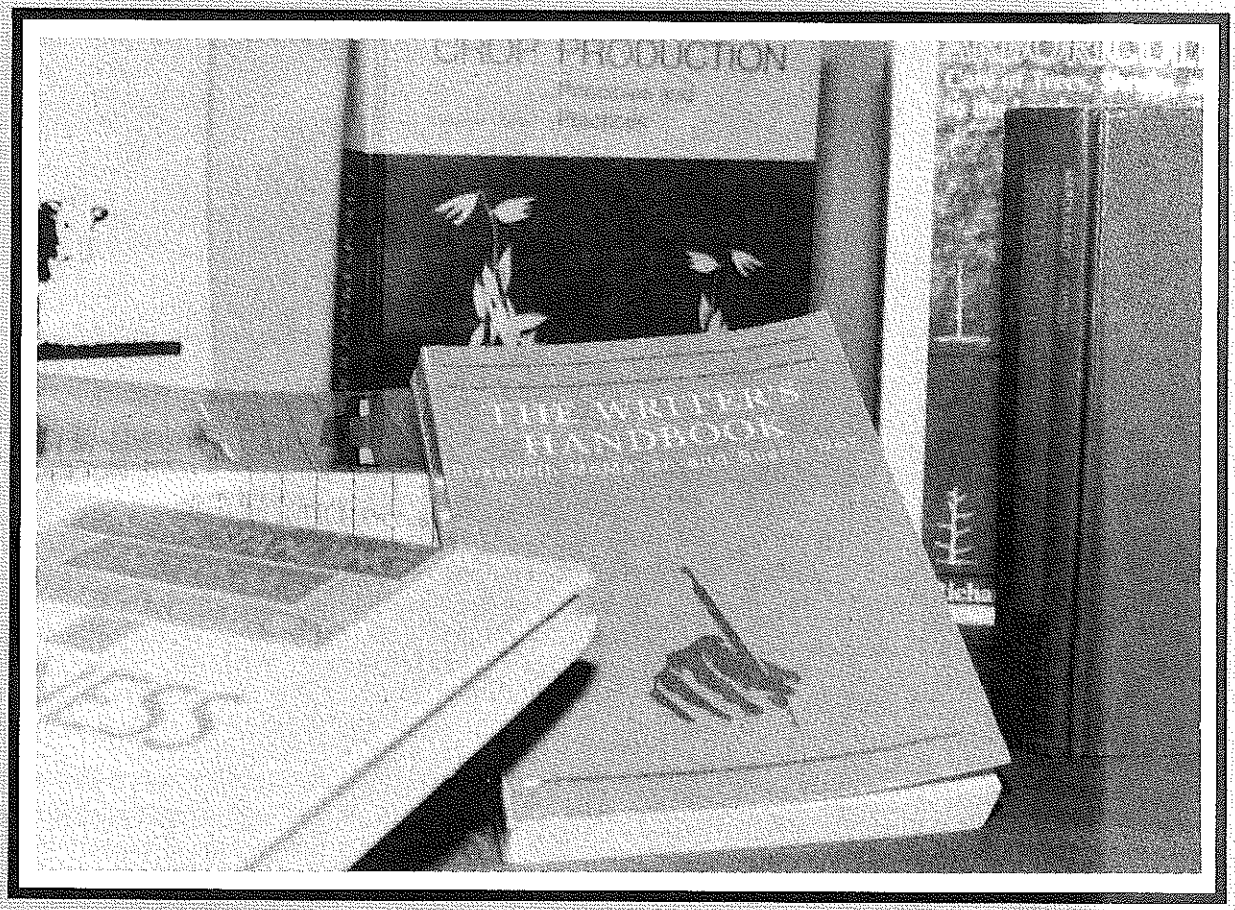
The
Agricultural Education
Magazine

May, 1987
Volume 59
Number 11



THEME: Teaching The Basics

THE
AGRICULTURAL EDUCATION
MAGAZINE

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TABLE OF CONTENTS

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.

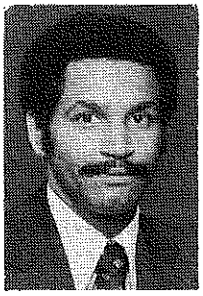
SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are $7 per year. Foreign subscriptions are $10 (U.S. Currency) per year for surface mail, and $20 (U.S. Currency) 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. 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. 7324677.

An Agricultural Education for Contemporary America

"As new technologies make old job skills obsolete, the best vocational education will be solid preparation in reading, writing, mathematics, and reasoning. In the future, American workers will acquire many of their job skills in the workplace and not in school. They will need to be able to master new technologies and upgrade their skills to meet specialized job demands. Men and women who have weak basic skills, or who cannot readily master new skills to keep pace with change, may be only marginally employed over their lifetimes" (U.S. Department of Education, 1986, p. 62).

Furthermore, "Business leaders stress that the school curriculum should emphasize literacy, mathematics, and problem-solving skills. They believe schools should emphasize such personal qualities as self-discipline, reliability, perseverance, teamwork, accepting responsibility, and respect for the rights of others. These characteristics will serve all secondary students well, whether they go on to college or directly into the world of work."



By Blannie E. Bowen, Editor

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

The above quotation from the U.S. Department of Education publication, What Works: Research About Teaching and Learning, presents a major challenge facing vocational educators during the balance of this decade. As well-hyped publications such as What Works successfully compete for the general public's attention, vocational education programs must demonstrate that they have a place in America's scheme of delivering public secondary education.

Changing Societal Demands

Vocational education serves clientele who are more educated than those in 1917 when the Smith-Hughes Act was passed. Countless parents are college graduates. Many have similar aspirations for their children. As educational norms rise, America is discovering that its citizens think, question, and challenge authority. As such, secondary instructional programs that deliver quickly outdated specific and narrow skills will receive close scrutiny the rest of this decade. Needless to say, those vocational programs providing skills that were out-of-date 25 years ago certainly should not exist in 1990.

Meanwhile, technologies being adopted by a global society are evolving so rapidly that human resource requirements in one nation can seemingly change overnight. Japan is an example most cited because it was nearly obliterated 47 years ago. However, one is severely derelict if South Korea, Taiwan, and a host of Asian as well as South American countries are not included. These nations as well as our friendly European allies skillfully adapt American technology to cheaply mass produce products that increase the U.S. trade deficit.

How does this happen? America takes too many "cat naps" to rest on its laurels as the world's premier superpower. Consequently, a subtle complacency establishes root while the U.S. conducts experiments to educate all of its citizens and a host of folks seeking "the good life" in America.

Along the way, the U.S. has retreated from being the industrial giant. To compensate, America proclaims itself the master of the information age. No longer will thousands be needed to produce goods in a service-oriented society. Robots and other high technology gadgets will perform this function. Americans are to be masters of the technology. But, alas, a sleeping giant was awakened during the early 1980s! To be a master in a democratic society, one must think, evaluate, calculate, communicate, and solve problems confronting contemporary society. America's educational establishment (including vocational educators) forgot or chose to ignore that human elements are needed even in an information and high technology age.

For example, to effectively write lesson plans or FFA proficiency award applications using word processors, one must be proficient with grammar and have a good command of English. To communicate via electronic mail or the Ag Ed Network, you must read. To compute net worth statements or keep records with databases and electronic spreadsheets, you must know alphabetizing, accounting, and basic arithmetic. To use robots, remote controlled harvesting equipment, or other high tech gimmicks, you must give clear instructions in English and more often than not, in "computer lingo."

(Continued on page 4)

An Agricultural Education For Contemporary America

(Continued from page 3)

Contemporary Agricultural Education

Contemporary America is demanding that a new product be delivered. Agricultural education must embrace and reward process-oriented education. As Cayce Scarborough wrote in the February, 1987 issue of this publication (p. 17), agricultural educators have long ignored career choice research that says 14-year-olds are too immature and inexperienced to make permanent career decisions. Thus, instructional approaches that lock teenagers into immediate employment yet dead-end career tracks rightfully deserve close scrutiny.

From a philosophical stance, it is possible for vocational agriculture to provide both agricultural skill development and the basic skills warranted by contemporary society. For this to be possible, however, a process orientation must be adopted. First, agriculture must be taught more on the principles and philosophical levels in lieu of a heavy emphasis on job specific skills. Agriculture must be taught as a diverse yet dynamic system and not as a static entity unto itself. Second, the basics must be taught as a process whereby students perfect skills learned via English, mathematics, science, and technology courses.

Authors Terry Heiman secured for this issue address problems and concerns about integrating the basics into agricultural education. He is to be congratulated for getting such a diverse group to treat this pressing topic.

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Scarborough, C.C. (1987, February). Philosophy of the Smith-Hughes Act — Then and now. THE AGRICULTURAL EDUCATION MAGAZINE, 59(8), 16-18.

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THEME

Do You Teach The Basics?

Since the report "A Nation at Risk" was released, the "basics" have occupied center stage in education. Because vocational agriculture functions within the perimeters of current education emphases, the question, "Do you teach the 'basics' in vocational agriculture?" is an important one. To answer effectively, we first need to define "basics." In this issue of THE MAGAZINE, agricultural education leaders present their interpretation of the "basics" and how they may be taught.

The authors in this issue discuss a wide range of ideas and positive alternatives for you to consider. Teacher educator James Knight gives us insight about the educational research studies that spawned the "basics" movement and identifies how vocational agriculture complements the "basics."

Bob Stewart, another teacher educator, outlines ways the vocational agriculture teacher can incorporate the "basics" into the classroom by example, feedback, and by sharing.

Rose Jones, an agricultural communications lecturer, gives us seven writing tools to help us hone our students and maybe our own writing skills.

How science can be applied in our daily lessons is discussed by Chris Roegge, a graduate student.

A study of the science and mathematics concepts and principles included in one state's core curriculum is outlined by State Supervisors G.W. Hamby and Norman Rohrbach.

Past NVATA President and postsecondary instructor Myron Sonne gives his opinions of the "basics" and challenges us to tell the vocational agriculture story.

A look at the "basics" taught in vocational agriculture is the focus of an article by Gary Briers, Richard Norris, and Tom Dayberry.

BY TERRY W. HEIMAN, THEME EDITOR

(Dr. Heiman is Director of Agricultural Education for the Missouri State Department of Education, Jefferson City, Missouri 65102.)

Larry Case, senior program officer at the U.S. Department of Education, encourages us to think about new basic skills and preparing for rapid change through examining "The Hidden Curriculum" in vocational agriculture.

The articles in this issue of THE MAGAZINE span the spectrum of the basics. They discuss where we have been, where we are, and present some ideas for future direction. After reading this issue, you will know where your vocational agriculture program stands in relation to the "basics." Use this issue to your best advantage to improve, enhance, and justify your local vocational agriculture program.

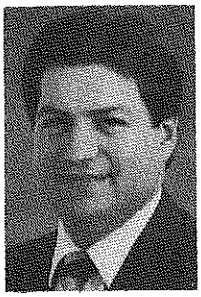
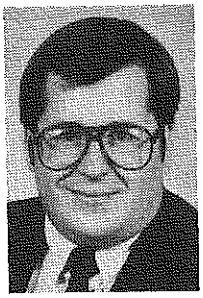
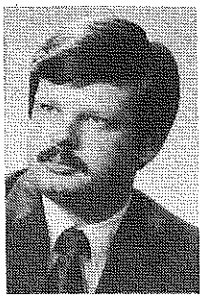
Be confident you can answer, "Yes, I teach the 'basics!' "

About The Cover

Style manuals and textbooks on writing may soon be commonplace on the agricultural teacher's bookshelf. (Photo courtesy of Rose L. Jones, Institute of Applied Agriculture, The University of Maryland, College Park.)

THEME

Basics: The Key To The Future

By Gary E. Briers, Richard J. Norris and Tom Dayberry

(Dr. Briers is an Associate Professor and Mr. Norris is a Graduate Assistant in the Department of Agricultural Education at Texas A&M University, College Station, Texas 77843; Mr. Dayberry is an Instructor of Agricultural Education at Southwest Texas State University, San Marcos, Texas 78666.)

These are unsure times for many connected with the industry of agriculture. According to Ronald Knutson, an agricultural economist at Texas A&M University, the outlook for the future is bleak. Consider the following statistics.

- The U.S. share of the world grain trade is declining steadily, showing substantial losses across the commodity board.
- World crop consumption is increasing at an annual rate of 12 million metric tons while production of crops is rising at a rate of 18 million metric tons.
- U.S. commodity stockpiles continue to rise, forcing market prices lower.
- More than half of the U.S. farmland is now owned for part-time or non-commercial interests.
- Of the commercial farms in the United States, more than one-third show a negative income, many having cash flow problems even before interest expenses are calculated.
- Only one-eighth of the commercial farms show an "above average" income when compared to a non-farm sector "middle" income of about $18,000 per year.

These are but a few startling facts, yet ones that every vocational agriculture instructor and student must be aware of as they build toward a future in this industry. And yes, there will be a future in agriculture for those properly educated men and women willing to accept the challenges that the modern agricultural world has to offer. In an age of high risk, our students must be prepared to analyze situations, make decisions intelligently based on available information, and then react in a proper manner. Agriculturalists of the future will have to be stronger leaders, better speakers, more knowledgeable about current problems and their possible solutions, and well versed in the fundamental aspects of agricultural science if they are to meet the challenges of the future.

As vocational agriculture instructors, we must stress the following "basics" to help our students begin their journey on the right path:

- Emphasis on student mastery of English (reading, writing, and speaking skills), mathematics, economics, and the sciences.
- A planned, ongoing study of agriculture's ever-changing place in the nation and the world.
- Orientation of the student to decision-making and problem-solving methods and their applications to agricultural industry.
- Continued, even increased use of the student organization (the Future Farmers of America) as a means for the practicing and honing of leadership qualities.
- Renewed commitment to and use of experiential learning opportunities (SOEPs) — not as a requirement for credit in a course, but as a proven means of teaching and learning.

With these basic skills solidly ingrained in our students, the foundation is in place for the future learning needed for success. And students should be aware that learning must be a never ending process if they are to survive in today's high technology, high risk world of agriculture.

Teaching Traditional Basics

Vocational agriculture has always had a strong foundation in the sciences. Instruction in animal breeding and selection, genetics, soil science, and plant growth and development have traditionally played a major role in vocational agriculture's "core curriculum." There is a wide variety of good materials available from many different sources for teaching the basic sciences of agriculture and instructors must continue to do the excellent job of teaching these as they have in the past.

However, in these unsure times, we must be aware that our students need more than just a scientific knowledge of agriculture to survive and prosper. They must become adept in use of the English language, mastering written, oral, and reading skills. All too often, we concentrate on the top students for whom these skills come naturally, involving them in contests to aid in their further development.

(Continued on page 6)

Basics: The Key To The Future

(Continued from page 5)

However, our students with undeveloped and underdeveloped skills could benefit most from writing and speaking experiences. Our classrooms need an increased emphasis on written, oral, and reading assignments. Of course, not all students have the ability to be great speakers or writers, but a good majority of students "get by" without really having those skills tested or challenged. It will take self-confident leaders, proficient in verbal and written skills, to put agriculture back on track.

One State's Approach

The Agricultural Education Department of Texas A&M University recently completed a study to determine how well the job of teaching educational basics was being done in Texas' programs of vocational agriculture. The study concentrated on the areas of science and mathematics, determining how well current agricultural curricula covered the "essential elements" identified by the State for science and mathematics. Teachers of math and science were asked to review core curricular materials designed for courses in the agricultural sciences. As part of the review, the teachers identified the essential elements for math and science being taught (actually "covered" by the materials). In the four basic agricultural science courses in Texas, 92% of the topics suggested in the core curriculum dealt with essential elements in science and/or mathematics. (See Table 1 for specific number of essential elements being taught in the agricultural sciences.)

This project identified areas of strengths and weaknesses in teaching math and science in vocational agriculture. With this survey, we can make improvements in the curriculum where weaknesses have been identified, and at the same time emphasize the areas in which we are strong. This survey will also help us, as instructors, "sell" our students on the idea that they are not just learning agriculture when we teach subjects like nutrition and ration formulation, but that they are learning and applying principles of mathematics and science as well.

Teaching Economic Basics

As stated before, these are rough economic times for the industry of agriculture. Almost daily we read about foreclosures and farmers selling out. It's time to realize that all of our students need a strong foundation in the basics of economics. In times past, when prices were high and costs relatively low, even poor managers were able to show a profit, but those days are gone. Students must be made aware that the industry of agriculture is one of high risk and problems, and that through use of the decision making process, study of the economic principles affecting supply and demand, and a close analysis of marketing strategies available to them, they can minimize that risk. As vocational agriculture instructors, we can no longer take it for granted that just because some students were reared on farms or ranches that they "know how things operate" when it comes to making decisions about producing and marketing agricultural products, because obviously much of our farm sector is in serious trouble today.

Table 1: Vocational Agriculture Student Materials Containing Essential Elements of Math and Science

	Number of Topics Containing Essential Elements In:				
Animal Science	Math	Science	Both	Neither	No. of Topics Examined
Vocational Agriculture I	13	16	13	1	17
Vocational Agriculture II	10	11	9	0	12
Vocational Agriculture III	8	11	8	0	11
Vocational Agriculture IV	2	1	2	1	4
Totals	33	39	32	2	44
Percent of Topics	75	89	73	4	
Soil Science					
Vocational Agriculture I	5	6	4	0	7
Vocational Agriculture II	4	7	3	1	9
Vocational Agriculture III	6	5	5	3	9
Vocational Agriculture IV	3	5	2	0	6
Totals	18	23	14	4	3
Percent of Topics	58	74	45	13	
Agricultural Mechanics					
Vocational Agriculture I	11	13	9	1	16
Vocational Agriculture II	12	12	12	1	13
Vocational Agriculture III	6	9	6	0	9
Vocational Agriculture IV	9	14	8	1	16
Totals	38	48	35	3	54
Percent of Topics	70	89	65	6	
Plant Science					
Vocational Agriculture I	5	13	5	0	13
Vocational Agriculture II	4	13	4	0	13
Vocational Agriculture III	3	5	3	1	6
Vocational Agriculture IV	*	*	*	*	*
Totals	12	31	12	1	32
Percent of Topics	38	97	38	3	
Agricultural Management					
Vocational Agriculture I	*	*	*	*	*
Vocational Agriculture II	*	*	*	*	*
Vocational Agriculture III	14	0	0	3	17
Vocational Agriculture IV	8	0	0	3	11
Totals	22	0	0	6	28
Percent of Totals	79	0	0	21	

Note: * Indicates that this subject matter area was not taught at the corresponding vocational agriculture class level. These recommendations were from the BASIC CURRICULUM GUIDE FOR PRODUCTION AGRICULTURE IN TEXAS.

With the influx of computers into education, most schools have laboratories where vocational agriculture instructors can instruct students in potential management uses. Advances in technology such as the computer can provide a tremendous tool in farm management. Students must be aware of the possibilities for its use, or one of the greatest gifts we could give our students, trying to make a place for themselves in agriculture, has been wasted.

The Basic Known As FFA

Since 1928, vocational agriculture instructors have had the Future Farmers of America organization as a means to enhance the learning taking place in the classroom. Never has that organization been more important than today. If problems facing agriculture are to be solved, dynamic leadership must exist. Students of vocational agriculture can learn public speaking, group dynamics skills, and group goal setting and accomplishment through participation in the local FFA chapter. Vocational agriculture instructors need to em-

Basics: The Key To The Future

(Continued from page 6)

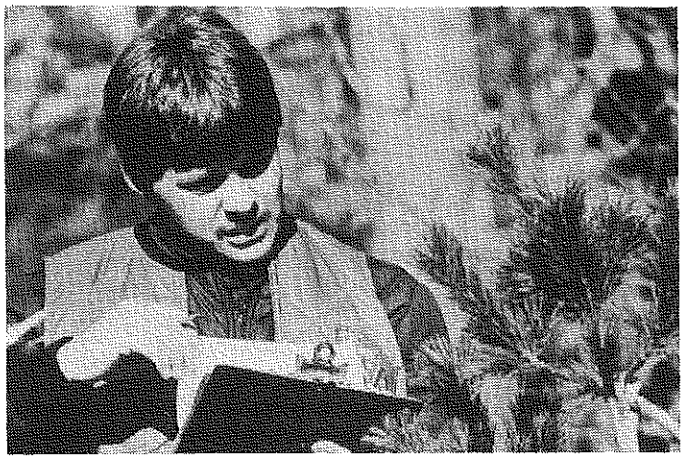
phasize membership and participation in the activities of the Future Farmers more than ever before if we are to develop the leaders that agriculture so badly needs. Our students deserve every chance for development and the Future Farmers of America organization is one of the best we have to offer.

SOEP: Always A Basic

No discussion of the basics of vocational agriculture would be complete without mentioning SOEP. The SOEP is a proven means for providing students with experience. Students are able to apply in practical, real-life situations the principles learned in class. We must work harder than ever to see that each student has a viable, on-going SOEP to round out the "basic" foundation which we are hoping to build for them. There is no question of the educational value of the SOEP portion of our program; it has proven itself many times over. So, let's use it to its ultimate potential.

Summary

There are many basics to consider when teaching vocational agriculture. We have tried to identify some of the most important for developing well rounded students with a foundation for success. These are unsure economic times and we need leaders who have strong foundations, not only in agriculture, but in communication skills, mathematics, science, economic principles, decision making skills, and practical experience. This seems like a tall order and no student will develop all these skills in the span of four years.



Instructional activities must move beyond mere judging activities to include underlying principles and concepts.

However, the foundation upon which all future development and learning will be based can be established by concentrating on these basics. For the future of vocational agriculture and the industry of agriculture in general, we cannot ignore any of these basics.

References

Ronald Knutson, Agricultural Economics Department, Texas A&M University. The statistics used in preparation of this article were presented to an Agricultural Education Graduate Student Seminar, Fall, 1986.

Information concerning the identification of essential math and science elements being taught in vocational agriculture in Texas comes from the recently completed study conducted by the Agricultural Education Department, Texas A&M University.

THEME

The "Hidden Curriculum"

By Larry D. Case

(Dr. Case is the Senior Program Specialist in Agriculture for the U.S. Department of Education, Washington, D.C. 20202.)

Our socioeconomic system is responding to a complex interaction of economics, technological impact, maturing industrial age, and rapidly changing societal demographics. These conditions are drawing us more and more away from a self-sufficient domestic economy into one of international interdependency. This interaction is redefining the way we live, work, and play and is difficult to map in a neat, orderly fashion.

In agriculture, it is predicted the large-scale farms — those with gross incomes of $200,000 or more per year — will dominate agriculture in terms of the value of the product produced. There will be about 1,000,000 fewer farms by the year 2000, according to the Office of Technology Assessment (OTA) projections.[1] Many farmers and agribusiness people will be required to make significant adjustments in their careers as well as their personal lives. Will they have the basic skills required to make those adjustments? What are the implications of these changes for the secondary, postsecondary, and adult programs in agriculture?

In his book, The New American Boom, Kiplinger speaks about growth and its effects in the economy. He states, ". . . these effects will spread out through the economy in a fashion still not apparent to most people. It's called 'synergy', and it stands for the way systems interact in support of each other."[2]

(Continued on page 8)

The "Hidden Curriculum"

(Continued from page 7)

He further states, "These interconnections are already at work and they are nearly impossible to map in any neat, orderly way. The force lines of synergy go off in all directions, knitting an almost random web. They are part of an entrepreneurial revolution that is sweeping through and transforming the economy — not only with the creation of whole new industries, but also by helping to revitalize older, basic lines."[3]

How do these facts and figures relate to agricultural education? We must understand that the changes we are experiencing are not unique to agriculture. The whole economy is changing. The change is rapid and relentless and the synergy effect cannot be ignored. Recognizing this environment of rapid, significant change helps in understanding what skills must be considered as *basic* for survival. Contemporary educational programs must include the "preparation for change" as an identifiable part of the curriculum.

Agricultural education programs have traditionally helped students learn skills which can be classified into at least two categories. Those skills which are "life-long" in nature (communications, working with people, leadership, analyzing and solving problems, etc.) and those which will be eventually outdated (technology-related skills).

Technology-related skills have been traditionally identified through competency analysis. The identified competencies provide a basis for teaching specific technological skills. But, if this singular approach becomes the sole basis for instruction, the learned competencies will become quickly outdated. However, when skills are applied in real world situations, problems are encountered. When students are taught to solve these problems, learning becomes more relevant. This process helps students learn the life-long skills of problem solving, critical thinking, etc.

The approach used in vocational agriculture provides up-to-date technical information in a formal class setting, the application of the information in an experience program, and achievement recognition through a student organization. The instruction becomes relevant and adds motivation for learning.

The vocational agriculture program approach, particularly at the secondary level, has been recognized as a model for education reform because of its effectiveness in equipping students with life-long skills. "Vocational agriculture ought to be viewed not just as a program that prepares youth to be farmers but to incorporate the skills, attitudes, and knowledge needed to begin a new business, or to participate in a business that demands critical thought and the ability to solve problems and make decisions."[4]

The vocational agriculture model has successfully integrated the real world of business with the educational enterprise. As stated earlier, learning and applying the latest technology in agricultural enterprises provides the educational environment for students to learn and improve their abilities in the life long skills of thinking, cooperation, communications, problem solving, decision making, etc.

With this in mind, it appears that the teaching/learning *process* is as important as the subject matter in preparing the student for the world of change. The results of this process is what might be called the "Hidden Curriculum" from which students learn and practice the life-long skills.

Skill Requirements of Change

One of the first things needed is an analysis to identify the skills required to cope with rapid change and how they are taught in the vocational agriculture program through the hidden curriculum process. Dr. Gordon Swanson provides us with a start on such an analysis. He views the new basic skills in three categories, namely Basic Skills, Multiplier Skills, and Multi Purpose Skills. He attempts to show where the student gains the skill. (See Tables 1-3.)

The Challenge

The challenge for agricultural education professionals is to bring the hidden curriculum out of hiding. All must have a thorough understanding of this teaching/learning process so that resulting life-long skills can be written in curriculum materials, taught in preservice and inservice teacher training programs, and effectively used by teachers. In addition, the process needs to be communicated clearly to educational administrators and other decision makers so they understand the contemporary nature of the program and therefore provide the necessary support to assure success.

More Work Needed

Dr. Swanson's analysis provides agricultural education professionals with a beginning for identifying the new basic skills and the hidden curriculum. More work is needed by researchers and curriculum developers to further clarify the skill requirements which will prepare students to effectively deal with future rapid change. Additional study is needed to more effectively focus on the learning styles of students of all ages and improve the teaching/learning process in all levels of agricultural education programs. This information will help assure a bright future for agriculture through effective educational programs.

Disclaimer: This article is the opinion of the author, and no official policy of the U.S. Department of Education is intended nor should it be inferred.

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[2]Kiplinger Washington Letter. The New American Boom. Washington, D.C., The Kiplinger Washington Editors, Inc. 1986, p. 11.

[3] Ibid.

[4] Forsight. Education and Training for New and Small Businesses. Research Triangle Park, NC, Southern Growth Policies Board, May, 1983.

Table 1
Basic Skills

Basic Skills	Specific Forms	Traditional Subjects	Agriculture Topic
1. Logical Thinking	Logical Conclusions	Formal Logic, algebra	Market analysis, estimating least-cost production
2. Analytical Processes	Analysis technique choosing an optimum route	Linguistics, analytical geometry	Enterprise analysis
3. Critical Thinking	Skill in argument, debate	Dialectics	Parliamentary procedure, Problem solving techniques
4. Structural Thinking	Classification	Hierarchy of phenomena, e.g. status, sequence, size	Taxonomies in the kingdoms of animals, plants, microorganisms and their interrelationships
5. Systematic Thinking	Adjustment of ends to means	Organization theory	Study of farm organizations and support agencies
6. Cooperation	Rules and techniques to improve the quality and consequences of human interaction	Specific games	Youth activities — the FFA Agricultural games and simulation
7. Contextual Thinking	Readiness and ability to plan (understanding parts in relation to a whole)	Planning techniques	Farm and business management; Design of cropping plans, landscapes, etc.
8. Decision-Making	Ability to decide and to understand the risks and the consequences of the decisions	Game Theory; decision theory	Judging contests — all types
9. Creativity	Association of ideas and concepts in new configurations	Brainstorming, morphology	Participation in voluntary activities FFA, Public speaking
10. Conceptual Thinking	Understanding of the connections and interdependence of ideas and actions	Chess, Strategic planning	Involvement in district, regional, and state youth activities

Source: Swanson, Gordon. "Table 1 — Basic Skills" Unpublished Mimeograph, University of Minnesota

Table 2
Multiplier Skills

Multiplier Skill	Specific Forms	Subject or Unit
Data on Data	(1) Nature of data	(1) General study of data
	(2) Procurement of data	(2) Study of libraries, directories, databases, market summaries, forecasts, farm accounts
	(3) Comprehensiveness data	(3) Study of symbols, programming languages, spreadsheets, printouts, models, drawings
	(4) Processing of data	(4) Understanding data sensing devices, using computers, using databases and forecasts

Source: Swanson, Gordon. "Table 2 — Multiplier Skills" Unpublished Mimeograph, University of Minnesota

Table 3
Multipurpose Skills

Multipurpose Skill	Specific Form	Subject of Unit
(1) Measuring Techniques	(1) Standards of Measure	(1) Study of instruments to measure: volume, weight, distance, speed, regularity, moisture content and flow Linear evaluation of dairy cattle
(2) Persuasion	(2) Argument and Debate	(2) Speaking, interviewing, parliamentary procedure
(3) Entrepreneurial Skill	(3) Resource Management	(3) Choosing and analyzing alternative paths — farm or enterprise management
(4) Bureaucratic Skill	(4) Acceptance of, and harnessing, bureaucratic style	(4) Study of local community, the state or federal executive functions BOAC
(5) Life-Preserving Skill	(5) Risk Reduction	(5) Safety Instruction — Chapter Safety Award
(6) Mechanical Skill	(6) Using Tools	(6) Using hand or power tools to cope with everyday problems
(7) Organizational Skills	(7) Taking initiative in organizing human effort	(7) FFA Program of Work activity, community, voluntary activities

Source: Swanson, Gordon. "Table 3 — Multi-Purpose Skills" Unpublished Mimeograph, University of Minnesota

THEME

Beating The Basics Blues

By Rose L. Jones

(Dr. Jones is a Lecturer in Agricultural Communications at the Institute of Applied Agriculture, University of Maryland, College Park, Maryland 20742.)

The scenario: Math has just been incorporated into your curriculum, even though you've argued for months that it has always been there. Now the curriculum committee wants you to teach English, too. And you start singing the "All-I-Really-Want-To-Teach-Is-Agriculture" blues. Is there a way to beat the "basic blues"? I say, "Join them!"

Even with the advancements in technology, writing effectively — with pen and paper or keyboard and monitor — remains an essential component of the new basics. Inundated with reports on the plummeting communication abilities of high school students, school administrators are asking teachers of all disciplines to tackle the writing skills problem. In schools nationwide, writing-across-the-curriculum has become the battle cry. The strategy is to assign writing experiences in almost every course students take.

How can the agriculture teacher competently guide students through the writing process? Writing principles do exist that, for one reason or another, are rarely employed by students. These principles are the tools that experienced writers use to tighten, smooth, and re-shape their writing. Agriculture teachers can influence students' writing skills by helping them master these principles.

Before rummaging through the writing tool box, be assured that you don't have to teach grammar to improve the writing abilities of your students. Writing experts are currently stressing the need to teach the *process* of writing rather than merely evaluating the *product* of writing. Therefore, grammar becomes only a part of the writing experience, not the major concern. So, what might the agriculture teacher pull from the writing tool box? Seven tools are major determiners of whether a student's writing will be effective.

Action Verbs and Vivid Descriptors

Students will immediately improve their writing if you have them concentrate on action verbs and descriptive adjectives and adverbs. Require them to examine their writing, searching for verbs and descriptors that don't really say much. If your curriculum demands are strenuous, spend your "writing" time on this major writing principle: Verbs should be showing the subject in action; descriptors should help "paint" a picture for the reader. For example, notice how blah the following sentence is. It just sits there saying little. The second sentence tells the reader much more.

Blah Example:	**The sheep cried.**
Descriptive Example:	**The black, wooly lamb whimpered softly.**

Get a clearer, more vivid picture with the second sentence? The first sentence is too general; consequently the reader gets a fuzzy picture or is compelled to create his/her own picture of what might have occurred. Such reader reconstructions are usually inaccurate and don't represent what the writer had in mind. After reading the first sentence the reader might picture a fat, old ewe bellowing for food which has nothing to do with the picture the writer was trying to create.

Active Vs. Passive Voice

Another writing tool that agriculture teachers should help students learn to use is the active voice (Don't panic, this is not grammar!). In the active voice, the subject takes the action of the verb. In contrast, when something is written in the passive voice, it's difficult to determine who is doing what. When the subject is unclear, the reader is once again left hanging, not always receiving complete information from the writer. The active voice enlivens sentences. Compare the following illustrations:

Passive Example:	**The seedlings were removed from the nursery this morning.**
Active Example:	**The workers removed the seedlings from the nursery this morning.**

Look at the first example again. Who moved the seedlings? Don't know? The writer lets you guess who might have moved those seedlings. In the second example, the reader knows who moved them. The active voice becomes especially important if the reader needs to know about the subject. For instance, if a prankster rather than a worker removed the seedlings, the reader would react differently.

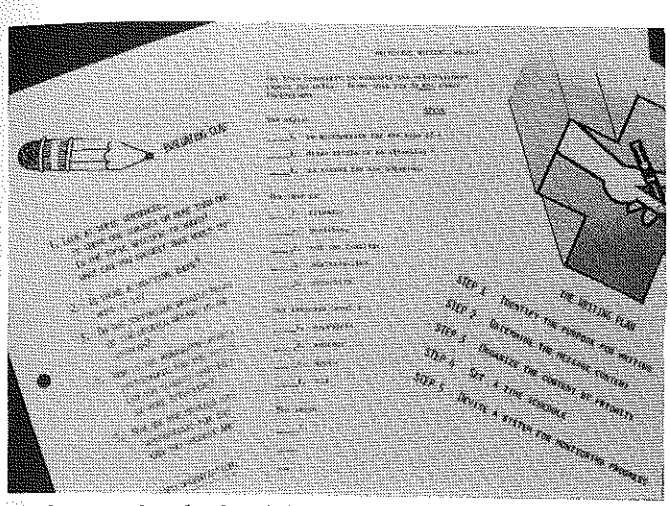
It-There And The Great Beginning

The beginning and the end of sentences and paragraphs are prime spots to grab readers' interest and refresh their memories. Get students to purge the words "it" and "there is or are" from the beginning of sentences. These words are extra baggage.

Weak Beginning:	**There are antique glasses, a pair of worn boots, and a faded picture on the attic floor.**
Stronger Beginning:	**Antique glasses, a pair of worn riding boots, and faded picture are on the attic floor.**

Deadwood

Every writer, experienced and inexperienced, needs a list of deadwood expressions from which he or she can compare his or her writing. Deadwood floats through students'



Teacher or student-developed checklists emphasizing various writing principles are useful tools for effective writing. (Photo courtesy of the author.)

writing daily. Some examples? The deadwood is in bold in the following sentences.

> Let's cooperate **together.**
> Never **at any time** has such a thing happened.
> **The questions as to** whether we should participate will be determined tomorrow.
> **In the neighborhood of** about fifty hamburgers were sold by the FFA.

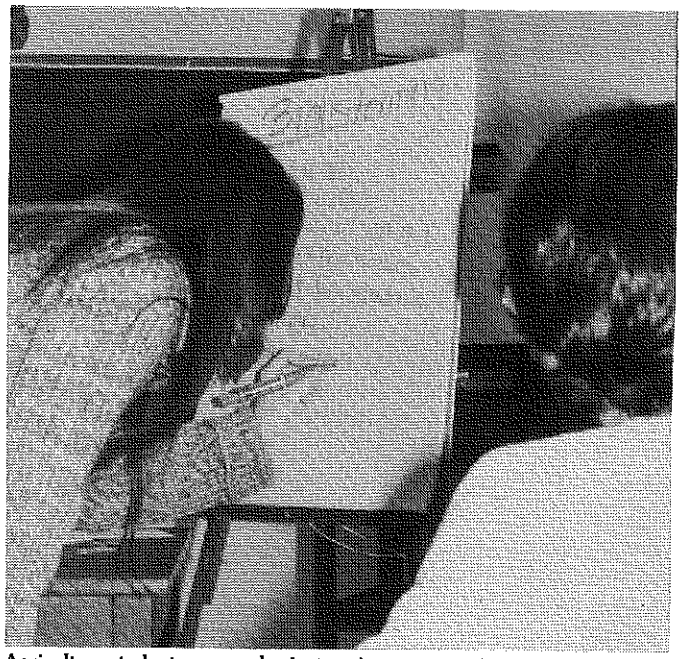
English style manuals list deadwood expressions. Duplicate a list and distribute it to your students. If necessary, create a contest where students try to discover deadwood in each other's writing. They really enjoy this exercise if the deadwood search includes your written material, too.

Wordiness

Closely related to deadwood expressions are wordy phrases that unnecessarily occupy space on a page or on the screen. Get students to search for and eliminate those wordy expressions. Some examples include:

Wordy	Concise
refer back	refer, back
feel free to	please
for the purpose of	for
in the event of	if
in the near future	soon
for the reason that	because
in the amount of	for
make a decision	decide
true facts	truth, facts
first priority	priority

Once again, make a list of wordy expressions (or better yet, have the students research and compile a list) that can be used as a checklist.



Agriculture students can use brainstorming to generating supporting details that expand the topics of their writing projects. (Photo courtesy of the author.)

Connectives

To smooth the rough edges, students need a few more trade secrets. Connectives are great little words that establish relationships between one sentence and another or between one paragraph and another paragraph. Get students to examine the relationships they're trying to convey between sentences or paragraphs. Then, have them choose connectives that best reflect those relationships. Some of the more frequently used connectives and their "relationship ability" (Pearce, Figgens and Golan, 1984) are:

- *__Time Connectives:__ soon, after, first, next, meanwhile, still, further, finally.
- *__Compare and Contrast Connectives:__ although, briefly, but, however, if-then, instead, nevertheless, otherwise, yet.
- *__Sequence Connectives:__ Also, in addition, likewise, therefore, furthermore, next, and.
- *__Cause and Effect Connectives:__ because, consequently, for, as a result.
- *__Example Connectives:__ For example, such as, for instance.

The following example of a flawed connective illustrates the importance of connectives.

Flawed Example:	**Because** I bought a new desk, I've become a better writer.
Accurate Example:	**Since** I bought a new desk, I've become a better writer.

The use of the connector "because" establishes a cause-and-effect relationship between purchasing the desk and improving one's writing skill. Now really, did the purchasing of the desk actually increase the author's writing ability? The use of a time connective such as "since" better represents what really occurred.

(Continued on page 12)

Beating The Basics Blues

(Continued from page 11)

Concrete and Specific

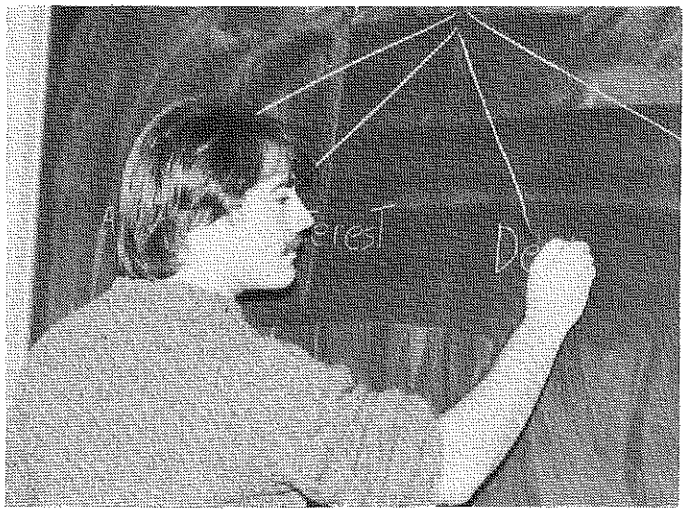
An effective expression is one that transmits a clear, accurate message from the writer to the reader. To be successful, the writer's message must be accurately interpreted by the reader. Students can insure a clear transmission if they use specific, concrete words. For instance, rather than selecting the general word "building," a student should learn to express exactly what type of building he or she is referring to (yes, prepositions at the end of the sentences are now acceptable). Is it a barn, a greenhouse, an apartment, a two-story colonial home, a ranch-style house or a store?

Also, the use of abstract terms such as truth, beauty, progress, and enthusiasm requires the writer to further explain what is meant. One's truth and beauty is not another's truth and beauty.

When you see these vague abstract terms in your students' writings, require them to explain what they meant by the terms. Sometimes the term was used because the student didn't clearly think about the message and the selection of a vague term was simpler for the student than forcing the mind to continue thinking. If the student does have a reason for selecting the vague term, then suggest that he or she use examples or an explanation to further clarify the term.

Conclusion

Today's vocational agriculture instructor is being asked to help students hone their writing skills. While English teachers will continue to deliver the technical procedures for mastering our language, agricultural educators can assist in the process by concentrating on some essential writing tools.



Branching is a visual writing organizer that can be used instead of outlining. (Photo courtesy of the author.)

The seven major tools that the agriculture teacher can help his or her students use effectively are: using action verbs and descriptors, selecting the active voice, creating strong sentence beginnings and endings, eliminating deadwood, culling wordiness, mastering connectives, and employing concrete, specific expressions. With a little planning, these seven principles can be incorporated into assignments you've already designed for your students. Meshing the writing tools with existing learning activities will help you beat the "basics blues."

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BOOK REVIEW

Physiological Processes Limiting Plant Productivity, edited by C.B. Johnson, Ph.D., Butterworths, London, 1981, $66.95.

The content of the book represents the proceedings of the Thirtieth University of Nottingham East School in Agricultural Sciences, which was held at Suton Boningham on the 2nd thru the 5th of April, 1979. The primary concerns of the proceedings are with the fundamental mechanisms which underlie crop production, and their control rather than with crop production as such. International experts brought together relevant aspects of plant physiology, biochemistry and genetics.

The book is very well presented but is highly technical material for the average person. An acute understanding of plant physiology is essential in enjoying and gaining benefits from the book. A large portion of the book is devoted to the ultimate source of all biological energy, light and its utilization by crop plants. Relationships of photoperiods and adaptation to shade in crop plants are covered in this book. Factors affecting photosynthesis and photorespiration are discussed along with the efficiency of solar energy and its interrelationship with fossil, fuel and water. The adaptation of plants to unfavorable conditions, such as low temperatures, abnormal salt levels and atmospheric pollution, were also interpolated. Concerns with plant nutrient interception and transport by root systems, the nutrient uptake in relation to growth of the plant, and symbiotic nitrogen fixation were elaborated upon in graphic detail.

Many charts, graphs, pictures, and tables were included in the book to enhance the knowledge and clarify the compiled information on the various topics.

Physiological Processes Limiting Plant Productivity would be an excellent reference for research people in crop production, plant biochemists, physiologists, and geneticists that are concerned with making contributions to agricultural productivity. There was a concerted effort to evaluate the problems confronting crop physiology today.

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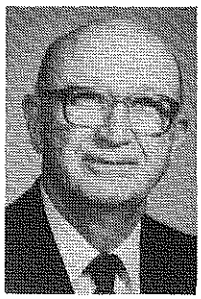
Getting The Basics Through Vocational Agriculture



By G.W. Hamby and Norman F. Rohrbach

(Mr. Hamby is a retired Supervisor and Dr. Rohrbach is a Supervisor in Agricultural Education for the Missouri State Department of Education, Jefferson City, Missouri 65102.)

Recent educational reforms emphasized a return to the basics throughout the entire educational delivery system. Vocational educators are feeling pressure since many people associate basic skills education with academic education. Consequently, vocational education is de-emphasized as high school graduation and college entrance requirements increase around the country. It seems that a race has begun to see who can uphold the most rigorous requirements as a symbol of intellectual purity.

This emphasis on basic skills has driven many in vocational agriculture to step back, take a hard look at the curriculum, and ask the question, "Are we teaching the basics in vocational agriculture?" We in the profession have always believed that basic skills in mathematics, science, and English were enhanced through a student's training in vocational agriculture. But, are we really doing it? In Missouri, we decided to explore the question.

A study of mathematical and science concepts, principles, and competencies which are part of Missouri Vocational Agriculture curricula (see Table 1) was made at the suggestion of the Agricultural Education Supervisory Staff (Missouri Department of Elementary and Secondary Education) and the Teacher Training Staffs of Agricultural Education at the University of Missouri, Northwest Missouri State University, Central Missouri State University, and Southwest Missouri State University. Part of the impetus for this effort came after questions were raised regarding the possibility and advisability of a student satisfying part of his or her math and/or science credit requirements through the completion of vocational agriculture courses. The National Commission on Secondary Vocational Education in 1984 made the recommendation that, "Students should be allowed to satisfy some requirements for high school graduation (for example, in the areas of mathematics, science, English or social studies) with selected courses in areas of vocational education that are comparable in content coverage and rigor." The Commission further stated, "All students, whether college bound or not, need a mix of both academic and vocational courses and enough elective options to match their interests and learning styles. Vocational education is frequently the catalyst that re-awakens students interest in school and sparks a renewal of interest in the academic skills." A Vocational Education Trends and Priorities Study commissioned by the Missouri General Assembly in 1984 stated, "Many vocational classes contain a substantial level of communications, computational, or scientific knowledge. These are identifiable and should be recognized for equivalent language arts, mathematics, or science credit."

The purpose of our study was to determine what concepts and principles are taught students through the vocational agriculture curriculum and how they relate to the various science and mathematics disciplines. The following is a partial listing of Missouri vocational agriculture courses offered that were analyzed for their math/science content.

Agricultural Science I	Soil & Water Management
Agricultural Science II	Forestry Production & Harvesting
Advanced Livestock Production	Horticulture
Agricultural Structures	Agricultural Management & Economics
Agricultural Construction	Agricultural Power

While 29 possible courses are offered, the above listed are most common. Agricultural Science I is the course taken primarily by freshmen and/or entering students and Agricultural Science II is taken primarily by sophomores and/or second year students. These two courses provide the prerequisite experience for the remainder of the courses from which students will select for their junior and senior years.

As presented in Table 1, the curriculum for each vocational agriculture class was broken down into concepts and principles to be taught (left side of table). The vocational agriculture class offering each particular science or math concept was then cross-listed with the corresponding discipline area across the top. This is by no means a detailed listing of the applied math and science taught in vocational agriculture but does give an indication of the breadth of general basic competencies studied.

In addition, there are many other basics beside mathematics and science needed by students and included in the vocational agriculture curriculum. The National Academy of Science report entitled, High Schools and the Changing Workplace which was released May 24, 1981, listed 10 essential core competencies needed by students.

(Continued on page 14)

Getting The Basics *(Continued from page 13)*

Many of these have always been an inherent part of the vocational agriculture curricula. A partial listing of these are: "Computation; understanding of American social and economic life; a knowledge of the basic principles of the physical and biological sciences; possession of attitudes and personal habits that make for a dependable, responsible, adaptable, and informed worker and citizen."

We think this study, even though incomplete, is a good beginning for us. It has strengthened our belief that if we do a good job in teaching what is in our curricula, the students are learning many basic mathematics and science competencies through vocational agriculture. We now need to look ahead to other disciplines mentioned in the National Academy Report to see how we rate. Our philosophy is that students should be **"Getting the Basics through Vocational Agriculture."**

Table 1 — Science and Mathematics Taught in Vocational Agriculture — Missouri 1984

Concept/Principle	Physical Science	Biology	Environmental Science	Physiology	Chemistry	Physics	Math
A. Animal Nutrition							
1. Feed Nutrients and Their Functions		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
2. Digestion		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk	AgSci I/Adv Lvstk		
Energy Utilization		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk	AgSci I/Adv Lvstk		
Protein Nutrition		AgSci I/Adv Lvstk			AgSci I/Adv Lvstk		
Mineral Nutrition		AgSci I/Adv Lvstk			AgSci I/Adv Lvstk		
Vitamin Nutrition		AgSci I/Adv Lvstk					
3. The Digestive System		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
4. Calculation of Rations							AgSci I/Adv Lvstk
(a) Balancing Rations							AgSci I/Adv Lvstk
(b) Petersen Method of Evaluating Feeds							AgSci I/Adv Lvstk
(c) Net Energy Determination							AgSci I/Adv Lvstk
(d) Use of Algebraic Equations in Formulating Ration Mixtures Including Use of Microcomputer							AgSci I/Adv Lvstk
5. Terms Related to Nutrition		AgSci I/Adv Lvstk			AgSci I/Adv Lvstk		
B. Animal Reproduction and Genetics							
1. Male and Female Reproductive Systems		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
2. Functions of Male and Female Reproductive Systems		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
3. The Genetics of Reproduction		AgSci I/Adv Lvstk					AgSci I/Adv Lvstk
4. Systems of Livestock Breeding		AgSci I/Adv Lvstk					AgSci I/Adv Lvstk
5. The Endocrine Basis of Reproduction and Lactation		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
6. Artificial Insemination		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
7. Health Concerns of Reproduction		AgSci I/Adv Lvstk		AgSci I/Adv Lvstk			
8. Economics of Sire and Dam Selection							AgSci I/Adv Lvstk
C. Mechanics							
1. Measurements: Linear, Square, Board Feet, Volume, Capacities, Weight	AgSci I&II Ag Struct Ag Const						AgSci I&II Ag Struct Ag Const
2. Metallurgy: Identification, Welding, Working with metals, Soldering	AgSci I&II Ag Struct Ag Const				AgSci I&II Ag Struct Ag Const	AgSci I&II Ag Struct Ag Const	
3. Land Survey: Use of Transit			Ag Sci II				Ag Sci II
Land Measurements			Soil Water Mgt				Soil Water Mgt
4. Buildings and Structures: Materials	AgSci I&II						
Measurements	AgSci I&II						
Cost Determination							Ag Struct
Depreciation							Ag Struct
5. Sketching and Drawing	AgSci I&II						
D. Plants							
1. Plants and the Plant Kingdom		AgSci II Forest/Hort					
2. Classification of Plants		AgSci II Forest/Hort					
3. Principles of Plant Growth		AgSci II Forest/Hort					
4. Principles of Plant Reproduction		AgSci II Forest/Hort					
E. Soils							
1. Soil Formation			AgSci II Soil Water Mgt				
2. Soil Properties	AgSci II		AgSci II Soil Water Mgt				
3. Soil Water			AgSci II Soil Water Mgt.		AgSci II		
4. Soil Chemical Properties	Ag Sci II		AgSci II Soil Water Mgt		AgSci II		
5. Soil Classification			AgSci II Soil Water Mgt				
6. Soil Conservation			Soil Water Mgt				Soil Water Mgt

Science and Mathematics Taught in Vocational Agriculture (continued) — Missouri 1984

Concept/Principle	Physical Science	Biology	Environmental Science	Physiology	Chemistry	Physics	Math
F. Economic Principles							
1. Diminishing Returns							Ag Mgt Econ
2. Production Function							Ag Mgt Econ
3. Profit Maximization							Ag Mgt Econ
4. Equi-Marginal Principle							Ag Mgt Econ
5. Opportunity Costs							Ag Mgt Econ
6. Substitution Principle							Ag Mgt Econ
7. Cost Concepts-Fixed, Variable Total, Average							Ag Mgt Econ
8. Figuring Interest and Depreciation							Ag Mgt Econ
9. Insurance (Risk-Bearing)							Ag Mgt Econ
10. Record Keeping-Entries, Cash Flow Financial Statement							Ag Mgt Econ
11. Financial Ratios-Liquidity, Solvency Profitability							Ag Mgt Econ
12. Investment Credit							Ag Mgt Econ
13. Value of Money: Future/Present							Ag Mgt Econ
14. Amortization							Ag Mgt Econ
15. Economic Resources: Land, Labor, Capital							Ag Mgt Econ
G. Electricity							
1. Principles and Terms	AgPower/ Struct						AgPower/ Struct
2. Generation of Electricity	AgPower/ Struct						AgPower/ Struct
3. Currents and Circuits	AgPower/ Struct						AgPower/ Struct
4. Motors	Ag Power						AgPower/ Struct
5. Protection Devices Figuring Overload	AgPower/ Struct						AgPower/ Struct
6. Measurements	AgPower/ Struct						AgPower/ Struct
H. Engines							
1. Fundamentals of Engines	Ag Power						Ag Power
2. Fuels and Principles of Combustion, Diesel, LP, Gasoline, Property of Fuels, Displacement Ratios	Ag Power					Ag Power	Ag Power
3. Fuel Systems, Air Fuel Ratio	Ag Power					Ag Power	Ag Power
4. Lubrication (oil & grease), Viscosity, Pourpoint	Ag Power						
5. Electrical Systems: Battery, Transistor, Magneto	Ag Power					Ag Power	
6. Hydraulics: Principles of Operation of Hydraulic Cylinder	Ag Power					Ag Power	
Power Transfer	Ag Power					Ag Power	
Use of Algebraic Equations Figuring Displacement, Flow Rate, Input and Output of Power, Volumetric Efficiency							Ag Power
7. Terms: Torque, Displacement, Efficiency, Foot Found, Back-Pressure, Accumulator, Heat Exchanger, Thermostat	Ag Power					Ag Power	
I. Concrete							
1. Figuring Aggregate Mixes and Water-Cement Ratios							Ag Struct
2. ASTM Specifications							Ag Struct

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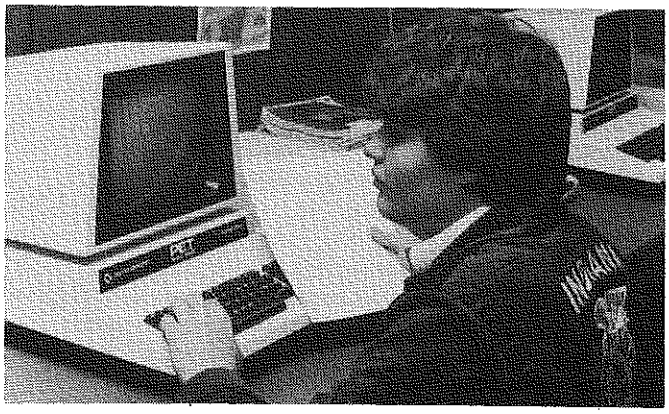

Computer technology provides a means for vocational agriculture to instruct students on various computational processes. Using computers to find "answers" without teaching the underlying computational processes should be discouraged.

THEME

Basics — We All Need Them

By Myron Sonne

(Mr. Sonne is Past President of NVATA and a Postsecondary Instructor at Mitchell Vocational Technical School, Letcher, South Dakota 57359.)

In the upper Midwest where I reside, the one room country school house had and still does seem to have a semblance of teaching basics the "good old way." Some of our school districts still utilize one room country schools, not because they do not know better, but because of the distance between patrons, the time-on-task necessity, and the fact that as a method of teaching, they are still effective.

We have gone through fads of individualizing instruction, schools without walls, team teaching, and many others in the name of modern teaching. Yet nothing replaces simple, effective, and concise presentation of the material. Students vary in their abilities and in their receptivity, thus the teacher must be an innovative presenter. Our chosen field in vocational agriculture also allows us to utilize the learning by doing approach. But as most would agree, we have kept close to the basics.

The basics, however, do not have to be limited and drab. Teachers should use a variety of ways to present material and excite students. The basics can be taught in nearly any type of setting and our vocational agriculture classrooms, laboratories, and supervised occupational experiences (SOE) are certainly positive places to continue that training. A plus for us is the opportunity to put the basics into an actual, factual, and useful situation. Our examples are realism to students. We can take the basics and through illustration, actuate students into real situations that they will handle in the home or agribusiness operations. What better sense of necessity might we need for teaching the basics?

As a postsecondary instructor, fewer than 50% of my students come from vocational agriculture programs. Now, I am from a state that brags of its students' scores on the ACT and similar tests. But, in fact, the claim for educational excellence is a warranted cry. We have that "academic" type of student and they still lack, as much as any group, the complete basic education. Eliminating the vocational curriculum to place students in "academic" classes does not accomplish the task. In fact, in most instances our strongest students come from a school that has provided them some vocational training.

Many groups can and will take credit for the academically strong student. I not only give credit to the academically strong student's educational institution and its teaching staff, but much credit must be given to the parents. The sense of value for education comes from the home not the school. As I view students in the postsecondary field, if they have not been motivated by a strong vocational agriculture, 4-H, or athletic program, their desire to achieve and especially to excel is limited. True — the basics as discussed by many have nothing to do with achieving or competing, but I maintain that real-life living is a conglomerate of competitions, from getting a job to marketing a product. Someone must teach these types of skills — we can and we do, but do we tell others of our efforts?

Vocational agriculture programs provide something normally not delivered in the pure basics. These programs work with people/communication skills and also develop an understanding and a working knowledge of entrepreneurship.

I do not mean to ridicule the basics. They are necessary and I believe that to be true. But, I disagree with those who want only classes comprised of pure basics and wish to eliminate the true application and practical use of that education.

The November-December 1986 Vocational Education Journal quotes James B. Conant, president-emeritus of Harvard University, as saying, "I do not see how anyone who has visited the kind of practical courses I visited could recommend eliminating vocational and practical work from the high school. When I hear adverse criticism of vocational education, I cannot help but conclude that the critic just has not taken the trouble to find out what he is talking about." We have some in leadership today that seem to have missed this point of really finding out what our programs include.

The high schools' responsibility is to educate the populace. Not just the elite, not just the technician, not just the laborer, but to educate the populace as a whole.

Students may be interested in academics, the trades, or in working immediately following high school. But all students will need the basics, technical skills, and communication skills in varying levels. We have the responsibility to train all students not just the small percentage who might go to a four year institution.

The basics are a necessary portion of our educational background, but that does not stem the need our students have for vocational curricula. We complement the basics with our vocational curricula but we are at a point where we need to make the public more aware of our value. In many cases we need only to remind past students where they learned their skills and they will be our proponents.

We have taught our students to evaluate, to speak out, to sell. It's now our turn to do the same and we best get started.

Teaching The Basics In Agriculture

By Bob R. Stewart
(Dr. Stewart is Professor and Coordinator of Agricultural Education at the University of Missouri-Columbia, Columbia, Missouri 65211.)

Missouri Commissioner of Education Arthur Mallory suggested that each person in the classroom should be a teacher of mathematics and a teacher of English. The challenge to agricultural educators is to provide learning experiences for students in math and English while providing instruction about agriculture and the personal development skills and competencies associated with the supervised occupational experience and FFA programs. Teachers of agriculture can provide learning experiences for students by example, feedback, and sharing.

Each teacher has the responsibility to set an example of good scholarship. There have been studies which have suggested that students live up to expectations held for them. The same might be true for the expectations teachers hold for their classroom. Students taught by one of our fine teachers stated, "When we come into this classroom, we feel as if he wants to teach us something. He wants to help us." Therefore, the example that teachers can set would be to value the correct use of English in both the written and spoken form. Each teacher should use correct outlining procedures on the chalkboard and spell each word correctly.

Long before basics became a byword in education, one of our successful teachers had a standing offer of giving a reward to any student who found a misspelled word on the chalkboard. He was teaching by example. Teachers also teach by example in the use of the spoken word. They have been instructed in the use of correct grammar and sentence structure and to eliminate slang words. Teachers have the responsibility to use correct grammar in the classroom. There is also the opportunity to encourage students to speak correctly, particularly when teaching units of instruction in public speaking and parliamentary procedure. This provides an opportune way to correct students and to draw attention to correct usage of spoken language. When using examples related to mathematics, the teacher should be careful not to take undue shortcuts on the board or to run through the calculations on a calculator and fail to place the procedures on the board. While students may use calculators to solve a problem such as balancing a ration or calculating board feet, the correct mathematical procedures and notations should be used in teaching the concepts. We teach by example.

Teachers can also facilitate learning by providing students feedback. There is an opportunity to involve students in both written and oral communications. Students are to keep notebooks of instructional activities, to keep recordbooks, and to provide written feedback to the teacher on quizzes and examinations. If the teacher is to work with students to teach correct spelling and English, then the written work of our students should be marked. There are some who would suggest that the best learning experience would be to mark those errors of spelling or of sentence structure and let the student have a minute when the papers are returned to correct the problem. This provides the students some involvement in solving their own problems rather than the teacher handing back ready made corrections.

Teachers are inclined to provide partial credit for math related problems if the correct procedures are followed. The same parallel could be used for writing. They could provide feedback to students without unduly penalizing their grade for poor writing skills. A second avenue of providing feedback to students is in critiquing oral communications. As a part of the leadership unit for Agricultural Science II students, it is suggested that each student prepare and deliver a short speech. This provides an opportunity for the teacher to work with students on sentence structure, phrasiology, and pronunciation. This structured setting provides the ideal time for the teacher to provide feedback to students about oral communications. We teach by providing feedback.

Another way that teachers can provide learning opportunities for students in agriculture is by sharing with colleagues. The mathematics supervisor in one of our large cities asked for practical examples of mathematical application to use with students in math classes. The math teacher can help students see a purpose to the applied problems. Not only can agriculture teachers share problems with teachers of mathematics, but they can share speech topics and materials for students who will be involved with speech or writing activities in English classes. They should also share practical applications of science related materials for use in science classrooms. The use of agricultural concepts by other teachers and in other classrooms should enhance the value placed on the instruction in agriculture and should reinforce the relationship of basics to the program.

Agricultural educators have the opportunity to assist in teaching the basics. We can teach by example, by providing feedback to students, and by sharing materials with other teachers so that they can use examples from agriculture. The challenge is to take advantage of the concern for the basics in providing the best learning situation possible for the students in programs of agricultural education.

THEME

Incorporating Science Into Vocational Agriculture Instruction

By Chris Roegge

(Mr. Roegge is a Graduate Student in Agricultural Education at the University of Illinois, Champaign, Illinois 61820.)

Everyone is aware that these are not the best of times for agricultural education. That awareness is evidenced by the theme of this month's issue. The call for "teaching the basics" in vocational agriculture programs is a reaction identical to that of all vocational education. Vocational education is experiencing problems of poor image and low enrollments. These problems are compounded in vocational agriculture education because of the "farm crisis" currently gripping the agricultural industry. Efforts to breathe new life into vocational agriculture programs have come in many forms and from many agencies.

As secondary vocational agriculture program enrollments continue to decline (from approximately 24,000 students in Illinois in 1980 to fewer than 14,000 at present) agricultural educators are looking for ways to "stop the bleeding" quickly, but also for long-term solutions. Given the achievement-oriented climate in education today fostered by the "excellence movement," teaching basic skills has become a catch phrase in virtually all of vocational education. Nearly every article one reads in any journal of vocational education recommends teaching basic academic skills in vocational programs. Many teachers are receptive to this suggestion, but need a strategy for carrying it out.

The Science Connection

Perhaps one of the most obvious vehicles for connecting the academic with the vocational is to teach applied science in agriculture. This is not a new concept, as many agricultural educators have advocated it over the years (Cragun, 1961; Haye, 1980; Layman, 1967; Michelson, 1965; Peddicord, Christensen, and Butler, 1965; Starling, 1965). This approach has also been suggested by science education professionals. The National Science Board Commission on Precollege Education (1983) reported a need for curricula which utilize science **applied** in practical situations to improve learning and stimulate interest. These are just a few examples of many to be found in the literature.

As part of the requirements for graduate study in agricultural education at the University of Illinois, the author conducted an analysis of the Illinois Core Curriculum for secondary vocational agriculture to determine if certain principles of biological science could logically be incorporated into the instructional units and problem areas. The Core Curriculum consists of two components, the Rural Agriculture Program, which contains mainly production agriculture teaching plans, and the Metropolitan Agriculture Program, which contains mainly horticulture teaching plans. The typical "core unit" consists of the "Unit & Problem Area Title" with suggestions to the teacher and the "Teacher's Guide" with objectives for each problem area, anticipated problems and concerns, and teaching materials and aids.

Table 1 contains sample problem areas taken from the Rural Agriculture Program and some suggested learning objectives which could be used to incorporate applied biology instruction into the problem areas.

Table 1
Sample Problem Areas and Suggested Learning Objectives About Rural Agriculture

Problem Area	Objective
Identifying Breeds of Livestock and Poultry	Explain the scientific classification of livestock species Describe how and why animals are classified and what criteria are used for classification
Feeding Livestock	Explain the digestive process in ruminant and monogastric animals Discuss the functions of enzymes in the digestive process Explain how feed is converted into usable form and how it is used by animals
Growing Corn	Explain the functions of the various corn plant parts Explain the factors which contribute to the germination of seeds Explain the processes which take place during corn plant growth and development
Maintaining Animal Health	Explain the host-parasite relationship Describe the symptoms of selected diseases of livestock
Conserving Soil and Water Resources	Discuss the environmental impact of soil erosion Discuss the effect of cultural practices on soil erosion
Understanding Basic Genetics and Reproduction	Identifying cell parts and their functions Explain the transmission of genetic characteristics Explain mitosis and meiosis Discuss the impact of genetic engineering on the livestock industry.

Establishing and Maintaining Turf	Identify and explain the functions of the parts of grass plants Explain stolonization Discuss the effects of environment and cultural practices on the growth and development of turf grasses
Understanding and Using Artificial Insemination	Identify the major parts of the male and female reproductive systems and their functions Explain the fertilization of the ovum Discuss the effect of reproductive hormones on the reproductive process

This list of problem areas is obviously not intended to be exhaustive, merely representative of the problem areas found in the RURAL AGRICULTURE PROGRAM. The Metropolitan Agriculture Program contains many units and problem areas in the area of horticulture which lend themselves readily to applied biology instruction. In all likelihood, most current secondary vocational agriculture programs' courses of study will combine features of both the Rural and Metropolitan Core Curriculum. Furthermore, this activity is not restricted to the Illinois Core Curriculum or any other core curriculum. Teachers can incorporate similar topics or objectives using their courses of study as a framework. Another point which should be made is that teachers are by no means limited to applied **biology** in their programs. Other agricultural areas lend themselves to application of chemistry and physical science, such as pesticide formulation, engine principles, and electricity.

Many teachers who read this will probably say to themselves, "I've always taught this material" or perhaps "I teach many more scientific applications than that." The point is that many teach a fair amount of applied science without realizing it. Agriculture is rich with applications of the "hard" sciences. Making it known that our curriculum is academically challenging will improve the image of vocational agriculture coursework. This, coupled with the leadership training offered through FFA and the practical application of SOE, make vocational agriculture a program attractive to students of all ability levels and educational aspirations.

Vocational agriculture needs to change, to adapt and to continue meeting the needs of students. Agricultural education professionals must carefully research and develop needed program modifications to serve the students and agricultural industry, and to continue offering educational programs of the highest quality.

Participants in the FFA's computers in agriculture awards program demonstrate basic skills involving high technology.

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THEME

Trends And Issues In Education Affecting Agricultural Education

By James A. Knight

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Several years ago when the National Commission on Excellence in Education released its now famous report, A Nation at Risk, education became front page information. As a result, many research studies and other commissions were spawned to further enlighten or to respond to A Nation at Risk. The results of that massive study and work are still being felt today and will continue to affect educational programs in the foreseeable future.

Vocational agriculture programs have not been and will not be exempt from the impact of these various studies and reports. This profession does not exist in isolation from the rest of education, and as such, must be responsive to the influences being felt by all of education. To do otherwise would almost surely spell the undoing of the program. The question to be answered here is, "How are the responses that are being precipitated in education affecting agricultural education?" In addition, another question to answer is, "How should agricultural education respond to these pressures?" It would seem appropriate then to summarize the reports, and to identify the implications that these finding might present for vocational agriculture programs today and in the future.

Curriculum and Standards

In summarizing the reports in the broad area of curriculum and standards, the general consensus was that greater emphasis should be placed upon "basic" skills. Having high expectations for all students and providing extra help for those who need it was also generally agreed upon. The reports further emphasized the importance of reasoning skills such as problem solving and critical thinking.

It would appear appropriate that agricultural education take a hard look at the content of its curriculum. Should vocational agriculture programs focus primarily upon production agriculture? Perhaps a greater curriculum question, however, focuses on not just the content, but the mission of that content. Is the sole purpose of vocational agriculture programs at the secondary level to prepare students for work or is it to prepare them for life which includes work? Research done at the University of Minnesota in 1985 on the purpose of secondary vocational education would suggest that a broader mission for vocational programs at the secondary level should be considered. This would not mean eliminating skill training, but rather than making the skills the end-product, they would become the means to an end. In other words, the skills would be the basis for the relevance of the curriculum. In addition, the opportunity to develop employability skills appears to be an area which deserves more attention.

Another curriculum area where there is a growing demand is computer instruction. A concern arises about use of that technology: Will students still learn basic skills or will the computer mask that need? In a study on the use of computers in the fifth grade, it was found that nearly all of the students could get the computer to create a right angle. However, less than one-third of the students could describe what a right angle is.

One of the fundamental notions related to the success of students is having high expectations of students. High expectations are reflected largely in the kind of work given to students and how that work is evaluated.

Many vocational agriculture programs have gone to longer periods of time in which to offer instruction. With the increased emphasis on college standards, vocational agriculture teachers may want to reconsider the traditional program model where students were in class for approximately one hour per day. The demands upon secondary students are going to continue to increase or have increased to such an extent that to schedule them in longer periods of time almost certainly will guarantee a lack of enrollment in the program.

Teaching

In general, the reports focused on the need to provide more recognition and incentives for teaching. At the same time, they expressed the desire to somehow evaluate instruction more appropriately while providing teachers with greater autonomy. In addition, the reports expressed concern about the quality of teaching that goes on regarding the "basics."

It would appear that agricultural education needs to find ways to keep highly qualified teachers in the field and to attract potentially outstanding teachers. This means that higher salaries will need to be provided for teachers of vocational agriculture just as with other educators. In addition, clear career incentives are needed to reward good teachers and to encourage them to stay in the profession.

Currently, teachers of vocational agriculture are recognized for teaching 5, 10, 15, 20 years or more, and most states recognize outstanding young teachers by district and perhaps an outstanding vocational agriculture teacher for the state. However, it would appear that an expansion of that recognition program might be in order to create incentive for recruiting and retaining excellent teachers. In addition, with the current emphasis upon the "back-to-basics" movement in schools, it will be more difficult to procure teachers from the world of work who have experiences but lack the kinds of preparation and skills necessary to teach the basics. While such persons may have good technical skills, they often are not as strong in the "basics."

Given the general finding of the research and reports, it would seem justifiable to reaffirm the long-standing commitment of vocational agriculture teachers to problem solving as an approach to teaching. The techniques related to supervised occupational programs including the home visit appear to be strategies that vocational agriculture teachers will want to continue or re-emphasize if they are not in the position of prominence they once were.

Organization

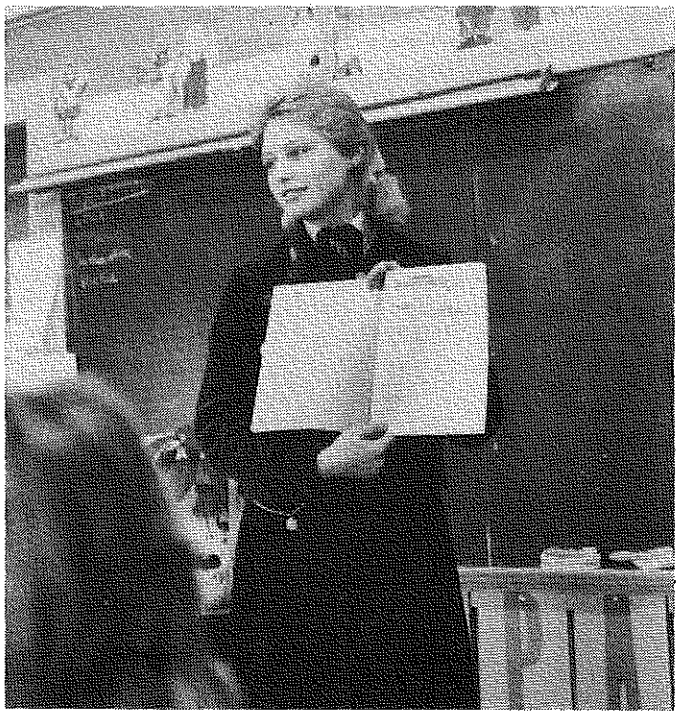
Generally, school climate factors such as smaller classes, better discipline, a more business-like use of time, and better school leadership were identified as important. The need for greater and more appropriate business and community involvement was seen as especially important.

A NATION AT RISK and other reports suggested that school days be lengthened. However, when all of the reports were in, many more suggested that schools simply needed to better use the available time. In vocational agriculture programs, particularly those organized around larger blocks of time, the pressure will be on to make sure that the time is used well, that basic skills are being provided, and that students are actually learning.

Vocational agriculture programs have traditionally had advisory councils. However, it appears that the tradition has waivered somewhat. It is time to reconsider advisory councils and make them work. They will be fundamental to the success of programs in the future. In addition, we should reach out to adults through adult education and other such efforts like the FFA Alumni to bring the people to the schools and to involve them more directly in the program.

Conclusion

When reviewing the mass of literature generated on school improvement since the historic report, A NATION AT RISK, it is clear that major thinkers and writers have expressed significant concerns about education. These concerns have been translated into recommendations that have affected all areas of education. Vocational agriculture programs are certainly no exception.



Vocational agriculture and the FFA have long been recognized for the personal development and speaking opportunities provided for students.

Teaching through the problem solving approach, using supervised occupational experience programs, and working on personal development through the FFA offer a framework upon which to base the search for excellence. Within that framework, teaching basic skills, having high expectations of students, involving business and the community, and improving the general school climate all appear to be fallow ground for vocational agriculture programs to consider.

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Book Reviewers Needed

Persons interested in reviewing books and related materials should contact Dr. Joy Cantrell, Department of Agricultural and Extension Education, Armsby Building, Pennsylvania State University, University Park, PA 16802. For your work the reviewer will keep a copy of the book that is reviewed.

ARTICLE

Small-Scale Vegetable Farming

By Alvin Larke, Jr. and Charles Barr

(Dr. Larke is an Assistant Professor in the Department of Agricultural Education and Mr. Barr is a Botany Lab Assistant at Texas A & M University, College Station, Texas 77843-2116.)

The Economics

A great paradox in modern agriculture is that most young people interested in farming cannot afford to buy the land on which to farm. The fortunate young farmer grows up on family land, takes over from his father after an education, and eventually inherits the land himself. Those without family-owned land are virtually priced out of farming from the very start.

As an example, using round numbers for simplicity, the average farm size in the U.S. is 400 acres. An average price for good farm land is say, $1,000/acre. With a 30-year loan at 10% interest, the monthly payments are approximately $3,500. Few young people can afford that payment or hope to get the needed yield from 400 acres, not to mention convincing a banker to loan the money. If medium and large farms are unaffordable, then the only alternative is small ones.

Most young couples can get a first real estate loan of $50,000, provided they have good credit, steady employment, and some savings for a down payment. Using the above example, $50,000 could buy 50 acres at a monthly payment of about $450. The numbers are at least conceivable now.

Next, you must throw out any ideas of conventional farming and conventional commodity crops. They will barely work on 400 acres let alone on 50. The key to small-scale farming is to grow high-yield, high-quality, high-priced crops. We'll use another simplified example to illustrate the potential of this method.

We're going to grow broccoli. A local wholesaler is paying $.25 a head for good quality broccoli. We space our plants at one-foot intervals on two-foot rows. In our ideal example, every plant produces a beautiful head, we get it to the market on time, and the wholesaler buys everything. What is our gross dollar yield per acre?

$$1 \text{ acre} \times \frac{43{,}560 \text{ ft}^2}{\text{acre}} \times \frac{\text{plant}}{2 \text{ sq. ft.}} \times \frac{\$.25}{\text{plant}} = \$5{,}445 \text{ per acre}$$

Not a bad yield on one acre of land. Now multiply by 50.

The Importance of Diversification

Obviously, you cannot hope to grow, harvest, transport, and sell 50 acres of perfect broccoli heads and sit back on your quarter-million dollars for the rest of the year. Diversification is the key to success. Most vegetable and fruit crops have the dollar/acre potential of our example, but with weather, labor, and market fluctuations, you simply cannot put all your hopes in just a few crops. The successful small farmer plants a series of successively maturing crops.

There are several advantages to successive cropping. If you hire labor, there will be enough to keep them busy year-round. If you do the work yourself, you won't be overwhelmed with everything coming in at once. You can make do with smaller equipment since less area will have to be worked at any one time. It provides a steadier income. It also gives you a backup crop if other crops fail.

Many farmers will start a permanent, slow-maturing crop such as grapes, asparagus, or an orchard on some of the land while keeping the rest in annuals. These crops are less weather dependent, so scheduling their harvest is less of a problem. Their initial cost is more, but they serve as a reliable, long-term investment.

The proper succession of crops is dependent on the local climate, labor, and market as well as your areas of expertise and tastes. In warmer climates, some crops can be harvested almost every month of the year. In cooler areas, early maturing varieties should be used to get the crops in and out as quickly as possible to plant fast succession crops such as beans before frost. With proper timing and selection, two crops can succeed on the same ground in one season in almost any area.

Marketing

The biggest mistake most small farmers, indeed most small businesses make, is an inadequate market survey. If your closest market is 200 miles away, transportation becomes a problem. You may just love to grow rhubarb, but your local wholesaler won't buy it because it doesn't sell. **Know your market before you try anything.** Call local wholesalers, farmers' markets, and retail stores. Most of them are very forthcoming with information about prices and needs. Remember, they would like to buy from a new, inexpensive, high-quality local source as much as you would like to provide one.

The fresh vegetable market is one of the most competitive in agriculture. If your crops arrive at the market even a few hours late, chances are you won't have a buyer or get a good price. Conversely, a hail storm in California can give a Texas grower a $10,000/acre field of cabbage.

Somewhat safer, but less profitable is the processing market. A large vegetable consumer such as a canning company will contract a farmer to grow a certain crop with the guarantee that it will be bought at a set price, provided the quality is up to standards. The price is usually lower than in the fresh market in a normal year, but you have a guaranteed buyer even if the market is glutted and prices are down.

Another method is to make your own market. Pick-your-own operations are gaining popularity near larger cities and

have the advantage of eliminating most of the harvest labor. A peculiarity of pick-your-own customers is that they will often pick and be delighted with a piece of produce that they would pass over in a supermarket. This improves sales tremendously. Roadside stands can also be remarkably successful, but as with any retailing, dealing with the general public takes time, labor and enormous patience that you as a grower may not have.

The Essentials

Success of a small farm depends on a few essential points:

1. **A thorough market analysis** — Know what, where, how, and to whom you will sell your produce before you even buy the land.
2. **A detailed, workable crop plan** — A good education and at least some growing experience is the only way to accomplish this point.
3. **Commitment** — An intensive farm will be your life. The work will be long and hard and the headaches frequent. You will be selling yourself as much as your produce so, if you don't believe in yourself completely, don't even start.
4. **Good land, good location, and adequate water** — Once you have the education, the market, the commitment, and have decided to "go for it" do not skimp on any of these three factors at any cost. You may be paying for any initial savings for years to come.

The Rewards

Most knowledgeable sources agree: the properly run small farm can **profit $1,000 - $3,000/acre per year** once established (three to five years depending on crop selection and market growth). You will be your boss and choose your own lifestyle. Also, selling something that is unquestionably "yours" is a satisfaction that can be achieved in few other professions.

TEACHING TIP

Reinforcing And Enhancing Basic Skills

By Philip Buriak

(Dr. Buriak is an Associate Professor of Agricultural and Extension Education at Mississippi State University, Mississippi State, Mississippi 39762.)

Contemporary critics of education have indicted teachers and schools as not teaching the basics. The indictment is the result of the demonstrated low levels of proficiency in basic skills of the graduates from our schools. "Back to Basics" has become one of the most common phrases in education today . . . so common is the term that entire issues of magazines are devoted to the discussion of "Teaching the Basics."

This in itself implies that the basics are just not being taught. I disagree. The basics are being taught, perhaps not well enough, but they are being taught. Elementary and secondary teachers are teaching basic skills; English teachers are teaching reading, writing, and grammar; math teachers are teaching computational arithmetic; and science teachers are teaching fundamental scientific principles. Even basic cultural and social skills are being taught by teachers in our schools. What then is the problem? Why the concern?

Students are initially learning basic skills. We, however, do not effectively reinforce and enhance these skills in many of our vocational agriculture programs.

How Should We Do This?

1. **Assign readings.** Preface assignments with background information about principal ideas. Follow with discussion to clarify, reinforce, and extend the student's understanding.
2. **Utilize the laboratory.** Students learn best when they witness basic principles in action.
3. **Have students write.** Assign papers regularly, encourage peer review of papers, and then vigorously evaluate for grammar, spelling, and content.
4. **Accept only complete sentences.** Answers to oral and written questions must be in complete sentences. Correct unacceptable speech and grammar.
5. **Teach math skills.** Build in arithmetic problem solving whenever appropriate. Evaluate not only correct answers, but also correct procedures.
6. **Use word problems.**
7. **Use various media.** Use films, tapes, videos, and other media only when they are the better way of presenting the lesson.
8. **Accept no marginal work.** Recycle substandard assignments to be revised and resubmitted. Do not be satisfied with marginal performance.
9. **Be a role model.** Demonstrate the same performance that you expect from your students.
10. **Set standards.** Communicate your high expectations to your students.

Reference

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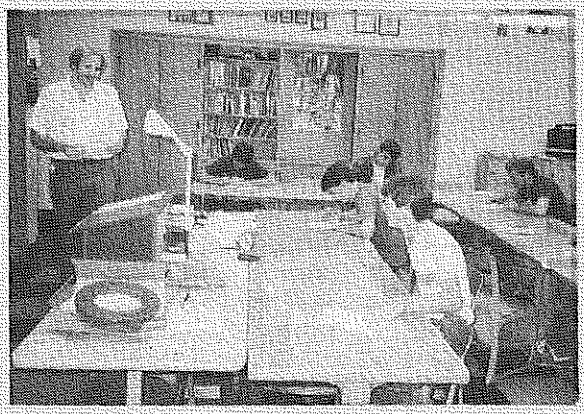
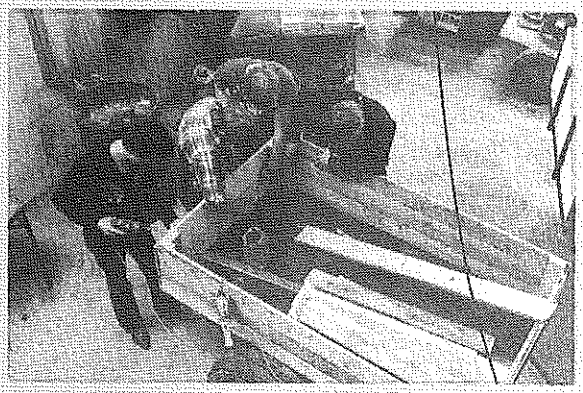
Stories in Pictures

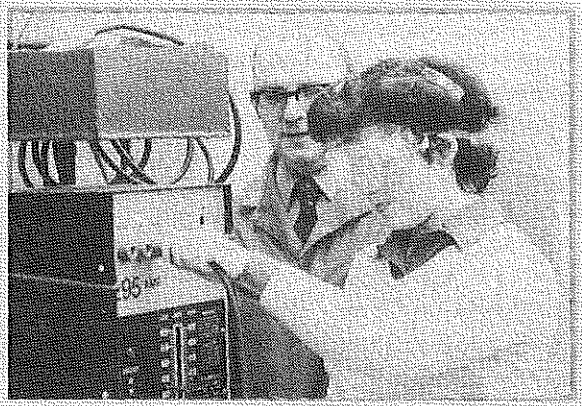
Teaching The Basics



Vocational agriculture teachers must not only assign more writing activities, but they must teach writing as a process.



Project construction provides an excellent opportunity for instructors to teach computational skills in a "live" setting. Teachers must not let "shop" activities become "work" periods rather than instruction that is sequenced and based on solid educational principles.



Students must develop psychomotor skills as well as affective work habits deemed crucial to career development.

Scientific principles can easily be demonstrated through land laboratories available through vocational agriculture programs.

(Photos courtesy of Jack Pitzer, National FFA Center, Alexandria, VA.)