

The
**Agricultural
Education
Magazine**

October, 1986
Volume 59
Number 4



**THEME: Staying Current —
Small Animals and Specialty Crops**

THE AGRICULTURAL EDUCATION MAGAZINE



October, 1986

Volume 59

Number 4

MANAGING EDITORS

Editor

BLANNIE E. BOWEN, 203 Ag. Adm. Bldg., 2120 Fyffe Road, Ohio State University, Columbus, OH 43210.

Business Manager

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

Consulting Editor

LARRY E. MILLER, 204 Ag. Adm. Bldg., 2120 Fyffe Road, Ohio State University, Columbus, OH 43210.

REGIONAL EDITORS

North Atlantic Region

CARROLL SHRY, Vocational Agriculture Teacher, 11622 Cragerstown Road, Woodsboro, MD 21798

Southern Region

WILLIE RAWLS, Dept. of Agricultural Education, Fort Valley State College, Fort Valley, GA 31030

Central Region

JOHN D. PARMLEY, Dept. of Adult & Occ. Ed., Blumont Hall, Kansas State University, Manhattan, KS 66506

Pacific Region

PHIL ZURBRICK, Dept. of Agricultural Education, College of Agriculture, University of Arizona, Tucson, AZ 85721

SPECIAL EDITORS

Book Review Editor

JOY CANTRELL, Ag. & Ext. Education, Armsby Bldg., Pennsylvania State University, University Park, PA 16802

Teaching Tips Editor

JERRY L. PETERS, Agricultural Education, South Campus Courts F-25, Purdue University, West Lafayette, IN 47907

Picture Editor

JACQUE DEEDS, Dept. of Ag. & Ext. Education, P.O. Drawer AV, Mississippi State, MS 39762

EDITING-MANAGING BOARD

Chairman

Douglas A. Pals, University of Idaho

Vice Chairman

William Dannenhauer, Delaware Department of Public Instruction

Secretary

Larry E. Miller, The Ohio State University

Editor

Blannie E. Bowen, The Ohio State University

Members

Glenn A. Anderson, Virginia Department of Education
Larry Case, U.S. Department of Education
Sam Stenzel, NVATA, Alexandria, VA
Duane L. Watkins, NVATA, Thermopolis, WY
Ralph Thomas, NVATA, Woodward, OK
Doug Spike, NVATA, Bloomfield Hills, MI
Max McGhee, University of Florida

Table of Contents

	Page
Editor's Page	
In These Changing Times	Blannie E. Bowen 3
Theme: Staying Current — Small Animals and Specialty Crops	
Staying Current — A Special Pay-Off	James A. Knight 4
Staying Current Through Hobbies	Susan Crank 5
Beekeeping: One Sweet SOE	Bob Weiser 8
Specialty Crops: Their Role in Vocational Agriculture	Michael E. Newman and Ronald L. Powell 11
Inservice Education Designed to Facilitate Using the Project Method with Poultry	Jimmy G. Cheek and Thomas L. Curry 13
Using Trade or Industry Organizations to Stay Current and Gain New Information	Pam Snyder 16
Small Animals: How to Realize Their Potential	Mark Bender and Lee Cole 19
Program Enhancement: Making Positive Changes	Bob R. Stewart and Robert Birkenholz 21
Book Reviews	23
Stories in Pictures	24

ARTICLE SUBMISSION

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

PUBLICATION INFORMATION

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

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

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

SUBSCRIPTIONS

Subscription prices for THE AGRICULTURAL EDUCATION MAGAZINE are \$7 per year. Foreign subscriptions are \$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.

In These Changing Times

A common expression about the weather is that if you do not like today's environmental conditions, wait until tomorrow because the weather is bound to change. As many renown scholars have aptly observed, the weather is like change in that nothing can ever be constant and changes still take place. This scholarly wisdom seems descriptive of agricultural education and vocational agriculture during the 1980s. Few periods in the history of agricultural education have played host to so many changes that are now occurring and must continue to occur if vocational agriculture is to survive into the 21st century.

The widespread calls for educational excellence noted in the January issue of this publication are bringing with them new types of accountability that will permanently alter the scope and appearance of secondary vocational agriculture. Most of this close scrutiny appears long overdue. For too long a period of time, those of us within agricultural education as well as other individuals who are intimately or even vaguely acquainted with the subject have described vocational agriculture almost exclusively with a "down on the farm" mentality. On the contrary, from a legislative standpoint the purposes of vocational-technical education in agriculture have included areas other than farming for almost 25 years.

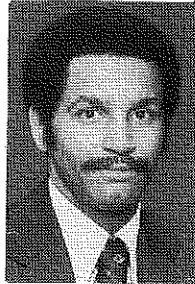
Legislation and Reality

As with many pieces of legislation, what is legal and current practice bear little resemblance. Those of us who drive automobiles often witness this fact. Individuals who obey the 55 mph speed limit are in a distinct minority. In Ohio as least, 58 mph was the average speed on rural highways in 1985. The situation is such that some highway patrol officers have even given-up their attempts to make drivers obey the speed limit. Even though this law is constantly broken, recent attempts to raise the speed limit have failed miserably in Congress. With our system of government, however, the will of the people will prevail or new legislators will be elected to make sure that the will of the people is being represented.

In agricultural education, it appears that new legislators are being elected and a change of the guard is occurring. The hold-overs and die-hards who cling viciously to the production mentality will find that they are rapidly becoming a distinct minority. A new crop of teachers being employed must know contemporary agriculture and be willing to subscribe to the dictates being mandated for individuals desiring careers in agriculture/agribusiness.

The New Agriculture

Topics discussed in this issue speak to the new agriculture that involves limited production employment opportunities, but a wealth of service oriented occupations. Unfortunately, the speed about which this



BY BLANNIE E. BOWEN, EDITOR

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

transformation is occurring in vocational agriculture is not at all consistent with the changes being dictated by a rapidly declining farm population. At first glance, many of the program changes being discussed do not appear to have a snowball's chance of being implemented. With more careful thought and quite a bit of examination, one tends to concur that the ideas being presented in this issue do make sense.

From a very similar perspective, America is still moving toward a service and information oriented society. With such a population, recreation and how the leisure hours are spent tend to be exceedingly important. Further, Mark Bender and Lee Cole write in this issue that more money is spent on pets and pet supplies than all other leisure activities combined. If such trends continue, it appears that a host of new career options will be available to students seeking occupations requiring less than a bachelor's degree.

Also, as Americans continue to change their eating habits, alternative foods that are tasty, nutritious, and healthy are being sought in lieu of red meats and potatoes. Foods that are high in both protein and fiber are in especially high demand. This means that for those individuals who are inclined toward the production of foods, an abundance of small animals and specialty crops can be used to meet the changing eating habits of Americans. As with any new raw product, careful attention must be paid to how that product will be processed and marketed.

Needless to say, this is a major shortcoming of most American farmers who ignored both how their products would be processed and whether sufficient markets were available to handle the supplies being produced. Individuals who produce new food products cannot afford to make this mistake. An example worth following involves catfish producers in the South who had the foresight to avoid mistakes now confronting many farmers. When catfish was being introduced in the 1970s, farmers became heavily involved and are still extensively involved in not only the production, but also the processing and marketing of the product. Similar thinking must be done by the in-

(Continued on page 4)

In These Changing Times

(Continued from page 3)

novators of tomorrow who tap new markets being created by a health and weight conscious populace.

Capable Employees Needed

Even though some of the subject matter being taught through vocational agriculture is changing, there is still a tremendous need for workers who have less than a four year degree. For example, while the Editor was visiting a very specialized agribusiness that produces, processes, and markets several thousand squabs each year, the owners expressed major concerns about finding employees with the skills to advance themselves and the business. This agribusiness, Arcadia Farms of Riegelwood, NC, is operated by Harvey M. Hargrave, my former vocational agriculture teacher who retired a few years ago, and his wife, Beulah, who is also a retired teacher. The Hargraves also produce and market barbecue sauces and related products. Their agribusiness needs workers who have technical skills not commonly taught in vocational agriculture. Thus, their employees must now receive on-the-job training.

Even in specialized operations such as the Hargraves', there is a need for workers who (1) know basic principles of animal science and marketing, and (2) have good human relations and employability skills. Their situation illustrates that animal husbandry and the animals themselves may change, but rarely do animal science principles. As vocational agriculture continues to evolve, small animals and specialty crops should acquire increasing prominent roles in the instructional process. Dr. James A. Knight is to be congratulated for securing the authors who addressed these important topics.

The Cover

Grooming certification offers instructors ways of improving techniques and skills. Helpful tips and advice as well as current trends are also offered at these certifications and workshops. (Photo courtesy of Northwest Career Center, Dublin, Ohio.)

THEME

Staying Current — A Special Pay-Off

Staying current in any field of endeavor is an important and oftentimes consuming task. However, the pay-offs of such an effort are clearly worth the time and energy. For teachers of vocational agriculture, this investment of time and energy are essential if the technical goals of the program are to be met. Teaching students techniques that are obsolete serves only to undermine the value good skill training in agriculture can really provide. On the other hand, when students receive training in technical areas that is current and useful, the credibility of all concerned rises.

With this thought in mind, it is important to note that while skills are valuable, the most important part of any program is the student who is being taught. The point is that students must come before the technical information in their importance in the eyes of the instructor. For teachers of vocational agriculture, this has generally not been a problem. However, with the recent emphasis on "excellence" which has tended to focus heavily upon technical shortcomings of students and teachers, it is not difficult to see how teachers and others connected with education could lose sight of their priorities.

One very interesting pay-off which helps to counterbalance the over recognition of technical information is the potential effect such information has on the enthusiasm level of the instructor. It appears that as the knowledge level of the instructors generally increases, so does their enthusiasm. Of course, there is not a one-to-one correlation, but the general trend does exist. The day a person decides to become a teacher is the day that person forever commits to be a student. Since enthusiasm is one of those special



BY JAMES A. KNIGHT, THEME EDITOR

(Dr. Knight is an Associate Professor in the Department of Agricultural Education at The Ohio State University, Columbus, Ohio 43210-1099.)

traits that is highly associated with student achievement, it would seem that if instructors keep their priorities in line, then all the effort to stay current technically will be worth the time.

This Issue

During recent issues of THE AGRICULTURAL EDUCATION MAGAZINE, a variety of methods for staying current in various technical areas of agriculture have been considered. This issue will continue with that theme. However, it should be noted that in the areas of small animals and specialty crops some difficulty begins to develop. The traditional methods of staying current while useful, are somewhat less practical because of the specialized nature of the technical content necessary to teachers in these areas. The articles addressing this theme will make this situation much more clear. However, at the same time, some interesting and useful techniques for staying current are provided and will be well worth the readers' time.

Staying Current Through Hobbies

Hobbies are pastimes that many of us enjoy and look forward to for their recreational, social, or educational benefits. Having a hobby that relates to your vocational area allows you as a vocational teacher an opportunity to stay current through meeting new people, experiencing new skills or techniques, and attending seminars and workshops.

As a vocational agriculture teacher, the new people you meet can offer you a wealth of information. They may have the same goal, (in my case to train dogs in obedience), but have a wide range of different experiences. These new friends can assist you in staying current by: demonstrating new techniques or equipment, providing specimens or equipment, training students in a specific skill area, judging skill teams, and as vendors of supplies.

Although staying current is not a problem unique to animal care teachers, it is of a special concern to animal care teachers. In Ohio, animal care instructors teach dog grooming, pet shop management, animal care and management, clinical techniques, and in some cases zoo animal management. Teachers must be knowledgeable in aquarium keeping, birds, reptiles, rodents, rabbits, dogs, cats, and exotic animals. Unfortunately, university preparation is not geared to the small animal industry. University course work includes classes in large animals only, such as horses, swine, and cattle. Teachers entering the field through industry also face the same problem because they are often skilled in one technical area, but are frequently lacking in others. Consequently, the animal care teacher must learn to network and find outside resource people in order to acquire additional technical knowledge.

Learn To Network

One of the ways for you as a vocational teacher to meet these resource people is through hobbies and clubs. In the animal care industry, there are many opportunities such as a local dog training club, dog breed club, herpetology club, Humane Society Volunteer, aquarium society, bird club, or professional organizations such as the Akron-Canton, OH Professional Dog Groomers Association or the Registered Animal Technicians of Central Ohio. My involvement with hobbies includes being a member of Columbus All-Breed Dog Training Club and the Columbus Collie Club.

As the President of and an instructor for a 300-plus member dog obedience club and as a member of a local dog breed club, I have met veterinarians, veterinary technicians, groomers, pet shop and business owners, dog breeders, and other animal industry people. All of these individuals have helped me as a teacher and helped my students in the animal care industry. Through these individuals I have met many other people who have also contributed in helping me stay current.



BY SUSAN CRANK

(Ms. Crank is an Instructor of Animal Production and Management at Northwest Career Center, 2960 Cranston Drive, Dublin, Ohio 43017.)

One of the ways these resource people can help you stay current is by performing demonstrations to teach both the student and teacher. Demonstrations give the students opportunities to meet people in the animal industry, are a change of pace for the classroom, and are often a necessity as the vocational teacher may be lacking in the knowledge of the technique. Resource people can demonstrate new techniques or skills as seen at a club meeting, such as bathing dogs or sexing reptiles, or bringing in unusual or expensive animals for students to see and handle such as a Blue and Gold Macaw or a baby chimpanzee. Through groomers I have met at my club, my students have had demonstrations on hand stripping of terriers, thinning techniques, and bathing of dogs. Pet shop personnel have demonstrated unusual breeds of dogs, bird taming, reptile care, and reptile management. Veterinarians have demonstrated parasite identification, fecal flotation, and vaccination procedures.

Of more value to the vocational teacher are demonstrations outside and away from the classroom. Due to the diversity of the field and the technical knowledge required, this is an excellent way to gain information and knowledge. Teachers can use available time gaining knowledge in their area of deficiency. Industry personnel are willing to share expertise with you at it, in turn, benefits students who may someday be their employees. The animal care teacher may want to gain general knowledge in areas such as kennel management, small business operation, or dog grooming. They may want very specific information such as how to hand feed birds, perform a lamb clip or identify tropical fish. Because of my college preparation, it has been necessary for me to learn dog grooming, aquarium management, and many other animal subjects through industry contacts and hobbies. Through individuals I have met through my hobbies, I have spent many hours learning additional subject matter. I have spent time at a kennel-grooming business learning thinning techniques, show grooming, use of chinks, coat conditioners, and other products, and observed breeding of dogs and whelping of puppies. While there, I also observed the skills needed in the

(Continued on page 6)

Staying Current Through Hobbies

(Continued from page 5)

day-to-day operation of the business. This has helped me to better prepare students by concentrating in the laboratory on those skills employers desire. As a result, some of my students have been hired as kennel aides by the owner.

Use Available Resources

Other resource people have included veterinarians, veterinary technicians, and pet shop owners. Veterinarians have allowed me to visit their offices and assist in duties such as fecal flotation, restraint of animals, vaccination of animals, administration of medication and observation of surgery. Veterinary technicians have helped by demonstrating recordkeeping systems, terminology needed, basic clinical procedures such as blood work, sterilization, and surgical instrument identification. Both veterinarian and veterinary technicians are a constant source of information for things such as current trends or practices, help with sick animals at school, or just to answer questions. Pet shop owners have helped me by demonstrating new equipment or products, answering countless questions, and allowing me to visit and wander through their shops. This has allowed me to learn fish and bird breeds, see equipment in operation, and gain ideas to use in the pet shop in the school laboratory. Once again, these employers later gained by employing students knowledgeable in all areas of the industry.

On occasion because of high costs, lack of money, or other reasons, the vocational teacher may find that various pieces of equipment, slides, specimens, or animals are not

practical or available for the laboratory. Using resource people you have met at meetings, the vocational teacher may find these individuals have materials available to borrow. Grooming or clinical equipment such as nail grinders, surgical instruments, or restraining devices or audiovisual materials such as slides on diseases or breeds may be borrowed. In my case, our program is geared toward pet shop and dog grooming based on industry needs and does not get as technical in the clinical aspect of the program. Consequently, my preparation and the materials in the laboratory are geared toward pet shop and grooming. Therefore, I often borrow the items needed for a demonstration. Veterinarians have loaned me microscope slides of parasites, laboratory equipment, and collected specimens to use for laboratory activities. They have collected blood for students to do blood work, feces for parasite identification or other specimens for demonstrations. Often they collect and donate specimens, old equipment, books, or magazines to the program. In addition to loans and donations, industry personnel can also purchase items for the vocational teacher that she/he may be unable to obtain. This can save money and time for the teacher because establishing new accounts and working with school purchasing procedures can be time consuming and often unfeasible.

Another way these individuals can help you is as resource personnel to help train students in a specific skill. Resource people can teach grooming, breed identification, or hoof trimming. Several club instructors meet with and instruct my students in dog obedience. They teach new experiences and have students practice and evaluate the dog and handler's progress. During contest preparation, they come in once a week for three months to work with students and their dogs. They also assist students with 4-H dog projects at fair time.

Students enjoy working with these extra teachers. They realize that the teachers are volunteers who are there to help students because they want to be there. Students receive more individual attention as the resource person is working with only 4-6 students. This also gives the vocational teacher more time to spend with the other students. Students soon begin probing and inquiring into the expert's field of knowledge. This teaches students networking



Attendance or participation in lectures, workshops or seminars can give practical advice on animals with which teachers may be less familiar. (Photo courtesy of Northwest Career Center, Dublin, Ohio).



Hobbies such as aquarium keeping offer opportunities for hands on experience. (Photo courtesy of Northwest Career Center, Dublin, Ohio).

skills. Students can meet with these resource people away from school and learn additional skills or technical knowledge. Several of my students have sought help in purchasing a puppy and veterinary advise.

Judging Contests

Judging skills contests are another way resource people can help the vocational teacher. At the Northwest Career Center, we have a local animal care skills contest where students compete for one of four slots on five different teams and then they advance to the state Animal Care Skills contest. This requires 3-5 adults to be judges. Through individuals I have met at my dog obedience club, I have had groomers judge the grooming contest, obedience instructors judge the obedience contest, pet shop employers judge the pet shop contest and veterinarians judge the animal health contest. Occasionally, these judges or other industry people are asked to judge at the state contest. Our school also hosts a job interview contest and these animal industry personnel have acted as interview judges.

A second benefit that hobbies can give the vocational teacher is experience. Vocational agriculture has long known the benefits of supervised occupational experience programs. What better way for the vocational teacher to stay current and learn new practices? You may not think of that aquarium of fish, that grooming business, aviary, or pet cat as your SOEP, but it does provide the same benefits. These hobbies can offer hands-on experience, increase your knowledge, and also increase your ability or quality of work.

Experiences Acquired

Hands-on experience is the basis of vocational agriculture. SOEP and school laboratory were established with this in mind. Although the animal care teacher supervises the pet shop, grooming area or animal wards, how often will she/he setup and carry out a breeding project, bathe a dog, or catch a fish for a customer? The teacher is more than capable but his or her time is spent supervising and assisting students. Finding the time at school to pursue these skills can be a problem. Hobbies can allow you to explore bird breeding, design an aviary or outdoor pond, or to perfect grooming skills. My hobby of cockatiel breeding has given me experience hand feeding abandoned chicks, taming a parrot, and teaching a parrot to talk. As a result, when a hen abandoned chicks at school, I knew what to do and was able to show students.

An increase in technical knowledge will also occur from experience. SOEPs are designed not only for hands-on experience, but to increase the level of technical skills and knowledge of the student. By having a project in which the student is interested, he or she is more apt to inquire and research problems that arise. The same result will occur for teachers having hobbies. When the fish in your aquarium suddenly die, you are going to find the answers in a hurry. You may find out by trial and error, read a book, or consult with an industry person. You have a need and are going to find an answer. This new information can then be used in the classroom or school laboratory as part of the teaching process. Several years ago I decided to set up a saltwater aquarium. Through reading, asking questions, and visiting pet shops, I was able to learn what equipment

was needed, how to maintain the tank, and what fish to select. With the increase in marine fish sales, employers want students to have marine fish knowledge. As a result of my hobby at home, I was able to develop a lesson plan and instruct students in setting up and maintaining a marine tank. I also raised angel fish which taught me many things about fish breeding which have proven useful in the classroom.

Because of the diversity of the industry, many teachers possess the basic skills in an area, but their ability and skill quality are at a job entry level. The teacher may be able to perform a lamb clip, but not within the time frame the industry demands, or the teacher may be able to identify some fish but not the number of species necessary. Hobbies can increase your ability and quality of work because they cause you to perform tasks repeatedly. In the hobby of dog grooming, you basically perform the same steps on each dog with the clipping patterns changing from breed to breed. With each level of dog training pursued, your ability increases.

The third benefit of hobbies is the opportunity to attend workshops and seminars. Many hobbies have local clubs or organizations you can join. As part of their structure, they may include local, state, regional, or national conferences, workshops, clinics, or seminars. These workshops and seminars offer the vocational teacher the opportunity to meet people from other areas, to share ideas, and to bring new skills or knowledge to the classroom.

Other Resources

Although you have met many individuals at the local level, there are many people outside your area who can benefit you as a teacher. Many companies and manufac-

(Continued on page 8)



Resource people met through hobbies may help in training students a specific skill. (Photo courtesy of Northwest Career Center, Dublin, Ohio).

Staying Current Through Hobbies

(Continued from page 7)

turers send company representatives to shows and these individuals often have travel budgets that allow them to visit your school. Industry personnel from other parts of the country may have new ideas or techniques that vary from your local situation. A guest speaker may have books, slides, products, or other audiovisuals available for resale. I have attended obedience clinics in Ohio where I learned new training techniques and tips. I have also attended several national collie club shows where I participated in workshops and seminars. While there I met a dryer manufacturer who will be demonstrating products to our taxonomy at the Ohio Vocational Association Conference. All of these seminars and workshops not only benefited me directly, but have given me ideas and skills to use in the classroom.

Seminars may be designed to be hands-on. You may be asked to bring an animal, product, or supplies or to pay a

fee for materials used. As part of the regular program of activities, many hobbyist clubs have regular hands-on workshops. A herpetology club may have a snake handling and restraint workshop, the local humane society may have a pet photographing workshop while the local bird club may have a tube feeding workshop. Investigate your local clubs to see if they have a program of activities as well as what type of workshops they have planned. Many clubs gear their programs to the needs of members and by asking, you may get a workshop in your areas of interest or need.

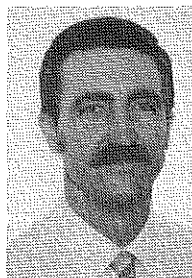
With constantly changing trends, ideas, and practices, staying current is not an easy job in any industry. In the animal care industry with the wide range of animal species, the breeds within, job diversity, and the technical knowledge needed, staying current is an ongoing job. By using recreation time to pursue hobbies you enjoy, you will gain the rewards of meeting new people, of developing new skills or techniques, and participating in seminars and workshops. At the same time, the task of staying current will become easier.

THEME

Beekeeping: One Sweet SOE

Students who choose management of honeybees as a supervised occupational experience program enter the realm of a craft with prehistoric origins. Rock paintings in Spain dated to about 15,000 B.C. depict men taking honeycomb from cliff recesses. The ancient Egyptians practiced migratory beekeeping up and down the Nile River and held the honey bee in high esteem as evidenced by its likeness preceding titles of kings (Root, 1972).

Currently, humans also realize the great importance of the honey bee and have developed complex systems of management for procuring the products of the beehive. Primarily, the honey bee is managed for pollination of 80 crops consumed by humans or fed to meat and milk producing animals. The honeybee produces honey which is used for food and in various cosmetics and medicines. Pollen is also used for food, especially by athletes. Wax is used for candles, lubricants, and cosmetics; and propolis, which is used medicinally. In 1983, U.S. beekeepers produced 200 million pounds of honey, which has been the average for the last ten years (USDA Statistics, 1984). California, Florida, and South Dakota are home to the highest populations of honeybee colonies with some areas of all 50 states supporting honeybees relative to their hectar and pollen producing vegetation concentrations (Agriculture Census, 1982). The industry has areas of specialization such as queen rearing, "package" bees production (a "package" is a nucleus of 2 to 3 pounds of bees with a laying queen used to start new colonies), pollen collection, and comb honey production. The primary source of income for commercial beekeepers is contracted pollination service which for many involves interstate transport of thousands of colonies. These colonies are placed on crops



BY BOB WEISER

(Mr. Weiser is an Instructor of Agricultural Mechanics with the Agricultural Education and Communications Department at the University of Nevada, Reno, Nevada 89557.)

such as almonds, citrus fruits, peaches, apples, etc., for per colony rental fees of up to \$30 (*The American Bee Journal*).

A great number of U.S. honeybee colonies are managed by beekeepers known as "hobbyists" or "sideliners" (with less than 250 colonies) who earn income from honeybees in addition to their occupation. Some maintain colonies out of interest or to increase garden production.

The USDA maintains research facilities in Arizona, Maryland, Wisconsin, and Louisiana to promote improvement in genetic stocks and combat diseases and pests peculiar to honeybees. Problems faced by the industry today center on competition from cheaper imported honey and various diseases and pests that reduce production levels (*The American Bee Journal*).

Honeybees Have Advantages

Beekeeping as a supervised occupational experience (SOE) has advantages for both urban and rural students, primarily in that each colony requires only the amount of space that allows the beekeeper to move freely around it

(approx. 20 sq. ft.). In addition to providing honey for the family table, surplus honey can be bottled and sold to friends, neighbors, and specialty food outlets. This teaches students the basics of quality control as successful honey retailing requires very close attention to factors that influence its attractiveness to the customer. The investment required to establish two or three colonies is feasible for most students and will vary according to how much equipment the student wishes to purchase. Honeybees gather their food and water, so short of supplying shelter and harvesting the surplus honey, the beginner need not invest a lot of time especially on a daily basis. For students, the apiary could essentially be a weekend project. The work load, of course, multiplies with the number of colonies.

Getting Started

To cover the basics in beekeeping and to get a student started on bees as an SOE project, the instructor could use a six week course including the following major topics that the student could pursue to whatever depth time allows.

- Week 1 - Basics in Beekeeping, Biology and Behavior.
- Week 2 - Beekeeping Equipment and Tools.
- Week 3 - Honeybee Diseases and Pests.
- Week 4 - Honey Plants and Pollination.
- Week 5 - Beekeeping Laws and Regulations.
- Week 6 - Marketing, Judging and Showing Honey.



Out of the way places in suburban areas are ideal for apiary locations. (Photo courtesy of Bob Weiser.)

The instruction is best if provided in the fall so the student has time to study the material and gather supplies before spring arrives. A comprehensive textbook such as *The Hive and the Honey Bee* (available from Dadant & Sons, Hamilton, Illinois) is recommended. A written worksheet with questions for the student to answer (open book type) could be utilized for reinforcement and progress evaluation. In the spring, the student will assemble the beehive (advanced woodworking students might be able to make their own), purchase the package bees, (for a reputable source of package bees, the student should talk to local beekeepers to find out whose packages are doing well in that area), install them in the beehive, and monitor their progress as the season advances through the summer. As such, it is an ideal way for the instructor to maintain

(Continued on page 10)



Examining the brood pattern to determine the egg laying ability of the queen. (Photo courtesy of Bob Weiser.)



An apiary location is generally a quiet, peaceful scene. (Photo courtesy of Bob Weiser.)

Beekeeping: One Sweet SOE

(Continued from page 9)

contact with the student through the summer and into the next school year. Sources of information for beekeeping instructional material include university Extension offices, industry publications such as *The American Bee Journal*, beekeeping supply houses such as Dadant & Sons, Inc., and local beekeeping organizations. Such organizations generally include individuals who are willing to assist students with the beekeeping project.

The following flow chart depicts activities involved in a typical year of beginning beekeeping for production of extracted honey.

Obtain and study information — Establish project plan and record keeping procedure — Decide on location for hives — Order equipment and assemble — Order packages and install — Add supers as needed — Purchase extracting equipment or make arrangements with another beekeeper — Remove surplus supers and extract — Bottle, label, show, sell, or gift — Plan increases and supplies needed for next year.

A basic equipment list and cost analysis could include the following:

- | | |
|------------------------------------------------------------------------------------------------------------------------------|-------|
| 1. A beekeeping starter kit. Includes beehive, book on basics, smoker and hive tool, veil and gloves, assembly instructions. | \$90 |
| 2. Coveralls and hat (optional). | 35 |
| 3. Package of bees with queen. | 25 |
| 4. Extractor, uncapping knife and barrel, containers | 250 |
| Total | \$400 |

The above total is from Dadant & Sons, Inc. 1986 Catalog. The veil and gloves, and preferably the coveralls and hat, are necessary safety equipment to reduce the

possibility of stings. Some people are allergic to bee venom, a factor which should be determined before the student begins the project. Honey extracting equipment need not be purchased until a surplus is gathered in the fall, but its expenses should be factored into the overall cost analysis as an eventual project cost item. Several students may wish to establish a cooperative and purchase an extractor on a joint ownership plan. Buying used equipment is discouraged as bacterial and viral diseases of bees can remain dormant and viable in equipment for years so cheaper used equipment can be more costly in the long run.

Other Benefits

Beekeeping offers beneficial aspects other than its entrepreneurial attractions. Home gardens are more productive if they are in close proximity to beehives and the student gains a feeling of contributing to his/her family welfare via managing the honey bee colony. By the way, honey makes an excellent holiday and housewarming gift! Boy Scout badge requirements, elementary schools, garden clubs, and county fairs are examples of opportunities for the student to gain valuable leadership experience by giving presentations on apiculture. The student beekeeper can offer the community a service by catching swarms that appear during the spring months and that homeowners are generally very anxious to have removed!

Beekeeping is an art and science that can remain with the student for the rest of his/her life and the vocational agriculture instructor can have a lasting effect on students by guiding their efforts in this most fascinating aspect of plant science.

References

- ABC & XYZ OF BEE CULTURE, A.I. Root, 1972, Medina, Ohio.
- Dadant & Sons, Inc. 1986 Catalog, Hamilton, Illinois.
- THE AMERICAN BEE JOURNAL, Hamilton, Illinois.
- USDA AGRICULTURAL STATISTICS 1984

SUBSCRIPTION RENEWAL

Please enter my subscription to THE AGRICULTURAL EDUCATION MAGAZINE.

New

Renewal

Check or money order is enclosed.

Please send bill (please enclose purchase order).

Mailing Address:

Billing Address (if different from mailing address):

Name: _____

Name: _____

Address: _____

Address: _____

Post Office: _____

Post Office: _____

State: _____ Zip: _____

State: _____ Zip: _____

Send this subscription form to:

Glenn A. Anderson, Business Manager
THE AGRICULTURAL EDUCATION MAGAZINE
1803 Rural Point Road
Mechanicsville, Virginia 23111

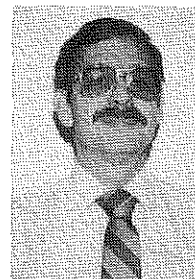
Specialty Crops: Their Role in Vocational Agriculture

A subject which is often overlooked in a vocational agriculture program is speciality crops. Because of the importance of the major production crops grown in an area, many vocational agriculture teachers devote almost all of their time to these crops. However, speciality crops, defined as crops that are not widely produced but have a market in specific areas, often can provide easy solutions to the problem(s) of vocational agriculture teachers in identifying Supervised Occupational Experience (SOE) projects for students.

Specialty crops are probably most effectively used when teachers, parents, and students are trying to select an ownership SOE project that fits the resources, needs, and goals of students. In many cases, the major production crops grown in the area are not the answer for students with limited resources. Vocational agriculture teachers may need to recommend a speciality crop such as strawberries or blueberries to help students develop needed occupational and managerial skills in production agriculture. Meanwhile, the students can gain needed experience in entrepreneurship and other skill areas that are necessary to make a profit with a small amount of acreage. Students with more resources available may turn to a speciality crop such as commercial catfish to begin a project that will continue to develop into an excellent source of income after graduation. Many speciality crops are fairly inexpensive to produce but can be very labor intensive, causing them not to be widely produced. Young vocational agriculture students, however, can use this detriment to their advantage as they acquire skills in agricultural production, management, and entrepreneurship while producing a needed product without a lot of capital.

Another area where vocational agriculture teachers often make good use of specialty crops is in the school greenhouse or land laboratory. In this setting, specialty crops may allow the teachers to assign individual student laboratory projects which later become sources of funds for the FFA. The growing of these crops helps students understand the concepts of plant and soil science learned in the classroom and later on, allows the students to develop skills in salesmanship and agribusiness management while at the same time the income can help pay for FFA trips and/or banquets.

Remember that one of the major criteria for selecting a speciality crop is that minimum acreage is required. There has been no attempt to limit speciality crops which take longer than one or two years to produce a return on the original investment. There are numerous speciality crops which require a minimum of acreage which could be considered for each region of the country. Examples include the following:



BY MICHAEL E. NEWMAN AND RONALD L. POWELL

(Mr. Newman is a Vocational Agriculture Instructor at East Central HS, P.O. Box 13, Hurley, Mississippi 39555; and Dr. Powell is a visiting Assistant Professor in the Department of Vocational Education, Dickey Hall, University of Kentucky, Lexington, Kentucky 40506.)

Strawberries

Strawberries are a versatile crop in that they can be grown in several different soil types and remain productive for up to three years. There are many good cultivars recommended for growing, however, consult your Cooperative Extension Service for the current cultivar in your area. Strawberries are labor intensive and require attention in the areas of weed control, blossom removal, irrigation, mulching, and insect and disease control. The return above total costs per acre was between \$2,000 and \$3,000, depending on whether the crop was picked by hired help or the customers picked their own. The return on the original investment usually begins the second year with strawberries (Ohio Cooperative Extension Service, 1986).

Commercial Catfish

Commercial catfish ponds require an initial investment of several thousand dollars which will be a limiting factor to most students. However, these operations have traditionally covered initial investment costs by the second or third year. Other requirements include a water supply, land, and capital for fingerlings and fish feed. This is a very good crop for a student to continue after graduation. Another new crop with the same general requirements as catfish is freshwater shrimp. However, only warm climates are acceptable because the shrimp must have 270 days with water temperature 68°F or higher.

Blueberries

Blueberries are a good fruit for small plantings. There are many cultivars available to the grower. At least two different cultivars should be grown to increase pollination

(Continued on page 12)

Speciality Crops: Their Role in Vo Ag

(Continued from page 11)

and therefore greater plant productivity. Blueberry plants begin to produce fruit in the third season, however, they do not reach full production until about the sixth year. There are several special concerns associated with blueberry production and culture which should be considered before establishing a planting. Blueberries require a very acid soil (pH 4.3 - 4.8) with at least 4 to 7 percent organic matter. Blueberries need to be pruned, insect and disease pests controlled, high soil acidity maintained, fertilized, watered when necessary, weeds controlled by cultivation and mulching, and blossoms removed the first and second year after planting to stimulate growth.

Blackberries/Raspberries

Blackberries, black raspberries and red raspberries can be an excellent addition to a strawberry operation because of the extended harvest season. At least two years are required to establish blackberries and raspberries, however, the planting could remain productive for several years (average life is 10 years). Blackberries and raspberries are very labor intensive, that is, the planting must be kept free of weeds, pruned 2 or 3 times a year, watered when necessary, kept free of pests, fertility level maintained, and in some cases the plants need to be supported. The return above total costs for a pick your own operation are: blackberries, approximately \$3,900 per acre; black raspberries, approximately \$700 per acre; and red raspberries, approximately \$600 per acre (Ohio Cooperative Extension Service, 1986).

Nuts

Growing nut trees is not a short term project! However, for students who have producing nut trees, they could manage the tree to produce a marketable crop. Depending upon your area, walnut (black & Persian), chestnut (Chinese), hazelnut, filbert, and pecan nuts could be grown and marketed. Cultural considerations include planting two or more cultivars of each species next to each other to enhance cross-pollination, and growing the trees on well-drained loamy or sandy soils for faster growth. Several advantages are long production life and few pruning requirements. A county Extension agent can recommend cultivars that are commercially available for your area.

Gourmet Vegetables

Miniature vegetables that are true dwarfs, except for sweet corn, which is picked before pollination, are included as gourmet vegetables. Vegetables which are grown for their small size include carrots, eggplants, tomatoes, beets, zucchini, and sweet corn. Gourmet vegetables are a relatively new crop and there are no cost figures available. However, costs should be no more than for the production of regular size vegetables. The return will usually be higher due to the nature of the market, a local fresh market. Caution should be exercised in beginning a miniature vegetable operation because of limited market recognition and higher costs of the vegetables, thus an established market is required before planting. Cultural requirements are similar for both types of vegetables (James, 1986).

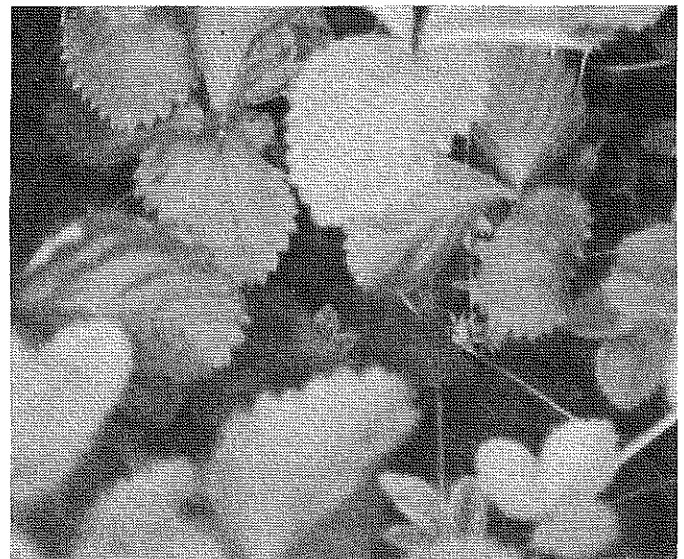
In addition to the above list, the following specialty crops are offered as suggestions: figs, pomegranate, hops,

Kiwi fruit, Jerusalem artichoke, mustard, dill, medicinal herbs (peppermint, spearmint, pigweed, lambsquarters, etc.) ginseng, daylilies (*Hemerocallis*), ground covers (*Ajuga*, *Hedra helix*, *Liriope spicata*, *Pachysandra terminatis*, *Sedum* spp., *Vinca minor*, & *Euonymus* spp.), muskmelons, grapes, ornamental gourds, and greenhouse speciality crops (*Ficus benjamina*, scented geraniums, miscellaneous vegetable seedlings, etc.).

The list of specialty crops is limited only by imagination and marketability of a crop. Before undertaking any specialty crop project consult your local Cooperative Extension agent for suggestions, assistance and guidance in cultivar selection, costs, pest control, and cultural practices.

References

- Bell, L. (July, 1986). Commercial catfish farmer, Water Valley, Mississippi. Telephone interview.
- James, R.E. (July, 1986). Cooperative Extension Agent, Geauga County, Ohio. Telephone interview.
- Landscape Facts*. Cooperative Extension Service. The Ohio State University, 2001 Fyffe Court, Columbus, Ohio 43210.
- Ohio Cooperative Extension Service (November 1985). Ohio Crop Enterprise Budgets 1986 — Speciality Crops. MM-389.
- Utzinger, J.D. (July, 1986). Professor and Extension Specialist, Horticulture, The Ohio State University, Personal interview.



Location often determines whether watermelons and strawberries are specialty crops. (Photos courtesy of the Editor.)

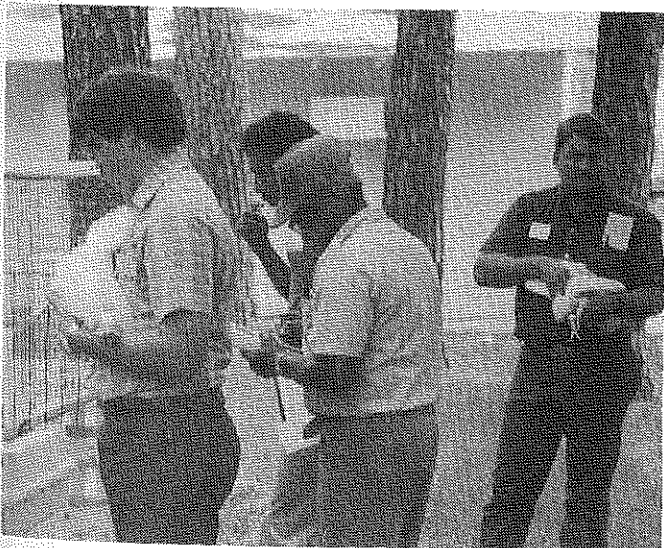
Inservice Education Designed to Facilitate Using the Project Method with Poultry

Inservice education has traditionally been a major priority of departments of agricultural and extension education. The primary purposes of such activities are to constantly update professionals in the field of agricultural education via workshops, seminars, and short courses. The Department of Agricultural and Extension Education at the University of Florida provides inservice educational programming for vocational agriculture teachers and cooperative extension agents who need to increase their knowledge and understanding relative to technical agriculture and professional education. By participating in these activities and improving themselves, teachers and agents are better able to develop educational programs and activities for their respective clientele groups. Funding for these activities typically comes from the College of Agriculture, the Cooperative Extension Service, local Teacher Education Centers, and the Florida Department of Education, Division of Vocational, Adult, and Continuing Education.

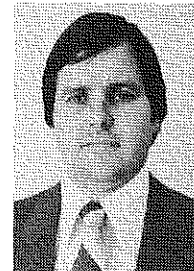
Need

Many inservice activities emphasize the latest scientific information relative to a specific discipline such as animal science, vegetable crops, or forestry. While these activities are valuable, many times teachers and agents do not have sufficient knowledge and skills to help students implement specific projects.

The project method can be traced back to Kilpatrick in the early part of the 1900s. He believed that education was too content oriented and not sufficiently concerned with



Teachers and agents evaluate live chickens. (Photo courtesy of Jimmy Cheek and Thomas Curry.)



By JIMMY G. CHEEK AND THOMAS L. CURRY

(Dr. Cheek is a Professor and Dr. Curry is an Assistant Professor in the Department of Agricultural and Extension Education at the University of Florida, Gainesville, Florida 32611.)

the process or with the student. Kilpatrick felt that education should be student oriented and problem centered. He proposed the project method to develop in students the values needed for building democratic character and personality with the majority of the responsibility resting on the students themselves. This was in keeping with his notion that the great end of life is not knowledge, but action. (Hamilton, Norton, Fardig, Herrington, and Quinn, 1977).

The value of projects in teaching agriculture has been around since the beginning of vocational agriculture. Rufus W. Stimson is considered the father of supervised farming in vocational agriculture. In 1908, he started the home project idea for teaching agriculture which continues today through SOE. In 1912 Stimson said, "It is believed that the project method of bringing agricultural science immediately to bear on actual farm practice is a promising solution of our most pressing problem in the field of vocational training." Thus, the project has been at the center of vocational agriculture since its inception and it continues to play a major role in vocational agriculture today (Deyoe, 1943).

Many educators have difficulty using the project method effectively because they do not possess the necessary technical expertise in all aspects related to the project. To alleviate this problem, this workshop was developed to teach teachers and agents all the necessary knowledge and skills needed to successfully assist students in implementing poultry projects.

A "Hands-On" Workshop

It was determined by the Department of Poultry Science and the Department of Agricultural and Extension Education that two days would be needed to provide teachers

(Continued on page 14)

Inservice Education Designed to Facilitate Using the Project Method with Poultry

(Continued from page 13)

and agents with the necessary information and activities to assist youth with poultry projects. Chickens, quail, pigeons, purebred projects, and poultry products were emphasized. To give different perspectives and effectively utilize expertise, faculty from the Departments of Poultry Science, 4-H and other youth programs, and Agricultural and Extension Education were used to present various topics. The University of Florida campus was selected as the site for the program because of the accessibility of poultry, personnel, and facilities.

This workshop used as a model, the Livestock workshop that was developed by the Department of Animal Science and the Department of Agricultural and Extension Education in 1982 and 1984 and reported in the June, 1986 issue of *The Agricultural Education Magazine*. The workshop was designed to teach those competencies teachers and agents needed in order to assist vocational agriculture students and 4-H members in developing appropriate poultry projects.

The following topical agenda illustrates the various activities in this workshop entitled, "Techniques for Small Flock and Youth Projects:"

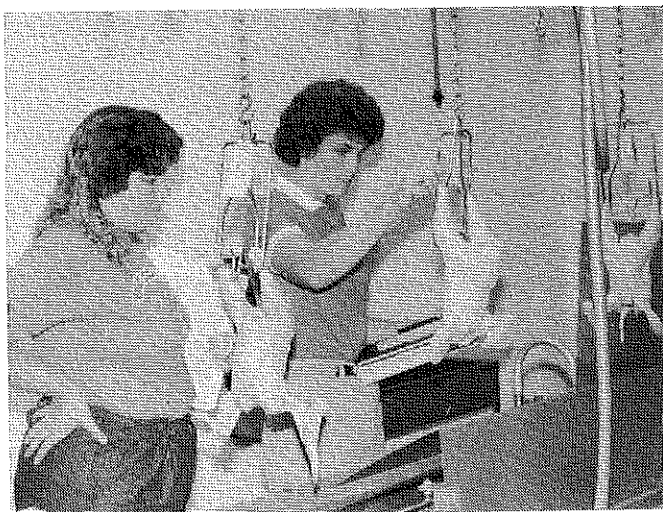
Small Flock Management Techniques

- Incubation and Chick Development
- Baby Chick Processing
- Anatomy and Physiology of the Chicken
- Feeding and Housing Small Flocks
- Management Troubleshooting
- Award Programs and Project Expansion Ideas

Purebred Poultry and Game Birds

- Quail Projects
- Pigeon Projects
- Purebred Poultry Projects

Poultry Judging



Vocational agriculture teachers evaluate ready-to-cook chickens. (Photo courtesy of Jimmy Cheek and Thomas Curry.)

Preparing Poultry for Exhibition

- Bird Selection and the Judging Process
- Training and Pre-Show Care
- Washing and Drying Poultry

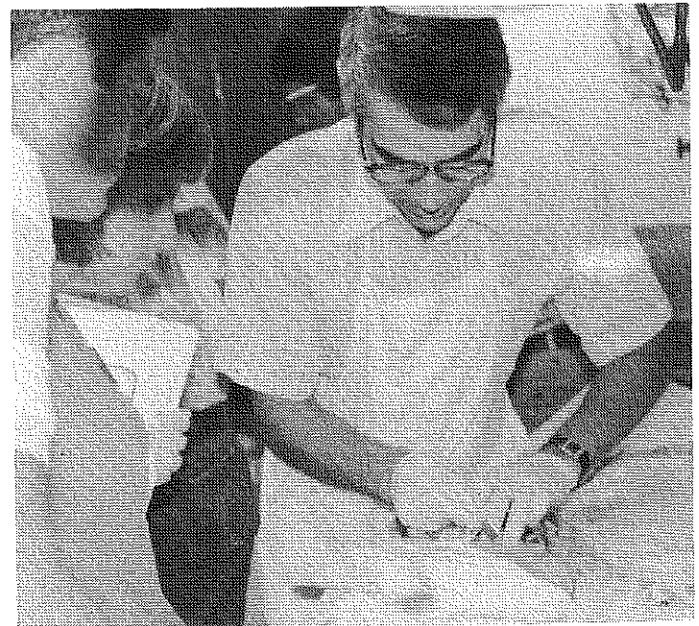
Poultry Products, Projects, and Activities

- The Cholesterol Issue
- Bar-B-Que and Egg Cookery Projects

To maximize learning of the participants, an educational outline was developed for each presentation. This outline identified the major topics to be discussed and space for the workshop participants to write notes by each major concept. For example, in the feeding and housing a small poultry flock section, the following educational outline was developed.

Education Outline for Feeding and Housing A Small Poultry Flock

- I. Feeding
 - A. Feeds
 1. Essential Nutrients
 2. Bird Requirements
 - B. Water
 1. Importance
 2. Bird Requirements
 - C. Feeding Programs
 1. Broilers
 - A. Starter
 - B. Finisher
 2. Egg Type
 - A. Starter
 - B. Grower
 - C. Layer
 3. Miscellaneous Poultry



Dr. Ben Mather, a workshop presenter, demonstrates dissecting a chicken to agents and teachers. (Photo courtesy of Jimmy Cheek and Thomas Curry.)

This type of activity was done for each of the presentations in the two-day workshop. This caused the presenters to focus their presentation on key pre-determined objectives and resulted in the presenters addressing those objectives. In addition, it provided a structuring activity for teachers and Extension agents which should lead to increased learning. A notebook was compiled which provided up-to-date technical information relative to each of the topics discussed. Examples of these materials were Extension Information Sheets related to topics such as Incubation, Embryo Development and Display, and Baby Chick Care, Florida 4-H Poultry Bar-B-Que Project Record, and Cholesterol and Heart Disease: No Easy Answer.

At the conclusion of the workshop, participants had been involved with all of the essential competencies necessary to help young people secure, raise, keep records on, show, sell, and expand small poultry projects.

Results and Conclusions

This workshop was held in the summer of 1985. Twelve vocational agriculture teachers, 14 Extension agents, and three graduate students attended. Because of its success, a similar workshop is being planned for the summer of 1988.

Based upon an analysis of the evaluation, comments, and observations during the workshop, the following conclusions were drawn:

1. The interaction between vocational agriculture teachers and extension agents was very positive and should be promoted in other inservice activities.
2. The workshop format provides a useful model from which to develop other workshops. Plans are currently being made for workshops in animal science and ornamental horticulture using this format.
3. The workshop was especially helpful to new teachers, teachers with limited poultry experience, and Extension agents with 4-H responsibilities.
4. The format and content were judged to be very appropriate by the participants.
5. The notebooks were determined to be excellent references to help teachers and agents.

Summary

Poultry projects have the potential to be very useful pro-



Teachers and agents view embryo development of a chicken. (Photo courtesy of Jimmy Cheek and Thomas Curry.)

jects for students' supervised occupational experience programs and 4-H projects. With increasing urbanization and suburbanization of our student population, the need for projects that require little space and low initial cost is increasing. While ornamental horticulture, vegetable gardening, and similar activities provide this opportunity, many students want some form of animal project. Poultry provides an excellent opportunity to be involved with an animal project when limited space and a low initial investment are important factors to consider in selecting a project. If poultry projects are to fill this void, it is important that teachers and agents be able to provide practical advice and help regarding all aspects of the poultry project. This workshop met this need by teaching participants the knowledge and skills needed to assist FFA and 4-H members plan, carry out, and expand poultry projects.

References

- Deyoe, G.P. (1943). *SUPERVISED FARMING IN VOCATIONAL AGRICULTURE*. Danville, Illinois: The Interstate Printers and Publishers.
- Hamilton, J.B., Norton, R.E., Fardig, G.E., Harrington, L.G., and Quinn, K.M. *EMPLOY THE PROJECT METHOD, MODULE C-9*. Athens, Georgia: American Association for Vocational Instructional Materials.

Next Month's Theme . . .

Staying Current: Professional Affairs

Using Trade or Industry Organizations to Stay Current and Gain New Information

In the Animal Production taxonomy in Ohio, students are trained in various animal related occupations ranging from animal technician to zookeeper. While individual programs may vary, most can be broken down into the major instructional areas of pet shop, grooming, and animal health. While this diversity of occupational instruction provides many ways of meeting student needs in wide varieties of interest areas, it does present special problems to instructors in this taxonomy. College course work is aimed at farm animal production with little emphasis on the animals that constitute major portions of the curriculum in this taxonomy.

Teachers very seldom have trade experience in more than one or two of the major areas of instruction. Whatever the individual teacher's background may be, it would be very difficult to be an expert in all areas of instruction. Subjects as varied as fish and bird keeping, business management, dog grooming, animal health skills, and management of animals such as dogs, cats, rabbits, rodents, reptiles, and amphibians make up this diverse curriculum. Some programs also emphasize horse management and zookeeping skills. Therefore, while staying current is extremely important, technical training received on the job may be the instructor's only way of gaining some types of information. Knowledge obtained while one is teaching is crucial in order to provide as accurate and comprehensive instruction as possible to students desiring employment in these animal occupations.

As with any other vocational service area, industry trends change and new knowledge is always becoming available. Because of this influx of new information, it is crucial that instructors stay current. The professional Animal Production and Management instructor is always trying to pick out the best of this information to present to students. There are wide varieties of ways that instructors can stay on the "cutting edge" of new information. One excellent way is to use the same organizations to stay current as people employed in the field. Described here by major instructional area are some of the trade and industry organizations that may help in this process. Personal examples that will illustrate or clarify points will also be included.

Pet Shop

Instructors in our taxonomy area generally include information on all rodents, rabbits, dogs, cats, birds, fish, reptiles, and amphibians as part of this instructional area. Along with this wide variety of animals comes a host of organizations associated with these animals. On the national level, the Pet Industry Joint Advisory Council (PIJAC) sponsors excellent seminars and workshops. It also serves as a lobby on pet related legislation. While the



BY PAM SNYDER

(Ms. Snyder is an Instructor of Animal Production and Management at the Northwest Career Center, 2960 Cranston, Drive, Dublin, Ohio 43017.)

information presented at these seminars is timely and comprehensive, many seminars are beyond the average instructor's reach because of the expense and travel time involved.

Activities that can be the most beneficial to instructors are those sponsored by organizations, clubs, or societies on the local level. In Columbus, Ohio, we have an aquarium society, a reptile and amphibian club, several dog obedience and breed clubs as well as organizations representing just about any other breed or species of animal. Many instructors in our state are involved in animal clubs of some type. The benefits of these activities should be obvious. Membership or even attending a few meetings can provide contacts for guest speakers, employment opportunities, and especially someone to call on for the latest in technical advice. It is amazing how many helpful people I have met through my co-instructor's involvement in the Columbus All Breed Training Club. The best course for finding these clubs and organizations is through area employers especially the pet shops. Your nearest zoo can be a good source of information. Newsletters and magazines may also list meeting dates.

Grooming

One of the trade organizations that I have become most involved with is Professional Pet Groomer's Certification (PPGC). A recently developed organization, it seeks to standardize dog grooming. PPGC offers a series of four tests which evaluate a groomer's skill and knowledge of dog grooming. Three of the tests involve two phases. The first phase is a practical, in which the individual must groom one or two dogs of a specific breed. The second phase involves a written test over the rest of the dogs in that breed's group. The fourth test given by PPGC is a very comprehensive written test over all dog breeds and general grooming information. My own skill at and knowledge of grooming have improved significantly as a result of these testing procedures. I cannot recommend them highly enough.

Workshops sponsored by PPGC can perhaps be of even greater benefit to instructors than becoming a certified

groomer. These workshops include lectures and demonstrations in the morning with "hands-on" sessions in the afternoon. Here, you may take a dog, groom it, and have it critiqued by PPGC certifiers — definitely learning by doing! I feel these workshops are a way of taking grooming lessons from some of the top groomers in the country. There is a charge for the workshops and testings. In my geographic area, they have been within a three hour drive which makes participation more feasible even though this is a national organization. For more information on PPGC contact Carolyn Bullock, 24622 Ford Rd., Dearborn, MI 48127, 313/561-PPGC (7742).

There are also many local and regional grooming organizations and many sponsor very informative seminars and workshops. Again, contact employers and look in magazines and newsletters for information on those in your area.

Animal Health

In Ohio, our animal health related occupations seem to break down into two major categories — those associated with private practice veterinarians and those associated with research facilities. For research facilities, the major organization involved with certification, testing, workshops, and seminars is the American Association for Laboratory Animal Science (AALAS). All these activities can help instructors stay current. There are three levels of certification within this organization. One of the certification requirements for AALAS is that the applicant have work experience in a research facility. Unless you meet this requirement, testing may be difficult if not impossible to go through yourself. However, the local branches sponsor many seminars and have informative guest speakers at their regularly scheduled meetings. The three local branches of AALAS in Ohio are encouraging membership of all people interested in laboratory animals.

We have developed a testing procedure with AALAS that is held in conjunction with our annual State Skills Contest. The top two seniors from each Animal Production and Management program in the state are tested and given the opportunity to achieve Provisional Certification as an Assistant Animal Technician. This is a definite

advantage to our graduates as they apply for that all important first job!

Several Ohio Animal Production and Management instructors are active in their respective branches. Local research facilities, hospitals, and universities involved in animal research may be your best source of information. For more information on the national level, contact: Donald Keene, AALAS Executive Director, 70 Timber Creek Dr., Cordova, Tenn. 38018.

Veterinary technicians in Ohio must complete two years of schooling past high school in an approved animal technician program. Once graduates have passed certification requirements and become registered animal technicians, they must also stay current and meet continuing education requirements. What better way for vocational agriculture teachers to stay current than to participate in these types of activities!

Our local animal technician organization sponsors monthly meetings that are approved for continuing education credits, and are opened to non-technician individuals. These meetings cover many different aspects of animals and animal care. Veterinary practices are seeing a wider range of animals than ever before and the meeting topics reflect this. Our local organization has invited our students and instructors to attend its meetings.

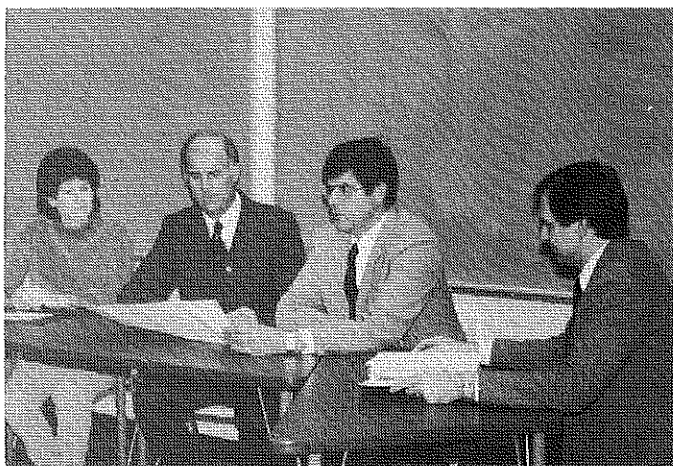
Several Ohio Animal Production and Management instructors are former technicians and they attend the yearly statewide technician's conference which is held in conjunction with the statewide veterinarian's conference every spring. Lectures and seminars approved for continuing education credits are also offered at this conference. Once again, your best source of information is local, but for more information on the national level contact Debra Bridges, ATR, President, North American Veterinary Technician Association, Inc. (NAVTA), 903 South Wells, Edna, Texas 77957.

Publications

Perhaps one of the best ways to stay current is to read. There are many sources of information available on all types of animals through a variety of magazines and
(Continued on page 18)



Employers, either through direct contact or through students, offer an excellent means of staying in touch with what is happening in their respective fields. (Photo courtesy of Northwest Career Center, Dublin, Ohio.)



Taxonomy and advisory committee meetings provide an excellent way to share ideas and stay abreast of new information. (Photo courtesy of Northwest Career Center, Dublin, Ohio.)

Using Trade or Industry Organizations to Stay Current and Gain New Information

(Continued from page 17)

newsletters. Most are inexpensive, readily available, and contain the latest on technical information. Best of all, they are designed to be used at your own pace and they will fit into your schedule.

Many of the organizations described earlier are associated with their own magazines or newsletters. For example, the *Veterinary Technician* is the official journal of the NAVTA. Each issue contains several continuing education articles complete with review questions. Some are on a level suitable only for instructors, but others may easily be adapted to classroom use. I have used some of the articles as extra credit for students who wish to do advanced work in a field of special interest.

These magazines and newsletters are also a prime source of information on upcoming seminars, lectures, and workshops — all excellent sources of current information. Back issues are good for student leisure time reading and can provide follow-up for classroom topics. Following is a list (in no particular order) of some of the most useful magazines we receive in our program. It should be noted that this is only a partial listing. There are many sources of animal related information available, but you will have to determine which ones meet your needs best.

PET SUPPLIES AND MARKETING, Harcourt Brace, Jovanich Publications, P.O. Box 6109, Duluth, Minnesota 55806.

GROOM AND BOARD, H.H. Backer Assoc., Inc., 207 S. Wabash Ave., Chicago, Illinois 60604.

VETERINARY TECHNICIAN, Veterinary Learning Systems Co., Inc., P.O. Box 277, Princeton Junction, New Jersey 08550.

DOG FANCY, Subscription Dept., P.O. Box 2430, Boulder, Colorado 80322.

CAT FANCY, Subscription Dept., P.O. Box 2431, Boulder, Colorado 80322.

BIRD TALK, Subscription Dept., P.O. Box 6040, Mission Viejo, California 92690.

PURE-BRED DOGS/AMERICAN KENNEL GAZETTE, 51 Madison Ave., New York, New York 10010

PET AGE, H.H. Backer Assoc., Inc., 207 Wabash Ave., Chicago, Illinois 60604.

THE A.F.A. WATCHBIRD, American Federation of Aviculture, P.O. Box 1568, Redondo Beach, California 90278.

TROPICAL FISH HOBBYIST, T.F.H. Publications, Inc., 211 W. Sylvania Ave., Neptune City, New Jersey 07753.

DOG WORLD, Maclean Hunter Publishing Corp., 300 West Adams St., Chicago, Illinois 60606.



Student participation in skills contests that industry conducts is one way of keeping instructors updated on current industry trends. (Photo courtesy of Northwest Career Center, Dublin, Ohio.)

Summary

Animal Production and Management is a widely varied taxonomy area — quite possibly its greatest advantage and disadvantage at the same time. Because of this diversity, it is a special problem for vocational agriculture instructors in this taxonomy to stay current and gain new knowledge in all of their major instructional areas.

Even though many national level organizations exist, the individual instructor's best (and least expensive) sources of information are local. They may be harder to discover initially, but the contact people are closer, travel time is lessened, and help is more immediate. Membership in trade and industry organizations can help instructors keep up with changing information as well as strengthening weak technical areas. Quite often, the people who are active members in the various clubs are the industry leaders in the community. Unfortunately, there are people who can be sources of bad information. Membership or attendance at organizational activities may help instructors sort out who is knowledgeable and who is not. Besides the technical skills that you develop and improve, every teacher needs people to call on for help, advice, and assistance. A major problem? — working all meetings, workshops, and seminars into an already busy schedule!

Coming in December . . .

Staying Current: Horticulture

Small Animals: How to Realize Their Potential

Staying current in any discipline takes a great deal of time and effort. To remain professionally prepared, one must continually evaluate which technical and/or pedagogical area needs the most attention. Small animals happen to be one of the areas that appear to be put on the back burner of professional preparation and program priority most of the time. This article will discuss reasons why small animal instruction should be a part of every vocational agriculture program. Rabbit production will be used as an example of small animal instruction and SOEP activities.

The first question that comes to mind when considering small animal production units is "Why should we teach small animals?" Small animals may be defined in many ways. For the purpose of this article, we will define them as nontraditional animal industries that include, but are not limited to, rabbits, poultry, dairy goats, pet animals, birds, and fish. Some of these areas may seem hobby oriented. However, if one considers that more leisure money is spent on pets and pet supplies than all other leisure activities combined, the potential for meeting the objectives of profitability and animal skills and knowledge acquisition in vocational agriculture education is easily seen. Considering that small animals, especially pet animals, have a universal distribution throughout the country, this makes teaching about them applicable to every program.

Another reason for concern regarding coverage of small animals in our curriculum is that high school vocational agriculture programs may lose many potential students because of the lack of instruction in this area. Many 4-H members are reluctant to take vocational agriculture in high school and join the FFA if they have a small animal project especially when the vocational agriculture program in their high school doesn't cover this aspect of their interest. The result is that a young person loses the benefits of vocational agriculture and FFA and the vocational agriculture program loses a potential student. In these times of declining enrollments, everything should be done to attract and keep students. As programs become more urbanized and less rural, we need to be continually reassessing our community and student needs. The results of these reassessments should direct vocational agriculture programs toward a stronger emphasis on small animals.

Small animals for the most part have shorter life cycles and require less land, facilities, and capital. This makes them prime instructional examples to teach basic principles of animal science. Animal nutrition, reproduction, management, etc., can be taught more economically and more thoroughly with less time and money involved. For example, raising a group of broilers can teach basic nutrition,

BY MARK BENDER AND LEE COLE

(Mr. Bender is an Instructor at Modesto Junior College Agriculture Department, College Avenue, Modesto, California 95350; and Dr. Cole is a Professor and Head of the Department of Agricultural Education, Oregon State University, Corvallis 97331.)

feed efficiency, disease control, and management in just eight short weeks. Another example would be using a rabbit production unit to teach reproduction, selection, and management. Rabbits can go through two complete production cycles in less than a year. Certainly, there are other examples that the reader could identify. Another advantage of using small animals as an instructional activity is that potential danger from handling a rabbit, chicken, or some other small animal is minimal when compared to handling larger livestock. With reduced potential danger comes greater peace of mind for the teacher and lower risk and liability for both school and the teacher.

One of the best ways for the agriculture teacher to stay current is to help students get involved with small animal projects as Supervised Occupational Experience Programs. Being involved this way has introduced teachers to different kinds of instructional areas and many times helps to develop a genuine interest. Extending this interest into the classroom is a natural outgrowth brought about by familiarity with the subject and enthusiasm for teaching.

(Continued on page 20)



Rabbits are a good alternative to large animals for students enrolled in vocational agriculture. (Photo courtesy of Mark Bender and Lee Cole.)

Small Animals: How to Realize Their Potential

(Continued from page 19)

Rabbits As An Example

Through a rabbit project, the student can learn and experience every aspect of the animal industry within a year's time. Rabbits are clean, odor free, and can be kept inside the city limits. The initial cost outlay is relatively low and the opportunity for returns on labor and capital are very good if the student will take advantage of the many possible markets. Rabbits are grown in every state and there are usually several breeders available who are willing to help and provide quality breeding stock at reasonable prices to FFA members. There is great potential for showing rabbits if that is one of the objectives. Over 500 shows are held each year across the U.S. and there are hundreds of local rabbit clubs willing to help and they are looking for new members. *The American Rabbit Breeders Association* has over 37,000 members and can provide information, names, and addresses of members in any locality.

Getting Started

The cost of getting started in rabbit production is relatively low. As in all things, you can be as elaborate as you want and can afford.

Housing and Equipment. Basically there are two types of housing. One is the all-wire cage, commercially available at most feed stores, which needs to be placed in some larger structure (cages and small buildings make excellent agricultural mechanics projects). A second type of housing is the traditional outside wire-and-wood hutch (also an excellent mechanics project). Both systems of housing have their advantages and disadvantages. What determines which to use is the availability of a structure and its orientation to the weather. Rabbits are affected by drafts and heat, but are not overly sensitive to cold.

Costs vary by materials used and how much labor the student is willing to invest. Expect to spend between \$15 and \$30 for each rabbit capacity unit. Cage sizes vary as to rabbit size. A good range would be: small breeds (less than 6 lbs.) 18" to 24" wide; Medium breeds (6 to 9 lbs.), 24" to

30" wide; and large breeds (over 9 lbs.), 30" to 36" wide. All cages should be 30" deep and 18" high.

Feeding and watering equipment can be as simple as earthenware crocks, however, most producers use metal hopper feeders and automatic waterers. These will add between \$3 and \$6 per animal cage unit to the cost of the cage itself. Other required equipment will include nest boxes, toenail clippers, feed buckets and bin, tattoo set, and carrying cages if showing is desired.

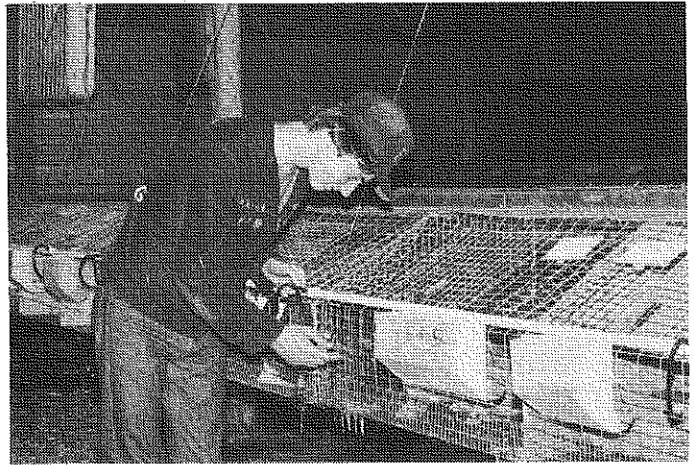
Breeding Stock. The cost of breeding stock varies according to the breed, the quality, and the age at the time of purchase. Expect to spend from \$10 to \$35 per animal for the more common breeds. There are 41 breeds of rabbits and more being developed all the time. Which breed to choose depends on availability and personal preference. You can spend as much as you like, but in many cases, there is little correlation between quality and cost. Remember, it costs as much to raise a mongrel as it does to raise quality and pedigreed stock. Health and vigor are also very important and it's a good idea to have someone who knows rabbits accompany you when looking at potential purchases.

Feeding. A good quality commercial ration containing 16% protein is adequate for the nutritional needs of most rabbits. Additional feeds for conditioning and providing for extra needs during lactation can be fed, but on a limited basis. Do not under any circumstance feed fresh leafy vegetables as these will lead to digestive upsets. Rabbits enjoy alfalfa, oat, or grass hay and clean wheat, oat or grass straw. Roughage of this type is a treat for them and keeps digestive upsets to a minimum. Feeds cost between 10 and 15 cents per pound. The amount of feed depends on the age, stage of growth, or production and size of the animal. A rule of thumb is to feed 3% of the body weight for mature animals. Younger animals need to be fed 5 to 6% of their body weight. Does in the last 8 days of pregnancy and when they are lactating should be fed 4 to 6% of their body weight.

Returns. Fryer rabbits sell to processors for 50 to 65 cents per pound live weight and dressed fryers sell for \$1.25 to \$2 per pound. Show stock sells for whatever the market will bear. Prize winning stock commands a premium price and it is not unusual to see rabbits sold for \$40 to \$50. The average range for top quality show stock is



Dairy goats give students good practical experiences raising animals. (Photo courtesy of Mark Bender and Lee Cole.)



Proper facilities are needed to raise any small animals. (Photo courtesy of Mark Bender and Lee Cole.)

\$20 to \$35. This also varies as to individual breed and breeder. Medical and research laboratories are difficult to sell to, but are willing to pay 4 or 5 times the commercial price. Normal pelts are sold by the pound. It takes up to 10 colored pelts or 6 white pelts to make a pound, which sells for \$2 to \$3.50. Rex rabbit pelts sell as high as \$25 per pelt if they are top quality and professionally tanned. Angora wool sells for \$2 to \$4 an ounce. Rabbit manure is excellent fertilizer and can be sold to neighbors and organic gardeners. Rabbit manure is also excellent feed for earthworms. With so much instructional value and such low costs, rabbits have great potential along with other small animal production units for inclusion in every vocational agriculture department. Small animal production units should therefore receive more emphasis than they currently enjoy.

Why isn't it happening? If small animal production holds so much potential, why aren't more vocational agriculture teachers encouraging students to get involved with small animal projects? Teachers don't and can't teach what they don't know. Few teacher preparation programs in agriculture require a small animal production course in their preservice programs. Likewise, few universities provide small animal production courses in the undergraduate curriculum. Teachers of vocational agriculture can be provided curriculum material, but if they have never had

direct, hands-on application using the curriculum material provided, they will seldom venture into the unknown. Small animal industry contacts can be utilized for the self-starter who is convinced that instruction in small animal production is a necessary part of his/her curriculum. Other teachers respond more positively to a specialized one week inservice course taught by a person with a strong industry background who is familiar with the instructional/learning process.

Summary

The difficult part of getting vocational agriculture teachers to participate in an inservice workshop is that if they don't have some background in the area being taught, they are not likely to voluntarily participate. This problem has a multitude of potential solutions. Each university offering inservice courses should examine the possibilities and work toward getting instructors involved with inservice education programs in small animal production. For more information about rabbits, contact The American Rabbit Breeders Association, Glen Carr, Secretary, 1925 S. Main St., Box 426, Bloomington, IL 61701. An extensive curriculum guide on rabbit production developed by Mark Bender is also available from the Agricultural Education Department, Oregon State University, Corvallis, Oregon.

ARTICLE

Program Enhancement: Making Positive Changes

When planning programs in vocational agriculture, we must be cognizant of major changes in the environment in which we work. Consideration should be given to changes in agriculture, education, and the local community. Plans can then be made for program adjustments in terms of course offerings, facility changes, and resource allocations. The purpose of this article is to examine possibilities for making positive changes in local programs of vocational agriculture.

Changes in Agriculture

Currently, we are experiencing changes in the structure of the agricultural industry. Demographers have predicted that the number of large, commercial farms and the number of small, part-time farms will increase dramatically over the next 15 years. For example, projections for the state of Missouri indicate that by the year 2000, 42.5 percent of the farms will be 50 acres or less in size and 5.5 percent of the farms will be 1,000 acres and over in size. The above data would seem to indicate that we will be preparing students to work in a two-class system of production agriculture. There will be a small but increasing number of commercial farmers who will earn their primary income

BY BOB R. STEWART AND ROBERT BIRKENHOLZ

(Dr. Stewart is a Professor and Dr. Birkenholz is an Assistant Professor in Agricultural Education at the University of Missouri-Columbia, Columbia, Missouri 65211.)

from production agriculture. However, the majority of farmers will be operating small and middle size farms and will derive significant proportions of their family income from off farm sources. This presents the challenge of meeting the basic needs in production for part-time farmers who are earning the majority of their income from sources outside of production agriculture. A greater challenge may be that of preparing workers for the total agribusiness industry. Further challenges arise from the possibility of preparing persons for dual occupations in agriculture. That is, to prepare persons to work part-time in production agriculture and to also derive a portion of their total income from the broader agribusiness sector of agriculture.

(Continued on page 22)

Program Enhancement: Making Positive Changes

(Continued from page 21)

Changes In Education

A second consideration relates to current and anticipated changes in education. As many as 10 reports in the past three years have focused on improving education through added emphasis on "the basics." States and local schools have reacted by increasing high school graduation requirements and the emphasis on college preparatory courses. These changes have made scheduling four-year programs of vocational agriculture more difficult. The implications are that teachers must do more in terms of providing program information and recruiting prospective students. Teachers must also help students plan a four-year sequenced program to take advantage of the opportunities for supervised occupational experience and participation in the FFA. At the same time, agricultural educators must examine the possibility of increased flexibility in working with students who wish to enter vocational agriculture during the sophomore, junior, or senior year. The challenge is to provide a reasonable amount of instruction in agriculture while helping meet other needs of these students. It would also appear that information about agriculture and the broad range of careers in agriculture will become more important at the seventh and eighth grade levels. The apparent emphasis on encouraging students to select career options or paths earlier in high school makes it increasingly important to provide students with information about agriculture earlier in the decision making process.

Changes in Communities

Another consideration involves an examination of the local community. Information about changes in agriculture in terms of number of farmers, the number of persons engaged in part-time agriculture, and employment opportunities in providing services to farmers is of paramount importance. Additional information about placement, mobility, and career changes of former students would also be helpful. Input from the local advisory committee on vocational agriculture becomes even more important as we evaluate and interpret changes occurring in the local community.

Program Adjustments

Information about agriculture, education, and the community is prerequisite for teachers to work with the advisory committee in proposing changes to enhance voca-

tional agriculture offerings at the local level. Obviously, specific changes will vary from community to community, but let us suggest some possibilities. 1) Programs may be adapted to include instruction in the areas of agribusiness and related services. This would seem to be appropriate for communities in most rural and suburban settings in this country. Careful consideration must be given to the proper mix of production information as applied to the business setting using realistic examples which relate to the needs of all students in the changing agricultural industry. Also, the emphasis on supervised occupational experience programs of students should reflect both the objectives of the students and the instructional program. 2) Expanding opportunities for part-time farmers in the area of horticulture production should also be examined. Intensive vegetable and truck farms, nurseries, or self-pick operations provide viable alternatives for small farms. This suggests curricular changes and/or facility modifications such as adding a small greenhouse or land laboratory facility. 3) In some programs, an increased emphasis on agricultural mechanics would be appropriate to provide students with the competencies needed to work in the fabrication and machinery repair industry as it relates to agriculture. 4) Finally, the need for adult education in agriculture should be examined. The needs of part-time farmers for agricultural information centered around basic production and management practices may differ from those of the intensive financial management programs needed by commercial farmers. In addition, the area of information for adults in terms of gardening and home grounds improvement is a potential in most communities. Instruction in the area of agribusiness management and working with employers on supervising employees is an avenue little explored or provided by teachers of vocational agriculture for adults in their communities. However, these appear to be viable possibilities based on the changing agricultural industry.

Summary

Finally, the vocational agriculture teacher, in concert with the advisory committee, should project facility, equipment, personnel, and programmatic needs for one, three, and five years. Such plans should accommodate the goals to be achieved and the resources needed to meet each goal.

With adequate planning, we should be able to enhance vocational agriculture programs on the local level by making positive adjustments. Such adjustments should reflect changes in agriculture, education, and the communities in which we work. Planning takes time; however, adjustments to enhance local efforts are the key to viable and timely programs of vocational agriculture.

Information for Contributors . . .

The 1987 Themes Are In the July, 1986 Issue.

Contact the Theme Editors and Share Your Ideas With the Profession.

BOOK REVIEWS

AGRICULTURE: FOUNDATIONS, PRINCIPLES AND DEVELOPMENT by J.R. Raeburn. John Wiley & Sons Ltd., Copyright 1984, 329 pages.

The author states that the purpose of this book is to "provide an overall picture of agriculture that is useful as an introduction, and as a general guide and frame of reference when particular questions or further studies are pursued, when information is stored, and when revisions and reassessments are desirable." In this endeavor, the author has succeeded. In general, the book is a useful summary of the Agricultural System that goes beyond a regional approach. Data are used for nine groups of farms from around the world that have very different conditions. The book can be used as a text for post-freshmen agricultural college students, as a guide or reference for anyone interested in agriculture, as a reading supplement for students of economics, history, business management, science, sociology, and engineering, and as a stimulation for further studies. Although introductory in intent, there are some areas requiring basic knowledge and understanding of certain principles in subjects not necessarily known to beginning students — economics, for example. Further, the summary diagrams of flows on pages 34, 110, 141, and 191, although simplified, would be difficult to appreciate without background or additional explanation. The book is divided into six parts (Introduction, The Biological Sub-system, The Work Sub-system, The Farm-Economic Sub-system, The Socio-Economic System and Agriculture, and Introduction to Policies) with 23 chapters. Chapters are divided into descriptive topics and subtopics for easy outlining by students and referencing by all readers. However, some sub-topics that are described with only one sentence, could be consolidated to improve coherency. References and further readings offer a realistic blend of recent and classical literature. Overall, the book provides an excellent summary of the systems approach to agriculture that is both historical and contemporary in perspective. It demonstrates the vastness of agricul-

ture and its interrelationships with the environment and activities in our daily lives.

Robert O. Blanchard
University of New Hampshire
Durham, New Hampshire

POWER TRAINS — COMPACT EQUIPMENT: FUNDAMENTALS OF SERVICE (FOS) by the Editorial Staff, Fundamental Writing Services, John Deere Service Training. Moline, Illinois: Deere & Company, 1983.

This is one of the manuals in the Fundamentals of Service (FOS) series covering compact equipment systems. Three other manuals in this series cover electrical systems, engines, and hydraulics. A teacher's guide, student workbook, and a set of 35 mm color slides back each manual. Users of this manual will gain a greater understanding about testing and repairing of power trains found on common compact equipment.

Power trains covered in this manual are limited to equipment rated up to 40 PTO horsepower. This manual discusses power trains found on such equipment as chain saws, snow blowers, powered hole diggers, riding mowers, lawn and garden tractors, compact loaders, and utility tractors.

The nine chapters are devoted to power trains transfer and control power; features of belt, chain, and gear drives; power trains in compact equipment; clutches; mechanical transmissions; hydrostatic transmissions; differentials; final drives; and power take-offs. An appendix which includes a section on definition of terms, a suggested readings section and an index complete this fine manual. There are many excellent illustrations, several of which are in color, along with hundreds of photographs to enliven the text and to make the manual very useful.

This manual would be an ideal choice for a text for students in trade or technical school or high school.

Donald L. Siefker
Ball State University
Muncie, IN 47306-1099

THE AGRICULTURAL FIELD EXPERIMENT — A STATISTICAL EXAMINATION OF THEORY AND PRACTICE by S.C. Pearce. Chichester, UK, John Wiley & Sons, 1983, 335 pp., no price given.

This book gives a sophisticated overview of experimental research design as used in agricultural experiments. It consists of 10 chapters with the titles of 1) The Experiment in Context, 2) Simple Experiments and How They Can Be Improved, 3) The General Case of Block Designs, 4) Some Useful Design Concepts, 5) Classes of Design, 6) Other Blocking Systems, 7) The Spoilt Experiment, 8) Interactions and the Confounding of Interactions, 9) Some Special Topics, and 10) The People Involved.

The first chapter and the last chapters were quite interesting. The first chapter, The Experiment in Context, emphasized the historical perspective of experimentation in agriculture. It discusses the influence of such researchers at Fischer, Yates and how the Latin Square got its name. There is also interesting discussion of generalization of results and the plot technique. Chapter 10, The People Involved, discusses the decision-makers for experimental research. It also includes suggestions on the role of the biometrician and data recording.

The author lives and has worked in Britain. Examples of British agriculture are both interesting and confusing to Americans. Professor Pearce obviously has a rich background in both agriculture and statistics.

Overall, the book contains a sophisticated explanation of agricultural experimentation. It has a heavy emphasis on statistics. It is recommended for a reference in advanced graduate courses with topics on research and/or statistics.

John Hillison
Virginia Tech
Blacksburg, VA 24061

Stories in Pictures

Staying Current With Trends In Small Animal Care



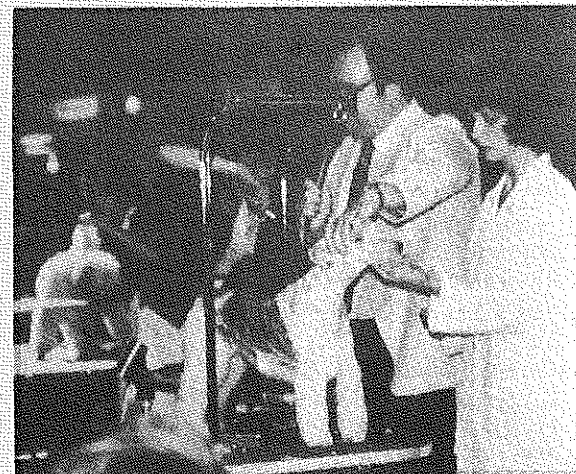
Resource people can also be used to judge at local skills contests.



Student achievement can be a way for instructors to evaluate their progress in keeping up with changing industry information.



Dog shows can keep instructors on the cutting edge of the latest in grooming and handling tips, as well as serving as a refresher on breed identification.



Lectures, seminars, workshops and demonstrations presented by trade and industry organizations are among the best ways to continue one's education and to learn what is new in various fields.

(All photos courtesy of the
Northwest Career Center, Dublin, Ohio.)