,400 Texas teachers attending AAT summer workshops and State Professional Improvement Conferences. Twenty-nine workshops sponsored by seven teacher training



BY JOHN M. DILLINGHAM AND TOM DAYBERRY

(Dr. Dillingham is Associate Professor and Head Teacher Educator.)

(Dr. Dayberry is Assistant Professor, Department of Agriculture, Southwest Texas State University.)

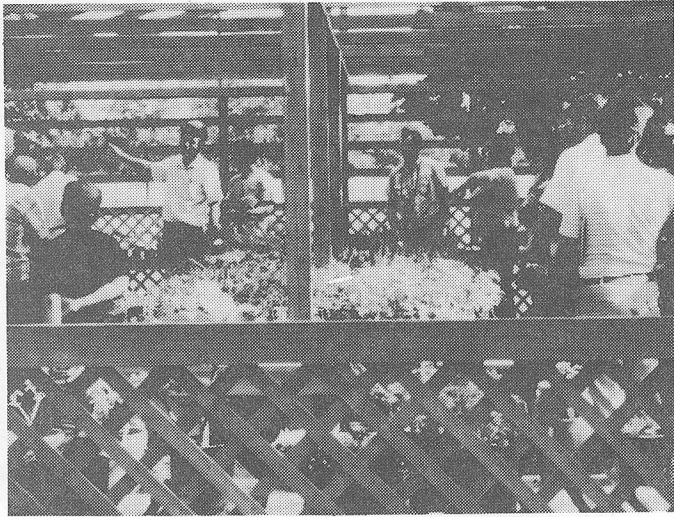
institutions and the statewide summer conference proved productive training grounds during the summer of 1990.

The theme of the 1990 State Improvement Conference in Corpus Christi was "Agriculture: Diversified Careers for the '90s." Presenter Sal Valdez of the Texas Department of Agriculture placed the meeting in perspective by stating, "As teachers you must have a changing world and encourage the expansion of agriculture into all possible areas. Excite our youth and give them many choices and expanded avenues for a life in agriculture" (Johnson, 1990). Personal skill development, food technology, diversified agriculture, mechanics, biotechnology and aquaculture training sessions were presented. A total of 1,100 teachers were present — over 800 teachers attended sessions on biotechnology, 300 teachers attended aquaculture sessions, and 450 teachers observed aquatic production facilities during two three-hour field trips. Aquaculture in Texas is in the developmental stage and was featured in Corpus Christi to introduce the aquatic concept for agriculture.

New Curricula for Students

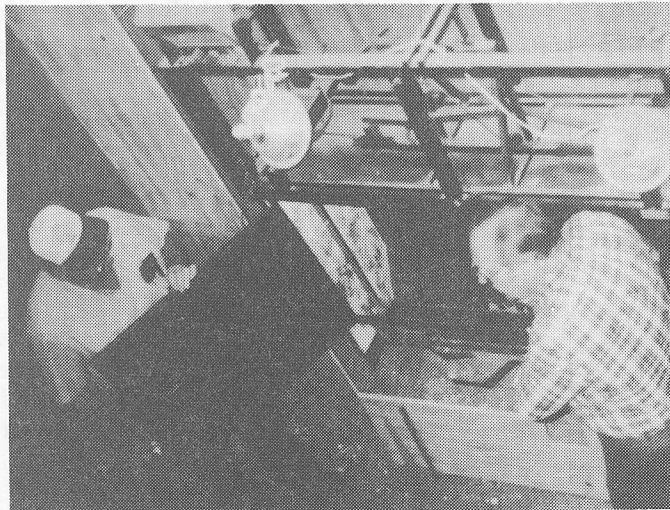
How "in" is the Texas agriculture curriculum? Twenty-seven semester agriscience and technology courses, including three designated honors courses, grace the broad expanse of Texas high school agriculture. The courses are as follows:

- Introduction to World Agricultural Science and Technology (comprehensive)
- Applied Agricultural Science Technology (comprehensive)



Texas agriscience teachers toured Hallford Orchards Fredricksburg, Texas during advanced academic training. Dr. John Lipe, extension horticulturist, gave instructions for the operation of an herb growing facility.

Introduction to Agricultural Mechanics
 Home Maintenance and Improvement
 Plant and Animal Production
 Food Technology
 Introduction to Horticultural Sciences
 Energy and Environmental Technology
 Agribusiness Management and Marketing
 Honors — Agribusiness Management and Marketing
 Personal Skill Development in Agriculture
 Entrepreneurship in Agriculture
 Agricultural Structures Technology



Mike Hughes, owner of mobile processing unit for venison, demonstrates his wild animal handling chute for Texas agriscience teachers during instruction for Wildlife and Recreational Management classes.

Agricultural Metal Fabrication Technology
 Agricultural Power Technology
 Diversified Agriculture
 Animal Science
 Honors Animal Science
 Plant and Soil Science
 Honors Plant and Soil Science
 Range Management and Ecology (experimental stage)
 Equine Science
 Landscape Design, Construction and Maintenance
 Horticulture Plant Production
 Floral Design and Interior Landscape Development
 Fruit, Nut and Vegetable Production
 Wildlife and Recreation Management
 Forestry and Wood Technology

Additionally, two agribusiness curricula — pre-employment laboratory training and agricultural cooperative training — may be taught in combination with the new curriculum.

New Program Options — New Stature

Texas agricultural science and technology teachers select appropriate courses for their programs based on community and students' needs and interests. Typically, over the span of a year, teachers must offer the comprehensive courses, Introduction to World Agricultural Science and Technology and Applied Agricultural Science and Technology. Popularity and effectiveness of programs stem largely from the following curricular options that teachers may offer in their schools.

1. Agriscience programs — teachers offer comprehensive courses plus six semester courses from at least three different instructional areas.
2. Combination agriscience/agribusiness programs — teachers offer comprehensive courses plus four courses from at least three different instructional areas, and at least, one agribusiness training course.

New curricula and flexible program options offered by teachers have resulted in increased student enrollment. Equally important is the re-establishment of the progressive stature of secondary agriculture programs in a world of rapidly changing agricultural science and technology. Results of Texas' "in-agriculture" curriculum are "innovative" AAT programs and "increased" interests in a rejuvenated agriculture program.

References

- Johnson, J. (1990, August). "Jani Johnson speaks to ag science teachers." *THE EXOTIC NEWS*. pp. 1, 5.
- Texas Administrative Code and Statutory Citations, Chapter 149, Subchapter D. (1988). pp. 1, 2.

HISTORICAL REVIEW

July 1941-1966

July 1941

A problem on enrollment was identified by C.L. Mondart (Teacher Education, Louisiana). The problem concerned boys entering or enrolled in agriculture who could not meet the specific provisions of the national vocational education acts. The boys he expressed concern over had no interest in agriculture, did not plan to farm, were not engaged in farming and could not obtain facilities for supervised farming.

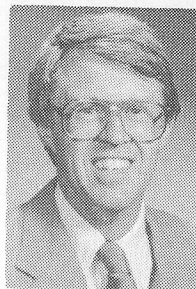
Based upon vocational act provisions and a study collecting data on the issue, a rating chart was established to determine who should be enrolled in all-day classes. The scale had a total of 100 points with the following sample specific points associated with each characteristic — the boy: wants the course — 27, has facilities for supervised practice — 25, plans to farm — 13, lives on a farm — 9, will probably engage in farming — 5, and is 14 years of age — 5.

One conclusion drawn was that "it is the responsibility of administrators to make available to high school boys training that will equip them to fit effectively into the society of which they will become members. This responsibility can be at least partially discharged through the use of a selection procedure that is designed to take into consideration the best interests of the boy."

Glen C. Cook (Teacher Education, East Lansing, Michigan) expressed concern over safety precautions in farm mechanics shops. He noted that with the emphasis upon speed and mechanized equipment, teachers had to be more cognizant than ever for the need to stress safety measures in the shop. He further reported that it was the teacher's responsibilities to develop the proper ideals, appreciations and abilities of tools and equipment in the students.

Cook shared helpful hints for various areas of the shop. Examples included— for general safety rules, keep the shop well lighted and ventilated and always wear goggles when using a grinder which is not properly equipped with shields; for promoting safety in handling tractors and trucks — when cranking the motor allow sufficient space and see that the engine is neutral, the spark retarded and the brakes set.

C.L. Angerer (Agricultural Education, Oklahoma A & M College) and S.W. Warren (Farm Management, Cornell University) wrote an article about the farm survey method of conducting research. They described a desirable farm survey procedure and quoted Eaton by writing, "For determining the vocations in which effective teaching can be done, the local survey is the best means. The business undertakings and the



By JOHN HILLISON, SPECIAL EDITOR

(Dr. Hillison is Professor and Program Area Leader, Agricultural Education, Virginia Polytechnic Institute and State University.)

productive enterprise serve as vocational-problem centers or individual-interest cores out of which develop the needs of pupils for skill, knowledge and social abilities, which shall constitute the subject matter of their learning."

They also wrote, "Every farm is an experiment station and every farmer the director thereof. If we can collect and relate the results of all experiences, we shall have valuable agricultural knowledge."

July 1966

The editorial written by Cayce Scarborough was entitled "Wanted: A Theory of Curriculum Development." Scarborough emphasized such points as the fact that revising the curriculum for vocational agriculture is a popular activity. Frequently considerable urgency is put on the need for curricular change. He noted a general lack of underlying theory for developing the curriculum. It is not impossible to find that a statement of educational objectives to be missing.

A basic idea to consider in curriculum development is to determine the most effective grade placement to teach a course. Scarborough went on to recognize basic theories underlying curriculum development and the importance of vocational agriculture leaders using them. He concluded the editorial by noting "that the real curriculum is what takes place in the classroom from day to day. Our dreams and plans for a better curriculum can be realized only through the teacher and his teaching in his situation."

Continuing with the issue theme on curriculum, Ray Agan (teacher education, Kansas State University) noted that for several years vocational agriculture professionals have reported being at the crossroads. Agan concluded that "today we find ourselves rocketed down a multi-lane road with much more 'traffic' away beyond the well-worn cross-road." He indicated that the propellant for change was the Morris-Perkins Law of 1963.

With such a headlong rush into the future an important point was that the future in subject matter and agricultural opportunities are growing rapidly and largely unknown. The salient question of "Are we faced with a situation where 'learning by doing' is no longer sufficient and we must teach 'that body of knowledge most transferable' and discard forever the term 'terminal education' " was asked by Agan.

Richard Baker (Teacher Education, Auburn University) described a curriculum for the world of work. While examining what curriculum patterns were available in many states the most common approach he

found was 1) basic courses with an orientation toward production of crops and livestock and 2) multiple-track courses involving common skills and abilities for agricultural occupations.

Baker expressed concern that production agriculture would be the sole basis for all agricultural occupation preparation. He indicated that only a few states could justify a completely production centered curriculum. "Those schools that fail to make the needed adjustments are implying, by their educational practice and their program objectives that farming and agriculture are synonymous terms."

Supervised Experience: An Integral Part of the In-Agriculture Curriculum

(Continued from page 14)

to retain employment and develops their interpersonal skills.

Students in ACE secure employment at a variety of agricultural businesses. Employment opportunities through ACE include — the Chicago Board of Trade, Chicago Mercantile Exchange, John Volk Company (an agricultural advertising firm), Cooperative Extension Service, USDA, landscape and horticulture businesses, veterinary clinics, produce departments of local groceries and food testing facilities.

The experiences gained through agricultural placement are meaningful to the students. They also recognized the importance of developing a sense of responsibility.



Many students continue their horticulture supervised experiences throughout their four years of high school. Some students obtain employment at local horticulture businesses. (Photo courtesy of Samuel E. Hall, Jr., Chicago, IL.)

Supervised Experience Outcomes

What are the outcomes of SE and its development of agricultural abilities at the Chicago High School for Agricultural Sciences? Upon graduation, seventy-five percent of the students attend college. These students pursue advanced education for careers in plant science, animal science, plant genetics, veterinary medicine, food science, agricultural economics, agricultural education, entomology, horticulture and natural resources conservation and research. In 1990 these graduates received over \$600,000 in academic scholarships. During the last two years, eleven students received scholarships to pursue agricultural careers through the doctoral level.

Students choosing not to attend college have also experienced success because of their education and SE's. As an example, one student attended CHSAS because of his interest in landscaping. As a sophomore, he acquired a job as a landscape maintenance person. He continued with the same landscape business through high school, expanding the types of experiences and the degree of responsibility. This job allowed him to participate in the ACE program during his senior year of high school. Upon graduation, he has been moved into a management position with the same landscape business with partial ownership in the firm.

This is only one example how SE successfully prepared a student for an agricultural career. Many more success stories like this have resulted from students' participation in SE at CHSAS.

Supervised experience at the Chicago High School for Agricultural Sciences assists in the education of urban agricultural students in Chicago. Supervised experience compliments the "In-Agriculture" curriculum by developing skills associated with goal setting and financial planning. It is encouraging to know that SE works as an integral part of the "In-Agriculture" curriculum for urban populations.

Fisheries Programs

In Alaska, FFA is more likely to mean "Future Fishermen (and women) of Alaska" rather than the traditional interpretation. Twenty new secondary fisheries education programs have been approved by the Office of Adult and Vocational Education and implemented throughout the state of Alaska over the last three years. High school students, parents, teachers and local communities are excited about these programs that integrate science and vocational education competencies, hands-on skills and knowledge of a renewable resource representing over 100 million dollars annually to Alaskans in wages and income.

Examples of Fisheries Education Programs

The programs range from a one semester exploratory course in Marine Technology to the implementation of student-operated fish hatcheries. Marine Technology is being offered in coastal communities throughout Alaska. This exploratory program provides students with entry level knowledge and skills for a variety of maritime occupations. Students learn about basic pilotage, navigation, safety and cold water survival, fishing methods and weather.

One of the oldest sea-ed programs in the state was started in 1969 in Ketchikan. Their current maritime program consists of four different classes and annually enrolls about 100 high school students. The students have an opportunity to practice their seamanship and commercial fishing skills aboard a 45' fiberglass school seiner, the F/V Jack Cotant.



Belle Mickelson, teacher (Cordova Commercial Fisheries Apprenticeship Program) and Duane Taylor (Andrew K. Demonski School, Nulato) preparing for a plankton drag in the Cordova harbor as part of technical workshop in fisheries.



BY FLORY VINSON

(Dr. Vinson is Assistant Professor, Vocational Teacher Education, University of Alaska, Anchorage.)

In 1986, Ketchikan's maritime program became one of the three programs in the United States to be recognized as a U.S. Coast Guard approved training institution. Students may also take elective credit in semester courses in oceanography, marine biology and hatchery management. Graduates from the Ketchikan Maritime Program are piloting cruise ships throughout Southeast Alaska; are employed by the Alaska State ferry system; own and operate their own fishing vessels and work in a wide variety of sea-oriented careers.

Cordova's Commercial Fisheries Apprenticeship Program won an award this year from the Alaska Department of Education as one of the top ten exemplary high school science programs in the state. The program is an outstanding example of how academic skills and knowledge can be integrated into a vocational curriculum.

Cordova High School students enrolled in the program study fisheries biology and aquaculture, seamanship, navigation, safety and survival. The program was designed to teach the children of local residents to fish commercially and to help keep fishing permits from "emigrating" out of the community. Students have an opportunity to try out their skills each summer on a boat with a local skipper operating under an Educational Limited Entry Permit.

During the 1990 fishing season, the students grossed \$38,000 gill netting which paid the expenses and supplementary costs associated with the program. The Commercial Fisheries Apprenticeship Program is a three year program of courses beginning at the sophomore level with two semesters of Marine Technology, followed by studies in marine engines and marine biology at the junior level and two semesters of fisheries seminar during the student's senior year. A minimum of two summers of fishing is required to complete the program and additional related short courses can be taken at Prince William Sound Community College.

Student managed hatcheries are functioning in Unalakleet, Unalaska, Nome and Skagway. Under the direction of their instructors and Alaska Fish and Game biologists, high school students in these communities do

an egg take during the summer months. After fertilization, the eggs are rinsed of excess milt and gently poured into incubator trays. The eggs develop during the fall and winter months and hatch into alevins, or fry with yolk sacs attached.

Pink and chum salmon fry are released into streams in mid-May. King and coho fry are held in rearing ponds until they reach the smolt stage when they are physiologically able to adapt to salt water. The high school students work with Fish and Game biologists when making the decision on when to transport and release fry. To insure a better survival rate, a target size is identified. If Plankton, which provide natural feed for the fry upon their release, "blooms" in nearby ocean waters, this natural phenomena also enters into the decision making process.

The Skagway Hatchery Program was named the 1989 Alaska State Vocational Education Program of the Year by the Alaska Department of Education. This year-round program has a fully functioning salmon hatchery which has been designated by the Alaska Department of Fish and Game as the chinook salmon facility for a 110 mile stretch of water from Skagway to the tip of northern Admiralty Island. This student managed hatchery is licensed to raise 200,000 pinks, 50,000 coho and 200,000 king salmon. The program operates year-round.

During the school year, one to two hours of instruction per day is spent in both classroom and laboratory settings at the hatchery site. Students are hired to monitor and manage the hatchery during the summer months. Instruction is both didactic and experiential and includes such hands-on activities as collecting brood stock for eggs, anesthesizing fish for weighing and monthly inspections, disease detection and experimenting with feeding programs.

Upon completion of each year of the three-year program, students can meet the entry level requirements for employment as a Fish Culturalist Technician I, II or III. Students who have been trained in the program have



Ketchikan Maritime student pulling bottom grab gear filled with marine specimens on board school seiner, M/V Jack Cotant.



Belle Mickelson, teacher (Cordova Commercial Fisheries Apprenticeship Program) demonstrating net-mending.

been employed on commercial boats, in processing plants, private and state hatcheries, private businesses, governmental agencies and have started their own businesses. Other schools, such as Ketchikan, have teamed with state run hatcheries to provide similar on-site laboratory and field experiences.

A new addition to the Alaskan fisheries curriculum is being piloted at Petersburg High School this year. Certified oyster spat from Washington State is being grown in the Wrangell Narrows using cages and lantern nets. Depending on their growth rate, the first crop of oysters will be harvested in approximately one year. The shellfish culture program complements a two-semester Aquaculture program which introduces students to the principles of salmon hatchery management and shellfish culturing.

Cooperation Promotes Success

A key component in this program development success story has been the cooperation between the Alaska State Legislature, state agencies, educational

(Continued on page 22)



Bill Biehl, principal (Nome-Beltz High School) practicing fish disease detection skills during technical workshop on Hatchery Management coordinated by the University of Alaska Anchorage.

INTERNATIONAL AGRICULTURE

Crops of the World: A Demonstration Plot

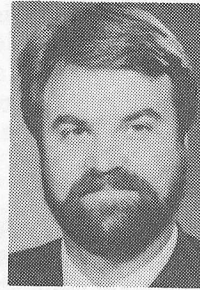
The study of the cultivation of many different agronomic crops is an important component of the curricula in a course titled "Agriculture of Developing Countries." The culture and harvesting of common and exotic agronomic crops is included in the subject matter within the course. The semester course is offered for general studies credit to non-agricultural majors at Illinois State University. Between 10 to 20 percent of the enrollment each semester has been identified as having a farm background. This high percentage of students with a farm background is not representative of the general U.S. population whose farm population is now less than 2%. Despite the disproportionately high number of students with a farm background who enroll in the course, it was determined that a demonstration plot which included crops of the world as well as economically important crops of the U.S. was justified and needed.

A "Crops of the World" demonstration plot which included sixty different crops (species or sub-species) was designed to augment instruction in the course. The plots were laid out according to the following criteria:

1. 25' row length
2. Two rows of each crop with 3' spacing between rows
3. 4' spacing between each crop
4. Alternate grass and broadleaf crops
5. Plant perennials in one strip
6. Plant annuals in second strip
7. Have a 2.5' border in front and back of each crop

The plot was located on an existing university farm within an area which had previously been in pasture. A push type garden seeder with six different plates was used for planting. Overseeding resulted in densely populated stands in rows which aggressively competed with weeds. Crops were thinned if the germination density would prevent a suitable crop stand. Seed was obtained from local sources (including several major seed companies), seed catalogs, colleagues and from USDA Regional Plant Introduction Stations. Seed was collected from mature crops at the end of the growing season, sealed and stored in glass jars and labeled for planting next year's crop. Insecticides were not used but herbicides were utilized. A band application was made over each row and tillage was done between rows and crops. A complete fertilizer was applied on the plots in early spring. P₁ test was maintained at 60-70 and K test at 350-400. pH was adjusted and maintained at 6.2-6.6.

Labor was supplied by faculty who spent 10-20 hours



By JEFFREY A. WOOD AND JANET L. HENDERSON,
SPECIAL EDITORS

(Dr. Wood is Associate Professor, Department of Agriculture, Illinois State University, Normal.)

(Dr. Henderson is Associate Professor, Department of Agricultural Education, The Ohio State University.)

per week during the month of June and July and approximately 8-10 hours per week in August and September to maintain the plots. Seed cost for the plots was approximately \$100.00 U.S. dollars and should be reduced to approximately \$50.00 U.S. dollars since an inventory of seed has been collected and maintained. Herbicide and fertilizer cost was approximately \$100.00 U.S. dollars. Each crop was identified with a sign which measured 4"x12" mounted on a 18" stake. A laboratory technician painted the signs with white lettering which could be viewed from a distance. The signs cost approximately \$1.00 U.S. dollar each.

The following crops were included in the demonstration plot:

Alfalfa	Sugar Cane	Potato
Sweet Clover	Switchgrass	Rice
Sweet Potato	Cotton	Soybean
Canola	Peanuts	Kenaf
Sugar beet	German millet	Tobacco
Amaranth	Lentils	Guar
Sweet clover	K. Bluegrass	Lupine
Japanese millet	Grain sorghum	Buckwheat
Sunflower	Sudangrass	Ryegrass
Sorghum-forage	Winter rye	Castorbean
Pearl millet	Crimson clover	Orchardgrass
Spring triticale	Red clover	Popcorn
Smooth bromegrass	Creeping red fescue	Timothy
Tall fescue	Alsike clover	Sesame

(Continued on page 23)

Fisheries Programs *(Continued from page 20)*

institutions, regional aquatic associations and local community support.

A \$90,000 state appropriation for fisheries education in FY 89 provided participation at the K-8 level for eight schools as well as 17 vocationally approved fisheries programs at the secondary level. Over \$200,000 has been provided at local school districts through Carl D. Perkins legislation which funded 22 competitive proposals pertaining to fisheries education.

The Alaska Department of Fish and Game, FRED Division, provides technical assistance streamside with egg takes and other field activities in addition to help with stream and site identification, disease detection and the necessary permitting process for the collection, transportation and possession of fish. Regional aquatic associations have also provided technical assistance and encouraged the development of local fisheries curriculum at the high school level.

The Office of Adult and Vocational Education, Alaska Department of Education has provided leadership in fisheries education through technical assistance, program approval, site visitations, management of the legislative appropriation and the development of a mini-grant process which allowed individual teachers to apply for grants up to \$5,000 for fisheries education programs through Carl D. Perkins funding.

In cooperation with the Office of Adult and Vocational Education, the University of Alaska Anchorage initiated a complete package of staff development opportunities. First, a series of weekend technical workshops in hatchery management and fisheries education were offered throughout the State of Alaska for one graduate credit.

Second, the University implemented the first year of a successful Mentor Teacher Program which provided districts with the opportunity to have experienced teachers in fisheries education help their staff develop fisheries programs and design curriculum.

Third, the Alaska Vocational Teacher Education Program (VIP) provides 160 hour on-site summer internships with business and industry related to the teacher's vocational program. Marine education teachers have taken advantage of this opportunity to get first hand experience by working in state operated fish hatcheries the last two summers.

Southeast Regional Resource Center is working in conjunction with the Office of Adult and Vocational Education to develop a competency based Alaska fisheries curriculum and Alaska fisheries resources which is made possible with Carl D. Perkins funding. After validation of the identified competencies by professionals in the fisheries industry, these curriculum resources are scheduled to be available September, 1991. A 16-page poster of "How a Hatchery Works" will be inserted in the official publication of the Alaska Department of Fish and Game this summer. The back 16 panels of the insert will describe vocational education activities related to Alaska's aquaculture industry.

As each program has been developed, local community support in the form of funding, donation of land

and equipment, and membership on advisory committees has helped implement fisheries education and encouraged its growth.

Fisheries Education — Implications for the Future

Alaskan educators are exploring the possibility of including applied biology and chemistry as a part of their fisheries curriculum both as separate course additions to their programs and as an integrated component of existing curriculum. Six Alaskan school districts offer cross-credit in science for fisheries education courses. Cross-crediting provides the option for students to meet their graduation requirements through these approved vocational programs which incorporate complex biology and chemistry applications. This has provided the opportunity for vocational educators to reach a broader audience of students, including those who may pursue a scientific career.

The potential for articulation between secondary and postsecondary training or education is good in Alaska. The Alaska Vocational Technical Center provides short-term training in a variety of marine related courses. The University of Alaska Fairbanks has a Ph.D. program in fisheries. A private college at Sitka, Sheldon Jackson College, offers an undergraduate degree in hatchery management. As 2+2 Tech/Prep programs are developed in vocational education throughout the State of Alaska, during the '90s, fisheries education stands at the front of the line ready for implementation.

The prospects for growth in fisheries education at both the secondary and postsecondary level in Alaska is encouraging. The direction has been set through approved programs, outstanding model projects and a technical training package that included weekend workshops for graduate credit, mentor teachers and the opportunity for internships in the industry. Through fisheries education, Alaska's sons and daughters are being prepared to go out to sea safely and to make careful decisions regarding the cultivation and harvest of this wonderful natural resource.



Ketchikan Maritime students skipper preparing to cast-off from dock on school boat M/V Jack Cotant.

From Crossroads to an Expressway

(Continued from page 9)

Summary

Two questions were posed at the beginning of this article:

1. Does the emphasis on basics that is sweeping the educational community suggest we are again at another crossroad?

The answer is yes. However, what makes this crossroad different from former ones? Declining enrollment and a minimal influence on the profession from current legislation distinguishes this crossroad from those in the past.

2. Do we need to exit the crossroads and build an expressway that accommodates modern high speed curricula?

Again, the answer is yes. Agricultural Education must travel the main road of education, and the only access is to modernize the curricula to meet the needs of students and society.

The real question at each crossroad focused on the purpose of Agricultural Education at the secondary level. Clearly, legislation played an important role in determining the purpose of each generation.

Agricultural education has matured from a program conceived, raised and guided by legislation to one that is ready to strike out on its own. Do we want to follow a

map designed by others, or are we going to adopt and support the ideas of the National Academy of Sciences and build an expressway for the future? It will be interesting to see how the profession is portrayed in Volume 80.

References

- Bowen, B.E. (ed.), 1987-88. THE AGRICULTURAL EDUCATION MAGAZINE, 60.
- Ekstrom, G.G.F. (Ed.), 1947-48. THE AGRICULTURAL EDUCATION MAGAZINE, 20.
- Hamlin, H.M. (ed.), 1929. THE AGRICULTURAL EDUCATION MAGAZINE, 1.
- Lenke, J.A., 1937. Which Way Vocational Agriculture? THE AGRICULTURAL EDUCATION MAGAZINE, 10 (1).
- National Research Council, 1988. UNDERSTANDING AGRICULTURE: NEW DIRECTIONS FOR EDUCATION. Washington, DC: National Academy Press.
- Newcomb, L.H., McCracken, J.D., and Warmbrod, J.R., 1986. METHODS OF TEACHING AGRICULTURE. Danville, IL: The Interstate Printers and Publishers, Inc.
- Rosenfeld, S., 1987. Determinants of Excellence in Vocational Education. DESIGN PAPERS FOR THE NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION, p. V-60.
- Scarborough, C. and Warmbrod, J.R. (Eds.), 1967-68. THE AGRICULTURAL EDUCATION MAGAZINE, 40.
- WEBSTER'S SEVENTH NEW COLLEGIATE DICTIONARY, 1971. Springfield, MA: G.C. Merriam Company, Publishers.

International Agriculture Crops of the World: A Demonstration Plot

(Continued from page 21)

Ladino clover	Yellow soybean	Pepper
Mung bean	Navy bean	Barley
Dent corn	Reed canarygrass	Buckwheat
Field pea	Red clover	Cowpea
Korean lespezea	Crown vetch	Rape
Birdsfoot trefoil	Perennial ryegrass	Redtop
Wheat	Wheat	Sweetcorn
(hard spring red)	(hard red winter)	Flax
Tall fescue	Flint corn	

The educational importance of the demonstration plot was greater than expected. Sixty species or sub-species of crops from around the world were included in the plot. Over 400 university students viewed the demonstration plots and utilized it for a wet laboratory. The

availability of plant specimens and material greatly enhanced the course subject matter which concerned common and exotic agronomic crops and conditions. Students were able to view unfamiliar crops in actual growing conditions.

Additionally, plant culture and harvesting techniques were observed. The plot was utilized by three other university courses in Agronomy and were viewed by nearly 2500 secondary school students and a myriad of 4-H members. The plot was a cost effective way to enhance laboratory in the course and served as a valuable teaching tool for augmenting instruction. Course evaluations by students rated the plot as a worthwhile and desirable component of the course.

1992 Themes

Issue/Theme	Due Date	Theme Editor
January Becoming More than Vocational	October 1, 1991	Dr. George Wardlow University of Minnesota 320 Vo Tech Bldg. 1954 Buford Ave. St. Paul, MN 55108
February Using Computers in Teaching	November 1, 1991	Dr. Bob Birkenholz University of Missouri 121 Gentry Hall Columbia, MO 65211
March The New Agricultural Mechanics	December 1, 1991	Dr. Phil Buriak University of Illinois 1304 W. Pennsylvania Ave. 107 AESB Urbana, IL 61801
April Laboratory Instruction Adult Education	January 1, 1992	Dr. Tom Bruening Penn State University Armsby Bldg. University Park, PA 16802
May Teaching Agriculture in the Elementary Schools	February 1, 1992	Dr. Gerry Fuller University of Vermont 104 Ag Engineering Bldg. Burlington, VT 05405-0004
June Advisory Councils	March 1, 1992	Dr. Robert Martin Iowa State University 201 Curtiss Hall Ames, IA 50011
July Collaborative Relationships	April 1, 1992	Dr. Gary Briers Dept. of Agricultural Education Texas A & M University College Station, TX 77843-2116
August Advising FFA Chapters	May 1, 1992	Dr. Max McGhee University of Florida 305 Rolfs Hall Gainesville, FL 32601
September Focus on Teaching	June 1, 1992	Dr. Jamie Cano Ohio State University 208 Ag Admin. Bldg. 2120 Fyffe Rd. Columbus, OH 43210-1099
October Teaching the Science of Agriculture	July 1, 1992	Dr. Jeff Moss University of Illinois 124 Mumford Hall 1302 W. Gregory Dr. Urbana, IL 61801
November Problem Solving/Inquiry Teaching	August 1, 1992	Dr. Jim Flowers North Carolina State University Box 7801 Raleigh, NC 27695-7801
December SAE Programs — A New Look	September 1, 1992	Dr. Kirby Barrick Ohio State University 208 Ag Admin. Bldg. 2120 Fyffe Rd. Columbus, OH 43210-1099