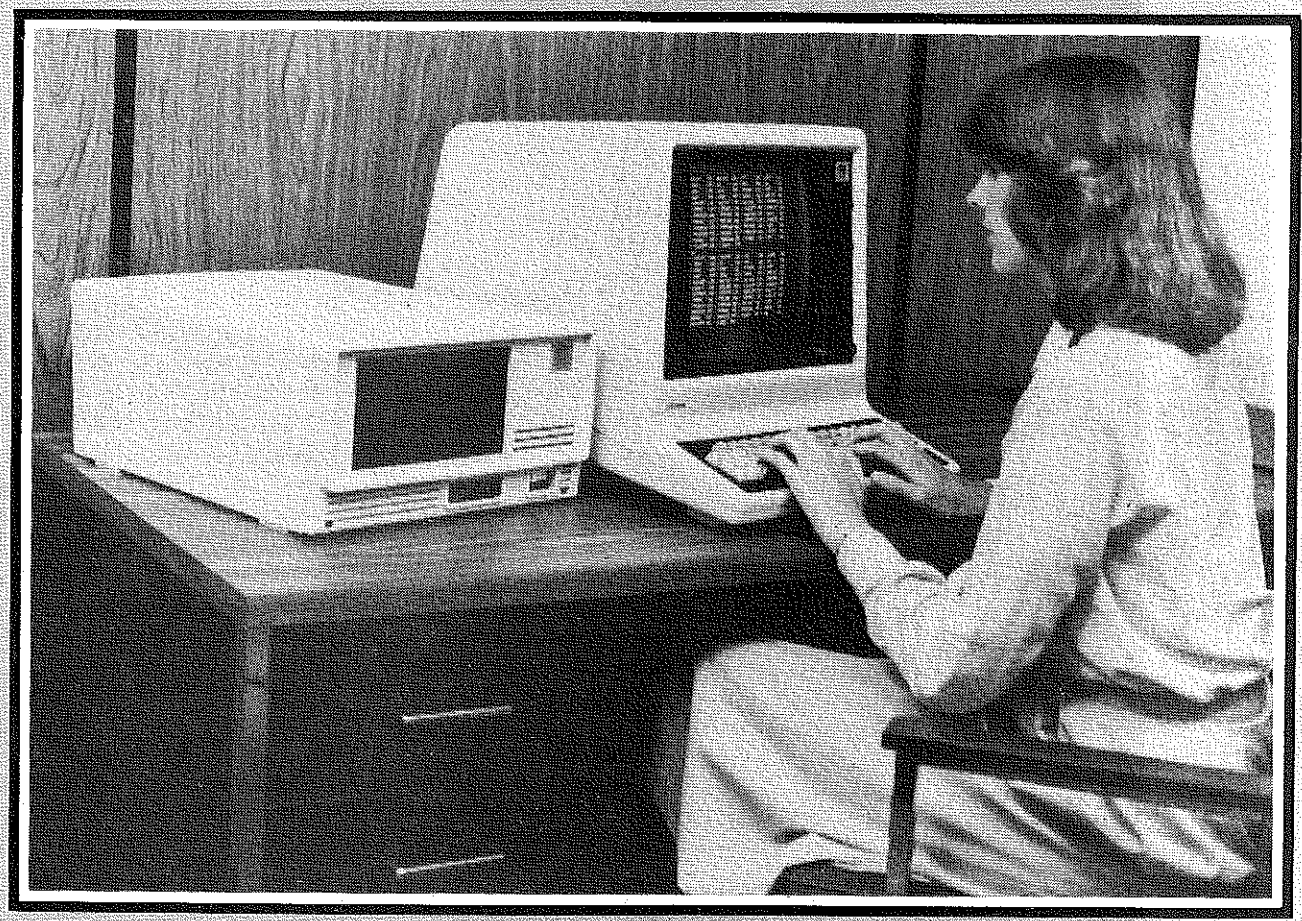
The
Agricultural Education
Magazine

January, 1982
Volume 54
Number 7



THEME: Computers in Agricultural Education

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PUBLICATION INFORMATION

THE AGRICULTURAL EDUCATION MAGAZINE (ISSN 0002-144x) 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 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.

EDITOR'S PAGE

Program Redefinition: Are We Losing Our Parts?

BY JASPER S. LEE, EDITOR
(The Editor also serves as Professor and Head, Department of Agricultural and Extension Education, Mississippi State University.)

Programs of vocational-technical education in agriculture are currently undergoing redefinition. As the trend is headed, our programs are increasingly becoming school-based. Classroom-laboratory instruction and certain areas of the FFA are receiving considerably more emphasis than the important area of practical, real-world experience (we often refer to this as supervised occupational experience-SOE).

The components of vocational-technical agriculture programs may change through default or through leadership. Default means that we simply let things occur without effort to correct them even when they may not be in the best interest of the program. Through leadership, we are able to take the initiative needed to direct the program to ensure that it is what professional educators feel it should be.

A definition which excludes SOE is a definition which neuters vocational-technical agricultural education. Excluding SOE would be very damaging. Many of the awards programs in the FFA are based on SOE. The application of classroom and laboratory instruction occurs in SOE. Somehow a way must be found to enhance SOE.

With coordination by staff members at the National FFA Center (primarily Bob Seefeldt), a thrust is underway to again make SOE a high priority in vocational-technical agricultural education. A national committee of teachers, supervisors, and teacher educators has been at work on this for over a year. The culmination of the work will be a national Supervised Occupational Experience Workshop in July, 1982. Each state will send a team of four individuals to be trained. These individuals will return to their respective states to conduct training programs for individuals at the local level.

Any redefinition of program components must be by leadership and not by default. It is likely that 1982 will be remembered as a year of commitment to quality in vocational-technical agricultural education. By working together, we can help to ensure quality. We must not let SOE be lost!

The Professional Meeting Crunch

There are a number of professional meetings for agricultural educators each year. Some are very beneficial. Others are good to attend but occasionally lack substance. Is it time to re-think our professional meeting schedule? Are there alternatives which would be just as beneficial?

A highlight of the year is the annual AVA Convention and the accompanying meetings of affiliated organizations. This annual gathering is a big affair held in a major city occupying a sizeable portion of the hotel and convention facilities. Sessions are held on almost every topic of interest to vocational educators. To participate in preconvention activities and the convention itself requires almost a full week of time. Meetings such as those of the Vocational Education Equity Council (VEEC), National Association of Vocational Education Special Needs Personnel (NAVESNP), and American Vocational Education Personnel Development Association (AVEPDA) are held along with those of the agricultural affiliates, like NVATA.

Regional conferences and seminars are held throughout the year. Some are for teachers while others are for supervisors and/or teacher educators.

Most states have some type of annual conference, either for all of vocational education or agricultural education. There may also be various professional and inservice meetings on a state-wide or district basis. In addition, there are agricultural events such as field days, tours, and commodity group meetings.

How do all of these contribute to improved vocational-technical agricultural education? What are the returns on the investment of personnel time, travel, lodging, and food to attend the meetings? It is time to give careful consideration to the investments made in meetings. Would biennial meetings be as effective as annual meetings? Could teleconferencing be used so that people in the profession who couldn't attend could benefit from the educational activities?

The time is at hand when agricultural educators will be forced to make decisions about meetings. This will necessitate good judgement in finding acceptable alternatives to encourage professional growth.

Are You Ready For Computers in Agriculture?

By James G. Leising, Theme Editor
(Editor's Note: Dr. Leising is Supervisor of Teacher Education in Agriculture at the University of California, Davis, CA 95616.)

In recent years, profit margins have narrowed for the agricultural industry. A massive and urgent need exists for finding information faster and for obtaining and using new technologies more efficiently to maximize profits. There is no question that computer technology has advanced to the point where it can meet information transfer needs. Education has been slow to implement this new technology.

The primary reasons, according to Molnar (1979), have been the high cost of hardware, limited memory, and difficulty in developing software. Also inhibiting the integration of computer-assisted instruction in the classroom has been the almost intimidating language and general mystique that have surrounded computers. Many of these problems still exist today, but dramatic changes in computer hardware have resulted from the development of the large scale integration chip. The cost and size of the hardware have been reduced. Easy-to-use authoring languages have been developed which have resulted in greater availability of courseware for the classroom teacher.

The significance of all this technological advancement is that even financially-limited school districts will soon be able to afford a computer in every classroom. Furthermore, the implications for changing the role of the teacher to one of diagnosis and prescription of the individual rather than playing the role of the fountain of knowledge is fantastic. We are several years away from having computer-assisted individualized educational plans for every student. However, there is little question that all vocational agriculture teachers should receive some type of education to assist them in meeting this important challenge of the 80's, that is "integrating computer-assisted instruction as a new teaching strategy."

This issue of The Agricultural Education Magazine focuses on the recent changes in computer technology and ways that this technology is being used to improve the quality of agricultural education. Are you ready to meet the challenge?

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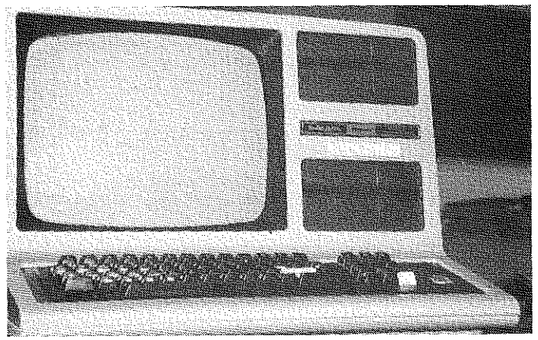
The Cover

Microcomputers should soon be found in every vocational-technical agricultural education program. The cover shows a Control Data 110 microcomputer which has both processing and training applications for agricultural education. (Photograph courtesy of William A. Bentzin, Box 0, Minneapolis, MN 55440.)



The TRS-80 Model III Microcomputer is commonly used in vocational agriculture programs. Some vocational agriculture departments have several available for personal and class project use by students. (Photograph courtesy of Chuck Wiseman, Big Walnut High School, Sunbury, OH 43074.)

Students enrolled in vocational agriculture at Big Walnut High School, Sunbury, Ohio, are shown using a microcomputer to keep SOE records. The school developed its own computer program in harmony with information required in record books. (Photograph courtesy of Chuck Wiseman, Big Walnut High School, Sunbury, OH 43074.)

A New Frontier for Vo-Ag —

Computers in Agriculture

By Rick Foster
(Editor's Note: Dr. Foster is Assistant Professor of Agricultural Education, University of Idaho, Moscow, ID 83843.)

Through the years, several factors have been recognized as being responsible for tremendous advances in food production. The use of hybrid seed and commercial fertilizers and the increase in machinery size and capacity have all been credited with "revolutionizing" agriculture and agricultural production. These innovations have increased agricultural efficiency by effectively reducing the number of persons needed to produce food and fiber for our country and millions of people around the world.

Where will the next great breakthrough be in the agricultural industry? While production agriculture has benefited greatly from technological advances during the 1970's, the big breakthrough in the future will be in the method by which farmers make their management decisions. More than ever before, management decisions will make the ultimate difference between a profit or loss. These decisions will be made easier with the continued development and adaption of computerized decision-making tools.

Vocational agriculture programs have traditionally accepted the responsibility of preparing students for entry into production agriculture and agribusiness. When providing this service for an industry as technically advanced as agriculture, our secondary and postsecondary programs must become deeply involved in teaching the use and capabilities of various computerized decision-making aids.

Computers have been continually reduced in size and complexity so that now an increasing number of producers find them adaptable to their farming needs. Costs have declined as well, making the use of a computer system just as attractive of an investment as purchasing a new piece of farm equipment. Currently there are three basic kinds of computer systems available for on-farm use and for inclusion in vocational agriculture programs; programmable calculators, microcomputers, and remote terminals. Each system has its own advantages and disadvantages.

Programmable Calculators

Programmable calculators are hand-held machines similar to the traditional calculators used by millions. However, unlike the typical calculator, one that is programmable has the ability to read and store data, analyze data according to prescribed instructions, and indicate answers on the display or on a printout. Programmable calculators provide decision-making assistance by receiving instructions (programs) on a magnetic strip, receiving input specific to the problem in question, analyzing the information, and displaying the answer.

Examples of programs include those which calculate sprayer calibrations, fertilizer needs, protein supplement requirements, adjusted weaning weights, and ration analysis.

Using the programmable calculator can afford a farm manager an opportunity to analyze problems with previously unavailable sophistication and accuracy. The cost of the programmable calculators currently ranges from $100 to $800, depending on brand and optional equipment purchased. They also have the advantage of being very portable, allowing the producer to determine solutions while in the field or in the feedlot.

When considering the programmable calculator, one must keep in mind that it is not a system that is capable of storing and processing farm records. Output from programmable calculators depends on accurate information available for input. As with any computerized decision-making system, bad management decisions can result from not having correct or appropriate data to analyze.

Programmable calculators could be effectively utilized in vocational agriculture classes, especially in farm management instruction, for making real-life decisions using the programmable calculator.

Microcomputers

One of the latest farm decision-making systems on the market is the microcomputer. These units have the capability to handle large amounts of data useful in making management decisions. Microcomputers are useful in storing, processing, and analyzing farm records as well as assisting in making such specific decisions as ration formulation. Large quantities of software (specific programs used in conjunction with microcomputer equipment) are being developed for all facets of agricultural production as well as for hundreds of other uses.

A farmer may use a microcomputer to determine the marketing strategy for beef animals and to maintain farm records while children in the family use interactive spelling and reading programs to assist them in their school work. Microcomputers provide the flexibility to assist in a wide variety of management decisions, yet offer an opportunity to individualize programs to specific enterprises.

Actual computer equipment is called "hardware." A complete hardware system generally consists of the micro-

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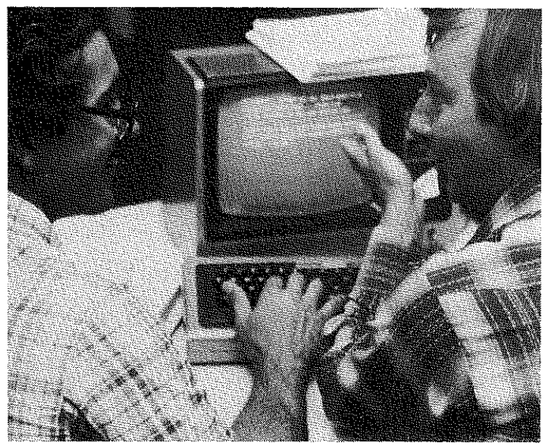
computer itself, a printer, a TV screen or monitor, a keyboard, and a disk drive. Programs are stored on "disks" and inputed into the computer via the disk drive. The cost of microcomputers continues to decline. A comprehensive system will start around $2,000 and increase with the capacity of the computer and the amount of optional equipment purchased.

Although keeping and analyzing farm records is a prime attraction to producers, the best use of a microcomputer may be in making day-to-day decisions. Today's farmer might use the computer to determine the expected return from marketing steers, maintain breeding and feeding data for individuals or groups of cows, or determine least cost rations for the swine herd. An operator might use the computer to keep and analyze labor/payroll records or maintain a depreciation schedule for farm equipment and machinery.

Microcomputers are becoming increasingly available to vocational agriculture programs across the country. Many school systems have recognized the technological push and have purchased microcomputers. Since computer applications are such naturals for agriculture, use in the vo-ag department is easily justified.

Remote Terminals

A third management decision-making aid is available with the use of a remote terminal. Remote terminals can be used in a farm office to access a large centralized computer, usually on a university campus. Terminals resemble a typewriter keyboard and are electronically linked to the source with a telephone acoustical coupler. Results can be printed on paper or displayed on a television screen. A microcomputer can also be adapted to serve as a remote terminal with the purchase of additional peripheral equipment.



Agricultural professional enrolled in an inservice program at the University of California (Davis) are shown learning to use a microcomputer. (Photograph courtesy of James Leising, University of California, Davis)

Remote terminal connections can be leased or purchased for $1,000 - $3,000. Land-grant universities, Cooperative Extension Service offices, and many commercial firms may provide access to producers for a user's fee, the cost of the long-distance call, and actual computer time used.

Three major remote terminal centralized systems are available. These are: AGNET, at the University of Nebraska; TELEPLAN, at the University of Michigan; and CMN, at Virginia Polytechnic Institute and State University. Several states subscribe to these systems, so a farmer need not reside in the originating state to participate.

Like the programmable calculator, the remote terminal is primarily an analysis tool. However, because of the size of the centralized unit, the problems can be much larger and more complex than those appropriate for a programmable calculator.

Programs available are oriented to management. However, the AGNET system also provides a message or "mailbox" program to route communications to specific users or groups. It also provides up-to-date market information for all commodities at the close of futures markets each day.

The Role of Vo-Ag

Vocational agriculture programs must take the initiative in providing students with a sound basis for working with computers in agriculture. This will have to be both in specific instruction on computer usage as well as by using computer-assisted instructional techniques. Numerous efforts around the country are underway to develop computer-assisted instructional materials for vocational agriculture as well as the areas of education.

Our prime mission through the years has been to develop job skills that enable vo-ag graduates to successfully enter and progress in agricultural occupations. Today, this means an understanding of computers and their use in making management decisions. Not to address this critical instructional area is to short-change each of our graduates.

Vo-ag instructors will have to obtain inservice education in the use and programming of computers. Teacher educators will have to include computer instruction as part of preservice preparation of new vocational agriculture instructors and provide opportunities for established teachers to prepare for computer usage in agriculture. Researchers and curriculum developers will have to assume more responsibility for the development of computer-assisted instructional materials for use in secondary and postsecondary programs. Cooperation between Extension Service and vocational agriculture personnel will have to be increased if new innovations in computer management decision-making procedures are to be introduced and taught to our adult clientele.

The computer age has been upon us for some time now. It is time for vocational agriculture to accept it as the new frontier in our agricultural program and to take immediate steps to meet the challenge.

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THEME

The Computer Emerges In Agricultural Education

By Myron A. Eighmy

(Editor's Note: Mr. Eighmy is Farm Management and Agribusiness Instructor at the University of Minnesota, Technical College, Waseca, MN 56093.)

The use of computers in agriculture is increasing at an accelerating rate. Agricultural educators, who had previously chosen to place computer literacy low on their list of priorities, have become interested in computers and their application to agriculture and agricultural education. One of the first decisions that the agricultural educator must make is to determine what type of computer system should be used to teach students, agribusinessmen, and farmers. Should microcomputers, minicomputers, or main frame computers be used? To make the proper decision, one must look very closely at the clientele to be served, the availability of usable programs, and the best use of budget dollars to get the most computer for the money.

Microcomputers

Microcomputers are perhaps the least costly system available. This has been one of the leading reasons for their rapid increase in popularity. For educational purposes, the microcomputer provides the opportunity for classroom and lab activities utilizing a portable computer system. It can be transported with minimum inconvenience and operates on normal household current. This makes it possible for students to use the computer wherever the students may be. Low cost, $500-$5,000, makes the system attractive from the standpoint that additional units can be purchased out of most equipment budgets as time goes on and additional needs surface.

Microcomputer software is usually low cost, $10-$1,000 per programmed diskette or cassette tape. However, software (programs) may be difficult to find to suit all special classroom and student needs. There is also the problem of keeping the programs from "walking away" and erasing.

Minicomputers

Minicomputer systems are usually higher priced than most microcomputer sytems. Minicomputers are usually found in agribusinesses or on farms having high volumes and high-speed record and accounting needs. A limited amount of agricultural software is readily available at this time for use with minicomputers.

Main Frame

Main frame computer systems were the first type of technology available to educators. Programs are accessed via remote terminals located at the school or office. The user pays a fee for computer time used as well as for long distance telephone hook-up. This type of system is called a "time-share system." Often, the telephone bill is greater than the computer expense incurred during usage periods.

Main frames provide the user access to a wide variety of programs that may be of value in classroom exercises and demonstrations. Programs are usually written in a format that is easy to follow and data is easy to interpret. Time-share systems usually make new programs available to users periodically as well as the necessary updating of old programs. Time-share systems also have a few disadvantages, too. One common complaint is that instructors are sometimes unable to complete the telephone hook-up because of either telephone line problems or because the main frame computer has all its hook-up lines busy. This is a very frustrating situation when you are in the middle of a class and want to present a demonstration or exercise. Some time-share systems require single-party telephone lines. This is quite a problem in many rural areas, especially with on-the-farm use.

What Combination?

My experience in teaching computer-based farm management courses has revealed that a combination of the microcomputer and the main frame works very well. If I had to choose one or the other, I would, without hesitation, choose the microcomputer.

The microcomputer provides some very significant advantages over the other alternative systems. The major advantage is that microcomputers provide timeliness of use. The system is an in-house system and can be used whenever and wherever desired. Once purchased, microcomputers have low maintenance costs and are a durable long-term investment, whereas, the costs of main frame use are operation expenses rather than equipment expense.

Software availability is becoming much less of a problem each day. For educational purposes, the programs are relatively inexpensive. Since programs are relatively low in cost, it is possible to build a library of programs continually as programs and funds become available. Some microcomputer firms offer special school packages that allow discounts on the purchase of additional units. Some states have purchasing contracts with computer companies that allow lower costs when bought through a state agency.

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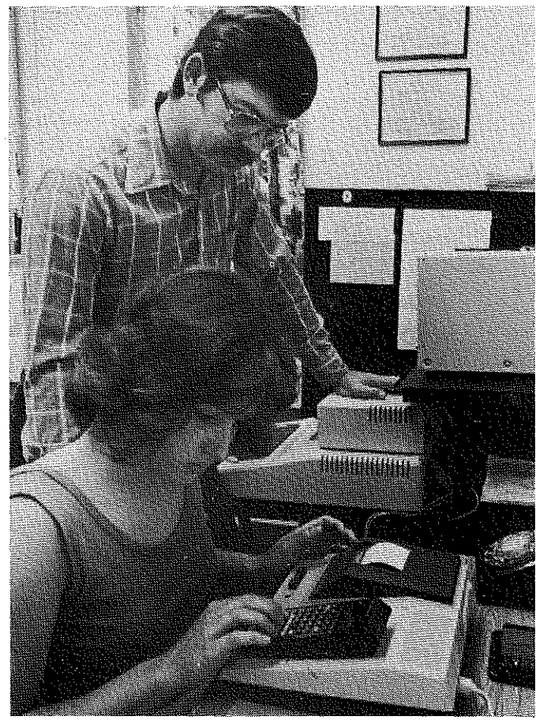
Main frame computers, too, have a place in education, especially when there is a need to run long programs. Examples of this type of program would be a whole farm feasibility study on return to farm business investment resulting from a change in the enterprise mix. These types of applications require in-depth calculations and comparisons. Other uses of main frames which are of great value are those applications or programs that require updating of data or changes in variables within the program itself. For example, changes in tax regulations could quickly make a microcomputer tax program out of date. Because time-share systems are able to change programs, they can be up-dated to include new tax rates, capital gains rates, or any other change that would effect the outcome of the program.

In short, I have found that for day-to-day educational use, the microcomputer provides the most accessibility for faculty and students, and the main frame terminal provides access to seldom used or complex programs.

How To Convince Your Budget Controller

Most agricultural educators already are feeling budgetarily squeezed. Finding the money to computerize your educational efforts can be a major headache. You may find that you will have to compromise with the school administration and nonagricultural faculty to get your first chance at computing. It will be easier to convince your budget controller and justify the expenditure if you can form a coalition with others who may have a need for computers in education.



Programmable calculators and the microcomputer are used to solve management problems after the basics of farm management have been taught. Here the author is shown instructing a student in the use of a programmable calculator.

Some people who make good "computing comrades" are math instructors, business instructors, home economics instructors, and business office bookkeepers. Get them enthused about how the computer can be used in their areas! Develop a schedule of times during the year that they would need to use the system. Then, when you can show that the system could be used enough to justify the expense, take the plan to your principal, superintendent, or whoever controls your budget. Another good technique which I have seen work successfully is the use of the vo-ag advisory committee as a spearhead in obtaining funding and justification of the system. For some reason, some administrations listen more carefully to what the community leaders say than to what faculty say in their requests for funding.

Putting The Computer To Work

Once you have determined how you will use the computer in your educational program and how to fund your "adventure" into computing, you will be ready for the key step in successfully getting the most out of your computer. It is more important to know how you are going to apply the technology and what programs will be needed than what brand or model you are going to purchase or which main frame system you are going to time-share. Programs must be identified that will meet your needs. You will soon discover that not all programs can be run interchangeably on all computer systems. For example, suppose you have determined that you would like to use a ration calculation program in your nutrition class. If the program was written to operate on an Apple microcomputer, you will not be able to use it with a Radio Shack computer unless you have the ability to rewrite the program's steps to conform to your computer. So, it becomes very important that you identify software that will be usable before you buy the computer system.

Software that has been found to be most useful allows students to apply newly learned concepts and formulas. Computers are excellent training aids when you use them to analyze "what if" situations. Some typical "what if" problems that the computer works well with are enterprise budgets, nutrition applications, and other areas that work with variables which cause changes or fluctuations in profits or yields.

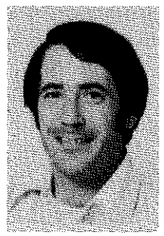
For instance, suppose you are discussing enterprise budgets and how each of the items in the budget influence profitability. By asking students to make changes in the cost of fertilizers, chemicals, fuels, or machinery costs, you can show the student how expected breakeven price and yield would be affected given those costs. This could then lead to discussions concerning marketing or other topics.

Using the computer allows much more time for discussion and management education. Students spend less time repeatedly going over mathematical problems. I must emphasize, however, that there is no substitute for having students learn the basics first! Once they have mastered the basics, they will be able to understand the reasons underlying the changes which the computer may show.

Whichever direction you may choose to take in computing, you are sure to find that your educational efforts will create enthusiasm and interest both at work and in the community. Vo-ag programs offering computer literacy and computer usage courses will find a willing clientele of all ages. Those who have already used the computer agree that it will continue to be a dynamic management tool for the rest of the century. The 1960's and 70's were the age of the diesel. The 1980's and 90's will certainly be the age of the computer in agriculture.

THEME

Using Microcomputers In Animal Health Management



By Robert Harmon, Jon Wolfson, and Ben B. Norman

(Editor's Note: Mr. Harmon and Mr. Wolfson are seniors in the School of Veterinary Medicine and Dr. Norman is Extension Veterinarian at the University of California, Davis, CA 95616.)

Progressive livestock owners have generally kept good health and production records about their animals. These records help them in making important management decisions. Microcomputers constitute a tool to process and evaluate such records with high speed, so that decisions can be made on a timely basis. With the aid of autotutorial programs, veterinary students are instructed in programming microcomputers to evaluate health and related production information. The main reason for using veterinary or animal science students rather than computer science students to write these programs is to bridge the language barrier between persons in agriculture and those in the computer sciences.

An easy way to "break the ice" with agriculture and veterinary students and staff is to provide open access to a microcomputer with game programs. There are even some good agriculturally-based games available ("Dairy Farming" in the May, 1980 issue of SOFTSIDE Magazine). The primary goal is not to train programmers, but to train persons in agriculture and veterinary medicine that are not afraid of computers and are able to make full use of computer technology. Microcomputers have opened great opportunities for application in agriculture and veterinary medicine. We are working on several projects, some of which are described below.

Monitoring Death Loss

Our first experience in writing programs to be used in the field was with a feedlot death loss program. We took a set of reports that were being done by hand and wrote a program to generate those same reports on a microcomputer. We then placed this program with a feedlot veterinarian in Imperial Valley and "supported" it for one year. Supporting a program includes adapting it to the particular requirements of a user (livestock producer or veterinarian), refining or streamlining it, debugging it, and providing consultation when problems arise.

Unfortunately, a state institution such as the University can not support a program in the long run. A means should be found to turn the program over to the private sector. This program was written by a beginning programmer with little instruction. Learning to program is mostly autotutorial and requires little instructor time.

Monitoring Dairy Reproduction

A program to monitor reproductive performance in dairy herds has been developed. The objective is to take existing data already being collected by the dairyman and the veterinarian and to produce timely summaries of the data which will help in spotting troubles before they become major problems. Some of the summaries generated by the microcomputer concern heat detection, inseminator efficiency, and bull fertility.

Computerized Swine Farms Records

As the size of production units increases, the demand on a manager's ability to produce maximally at the lowest cost reaches the breaking point. A large farrowing unit may have 3,000 sows producing 50,000 market hogs per year. Keeping records manually on all the production and health data is almost impossible. Making sound and timely management decisions based on such records is impossible. A swine health and production management program for microcomputers has been written. This program helps monitor litter size, death loss, weight gain, and medicine costs. It produces reports which enable the manager to detect problem areas at an early stage and to correct them before they become economically important.

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Using Microcomputers In Animal Health Management

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Beef Herd Goes on Computer

Sometimes you just can't say no! Such was the case with a cow/calf producer who desperately wanted help in developing a computerized beef cow record system. Although programs developed by the University are public domain, this producer provided us with a computer and his manual record system as a basis for development of a program. The program is now being field tested by the producer. The reports provide him with inventory, weigh-up worksheets, and production ranking. In addition to the special records programs we provided, this producer is using standard business programs for word processing and business management. In many cases, we have found that the business use alone more than justifies the purchase of the computer.

Minimum Requirements

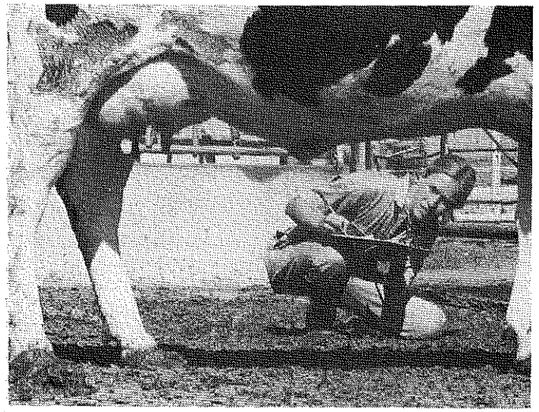
One of the hardest decisions to make in entering the microcomputer field is to determine what equipment to buy. One should select a computer only after deciding what software you will need. Then choose a computer that will be compatible with as much of the software you have chosen as possible. For us, the computer of choice must meet these minimum standards:

1. Run with CP/M Operating System;
2. Have at least 64K Bytes of Random Access Memory (RAM);
3. Have at least an 80 x 24 character screen;
4. Have 8" floppy disk drives (or hard disk); and
5. Have local sales and service support of this equipment.

The specifications allow for enough memory to run most microcomputer programs on the market today and includes an operating system that will enable the sharing of programs with almost all the microcomputers available. It is also important to purchase from a local dealer who can provide long term support when trouble occurs — as it will.

Summary

The objective of teaching students to use microcomputers and to write programs is to enable them to better communicate with the computer specialists as to what is really needed and to give them an understanding of potential uses. We hope that as these persons enter the livestock industry, they will bring with them this new technology which will aid producers in maximizing resource use and profit potential. Although many instructors don't have the background or resources to teach these skills, it should be their reponsibility to provide the students access to computer instruction somewhere in the curriculum. It has been our experience that once students are introduced to computers, it may be a problem to set them back to other subjects.



Collecting data is an integral part of any computerized program in livestock management. Betsy Webb, a senior at the University of California (David), is shown collecting data on dairy cattle.

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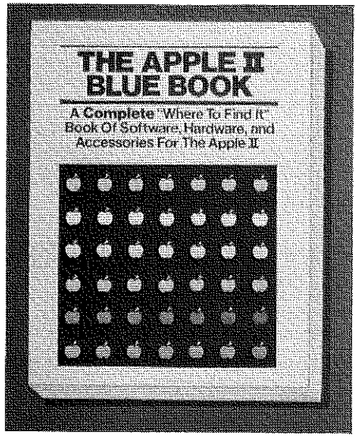


Where To Find Software and Hardware

By James C. Moran

(Editor's Note: Mr. Moran is with Visual Materials Incorporated, 4170 Grove Avenue, Gurnee, IL 60031.)

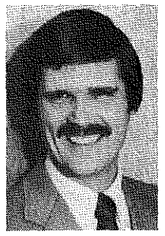
More than 5,000 computer software programs and hardware options are described in VMI's new APPLE COMPUTER "BLUE BOOK". This complete "where-to-find-it" guide describes each program and identifies names and addresses of more than 400 producers. Each listing is conveniently categorized by general application by subject for Business, Engineering, Education, Games/Household programs as well as peripheral equipment and accessories.

This 400 page volume is an essential reference for owners of Apple Computers as well as for comparison purposes for those using other microcomputers.

Available for $24.95 plus $2.00 for shipping and handling from Visual Materials Inc., 4170 Grove Avenue, Gurnee, IL 60031.

THEME

How Ohio Teachers Learn Microcomputers



By John T. Starling and David B. Shewmaker

(Editor's Note: Dr. Starling is Professor, Department of Agricultural Education, The Ohio State University, Columbus, OH 43210. Mr. Shewmaker is Computer Consultant with Advanced Genetic Technologies, Inc., Athens, OH 45701.)

Narrowing profit margins, escalating interest rates, fluctuating weather patterns, and increasingly tight money have made the need for more accurate data and analysis more critical than ever before for the proper financial management of individual farm and agribusiness operations. One of the tools that has tremendous potential in helping operate farms and businesses with a higher degree of sophistication is the microcomputer. Many agriculturalists realize the potential that microcomputer systems hold but they are uncertain about how to implement such a system. Profuse jargon and unfamiliar topics make individualized entry into this area difficult.

A Beginning

In order to meet this critical need in Ohio, it seemed that the logical place to begin was to organize a workshop entitled "Using Microcomputers in Agriculture" for a group of Farm Business Planning and Analysis teachers. Since these are full-time adult teachers who are responsible for planning and conducting a farm business analysis program for young and adult farmers, and have direct contact with farmers throughout Ohio, they are in the most favorable position to help farmers with new innovations.

During the month of June, a two-week workshop, sponsored by the Ohio Department of Education, Division of Vocational Education, was conducted at Tri-River Joint Vocational School. Fifteen Farm Business Planning and Analysis teachers from throughout Ohio participated in the workshop.

Dave Shewmaker, a purebred hog breeder with 11 years of computer programming experience, was employed as the instructor.

The intent of the workshop was to give the teachers: (1) a comprehensive update of the latest developments in the field of agricultural computing, (2) detailed instruction in microcomputer programming with the major emphasis on agricultural applications, and (3) an opportunity to discuss the computing needs of the farmers within their service area and the role Farm Business Planning and Analysis teachers might assume in helping farmers to meet their needs.

Workshop Content

A large portion of the workshop time was spent learning the process of program construction. During the two-week period the participants wrote a sow productivity indexing program which can be used by the instructors, in their local communities, to evaluate and rank the reproductive efficiency of sow herds. As a result of this exercise, the instructors came to understand that programming is a very time consuming and exacting process which probably will require more time than most farmers will be able to devote to such a project.

There will undoubtedly be some good software developed by exceptionally gifted farmers, but most farmers prefer to purchase "canned" or prewritten programs. There is a tremendous need for much more good agricultural software.

Perhaps the outstanding feature of the workshop was the fact that seven microcomputers were available for hands-on experience. The workshop participants spent most of the afternoon sessions working with Apple 2, Radio Shack Models 1 and 3, and Commodore 2001 and 8032 computer systems.

Several commercially prepared software packages were examined by the Farm Business Planning and Analysis teachers. These included a word processor, general accounting system, hog production simulator, genetic analysis, and data base management.

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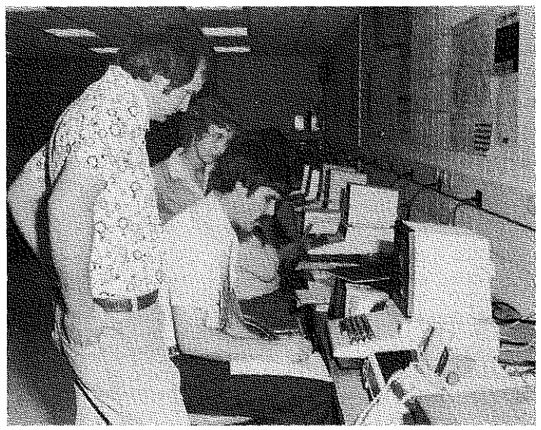

Ohio Farm Business Planning and Analysis instructors are shown learning microcomputer skills in a workshop.

How Ohio Teachers Learn Microcomputers

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Considerable time was spent in evaluating the role the farm business analysis program and the instructors will play in the future as farm records become more and more computerized. The immediate educational needs of the farming community and the role of the farm business analysis program in meeting this need was discussed in some detail.

The Result

As a result of this workshop, Farm Business Planning and Analysis instructors are now in a position to return to their local communities and at least begin informing their participating farmers of some of the opportunities presently available through microcomputers as well as make them aware of the many pitfalls that need to be avoided.

This workshop was only a beginning and Farm Business Planning and Analysis instructors will continue to be involved with microcomputers. Another workshop should be conducted for the instructors who could not attend this year and regional meetings need to be held throughout the state to update and continue programming instruction.

THEME

Opportunities With Computer Assisted Instruction

Computers! Computers! Computers! We've got computers coming out our ears! The feedstore uses them to determine ration mixtures. The elevator uses them to maintain inventory control. Producers are using them daily to keep and analyze farm records. Is there any way to prevent the invasion of our agricultural world by these industrious little super brains?

The answer, obviously, is no. The computer age has hit the agricultural industry full force and the modern producer and agribusinessman couldn't be happier. In a few short years, the advent of tiny integrated circuits — or chips — has enabled a $2,000 table-top microcomputer to do the work of the multi-million dollar, room-size computer of a decade ago. The applications for which microcomputers can be adapted are endless and the agricultural industry has been quick to seize upon the opportunities that are presented.

Agricultural educators must realize the benefits of using computer technology in the classroom. If one of our primary objectives is to develop the occupational skills and knowledge needed to enter and progress in an agricultural occupation, then an understanding of microcomputers is essential.

To gain this understanding, students need instruction in the selection, use, and maintenance of the microcomputer. Direct instruction on the operation of a microcomputer system can be reinforced through a comprehensive program of Computer Assisted Instruction (CAI) throughout the curriculum. The computer becomes not only a management decision-making aid, but also an educational method of instruction.

What is CAI?

If you recognize the acronym, CAI, you are part of the teaching minority who has attained some basic computer literacy. CAI (computer assisted instruction) has been around since the inception of the computer. It is currently,

By Rick Foster and Marvin Kleene

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however, finding a new prominence in the classroom as an educational tool.

CAI is a process in which the learner interacts directly with lessons which are displayed on a computer monitor or on paper from a printer. CAI lessons can be divided into four categories: drill and practice, tutorial, simulation, and problem solving.

The drill-and-practice format is designed to help students master a subject after the concepts and principles have been taught by the instructor. These programs allow for repetition of similar problems and are structured to give the student immediate feedback. Correct answers reward the student with an encouraging message to "keep going" while wrong answers receive a sympathetic "try again" message. Drill-and-practice instructions have had impressive results in enhancing learning over conventional instruction in a number of experimental student groups (Taylor, 1974). It also offers additional educational assistance for disadvantaged students requiring individualized instruction.

The tutorial format presents the computer as the teacher. The principle or concept is "taught" on an interactive basis with the student. The lesson asks questions to which the student responds and, if correct, the lesson progresses. If the answer is in error, the question may be repeated or remedial work completed until the correct answer is given. Tutorial instruction tests comprehension and performance, corrects the errors, and retests. There are relatively few of these types of programs for agriculture. More will be available as individualized learning activity packets (LAPs) are revised and adapted to the computer.

The simulation format opens the door to many possibilities for the student. Simulation provides the student an opportunity to run a farm in the 1800s, ride a covered wagon and survive the Oregon Trail, or feed a hungry nation with limited resources and still make it to the next class on time. Simulation poses a particular problem to which the student must provide specific answers by reviewing the activity, assessing the alternatives, and making a decision. The computer interjects random hazards into the lesson (i.e., drought, Indian attacks, etc.) that represent real life situations. It allows the student to examine the forces at work in the simulation and experience the penalty or reward for making various decisions.

The use of CAI for problem solving helps students obtain a greater understanding of problem strategies (Naval Personnel Research and Development Center, 1975). The computer program is designed so a student must analyze a problem and find the solution. This allows the student more time to dwell on mastering concepts, principles, and relationships for greater comprehension of the problem.

A slightly altered form of problem solving is evident in agriculture. These programs are decision aids and the problems are generated by students and farmers. The computer program provides the format and power to complete the numerous calculations necessary for solving the problem. These decision aids can be important tools for the agribusiness student and manager.

Developing Student Interest

There are many educationally sound ways to introduce students to a microcomputer. Usually student interest is very much alive since they probably have already had contact with a large number of electronic games and home computers. Focusing student interest toward educational applications becomes the greater challenge!

Getting students off to the right start takes a great deal of planning. Student and teacher expectations may be very different. While you are thinking CAI, they may very well be thinking space invaders! Plan for some discussion time with your students so everyone will understand what is going to occur. Discuss and develop the basic rules of classroom use of the computer before you start operations. Remember, you are the model. If you show interest, care, and concern about your new computer system, so will your students. Demonstrate the responsible use of the computer to your students. Let them operate the computer under your guidance — remember, you bought it to enhance their education.

Games are excellent ways of introducing the computer to your students. They give an immediate sense of comradeship with the computer, providing experience without fear and education through enjoyment. When students have overcome their initial apprehension they can progress to other types of CAI programs. The use of games has then accomplished its purpose and can be relegated to the special status of reward for good work and after-class enjoyment.

Don't worry too much about hurting your system. Computers are very durable. Even if you push the wrong button, they won't self-destruct. However, care must be taken to maintain this equipment in a cool, dry area. Dust is deadly, too. Temperature, moisture, and traffic patterns should be considered in selecting a location for your computing station. If given reasonable care, computers are generally kid-proof.

Developing Classroom Strategy

Planning for long-term use of microcomputers in your classroom depends on a number of factors such as class size, length of class period, number of computers, locations of computers, type of CAI program, and teacher experience. A number of computer companies have completed or are developing smaller capacity computers for placing multiple units in the classroom at lower prices. However, instructors may have access to only a limited number of units. The question then becomes, "What do I do with a classroom of students and one computer?" The answer is, "More than you can imagine!"

Strategies for classroom use can be categorized into three general areas based on their use: individual, small group and entire class participation. The individual student use of CAI provides the greatest flexibility for selecting programs. With few exceptions, a student can interact with all types of CAI programs. This strategy is best used for those who need additional short-term classroom assistance or for students who require extended individualized help.

A second strategy is small group instruction. It requires preplanning by the instructor and a clear description of expectations for the student. The two CAI programs which function best are problem solving and simulations. Small

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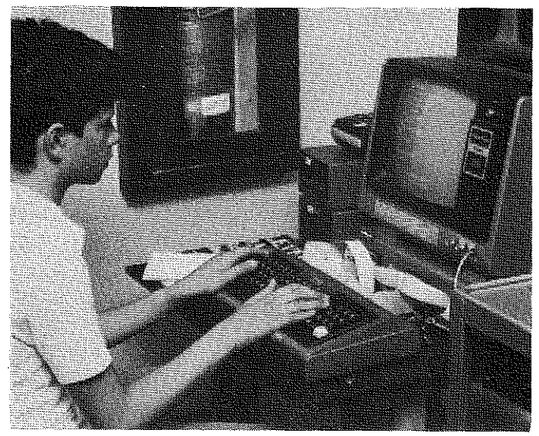

A student learning to use the microcomputer. (Courtesy of the University of California, Davis)

Opportunities With Computer Assisted Instruction

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group interaction allows students to participate in leadership, group planning, and group decision-making activities. This strategy also requires the greatest amount of teacher preparation and supervision. The instructor should help coordinate group schedules, check on progress and provide a final review of the group's achievement.

The third strategy demands some innovative thinking on the part of the instructor. Teaching an entire class with one microcomputer may require some technical changes such as hooking up one or two large-screen TV monitors so the entire class has easy viewing of the CAI program. Simulations and selected problem solving programs may be best for the beginning instructor using this method in agriculture classes. This strategy requires a separate computer operator, one or more record keepers, and a division of the class into appropriate decision-making bodies depending on the program. After the simulation is outlined, rules are established and the instructor acts as a facilitator of the discussion. Students may make various decisions necessary for the program to progress to its ultimate conclusion. The class then provides follow-up on the various impacts of the students' decisions.

Microcomputers as an Administrative Aid

Agriculture teachers will quickly see the administrative shortcuts the microcomputer can provide. Maintaining a record of student grades is as easy as pushing computer keys with the many "grade book" programs on the market. Instructors can have a grade listing for every student in each class. Written results are readily available by simply activating the printer.

Departmental inventories and budgets can also be maintained via the microcomputer. Up-to-date figures are available at the touch of a key. Classroom attendance, FFA chapter attendance, and financial reports are easily maintained. Programs can even be developed to keep the chapter point system.

The application of the computer is limited only by your imagination. With an additional control card, the microcomputer can connect you with a large university computer via a telephone acoustical coupler. The microcomputer can make day-to-day departmental administration much easier and more efficient for the innovative instructor.

Never Replace Instructor

Since the microcomputer doesn't have a brain, it will never replace the instructor. It will, however, make instruction more fun and efficient for agriculture students. The interactive nature of CAI material will allow students a chance to develop computer skills while learning about technical agriculture subject matter.

A grant from the Apple Education Foundation to develop CAI materials in the area of agricultural economics was provided jointly to the Departments of Agricultural Education at the University of Idaho and Washington State University. It is hoped that such efforts in developing computer related curriculum materials will hasten the acceptance and use of CAI instruction in Washington and Idaho.

Examples of the use of microcomputers in agriculture are numerous. However, there are still a large number of school districts that have not integrated microcomputers and CAI into their programs. With the ever-changing technology in agriculture, instructors cannot wait to get into the CAI game. We must accept the challenge to provide instruction in the use of computers and utilize computer-assisted instruction within the curriculum. If our motto is really "learning by doing," then we have the responsibility to begin now.

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BOOK REVIEW

TROPICAL PASTURE SCIENCE by P.C. Whiteman, New York: Oxford University Press, 1980, 392 pp., $28.50.

The book is written for the undergraduate and post-graduate level in agriculture science at the senior college level. It is useful as a reference or course text for the undergraduate and graduate student. The author uses tables, graphs, formulas, and equations throughout the book. He cites numerous references after each chaper.

The book has its origins in practical experiments for tropical pasture science. The first chapter reviews the climatic factors affecting pasture growth and yield. Characteristics of tropical climates are defined by area or region. Climatic factors are described in terms of radiation, temperature and moisture regimes. The influence of temperature and moisture on various grass and legume species is compared.

The next chapter covers soil transformation, translocation, and homogenization. The author describes the process of soil formation in time, parent material, climatic relief, and organism. The physical properties of soil size, chemistry, and cation exchange capacity are detailed. The author lists the various tropical soils by three classification systems.

Pasture improvement through plant introduction and evolution is discussed in the third chapter. The important features of some grasses and legumes at the genus and species level is described. The importance of adaption of the species to climate, soils and stress conditions are analyzed in some detail.

The next topic is animal production from tropical pastures. The value of native tropical pastures is discussed with digestibility and voluntary intake related to pasture quality. Proper stocking rate and grazing management is detailed. Beef and milk from tropical pastures is treated separately and classified by location and mean annual rainfall for various pastures and treatments.

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THEME

Computers In Agriculture — A Program For Postsecondary Teachers

BY JAMES G. LEISING

(Editor's Note: Dr. Leising is Supervisor of Teacher Education in Agriculture at the University of California, Davis, CA 95616. He is also Theme Editor for this issue of THE MAGAZINE.*)*

Computer technology is being used throughout the agricultural industry. As a result, employers are expecting employees to be able to use the computer and computerized information in their daily work. Agricultural leaders in California's Community Colleges are concerned about the need to develop greater student and faculty competency in the use of the computer to meet these needs. Through input hearings to determine the priorities for use of P.L. 94-482, Sub—Part III Funds in California, inservice education for community college agricultural instructors emphasizing computers and their use in instruction was identified as a priority area. To begin to meet this critical need, the Chancellor's Office of the California Community College System in May of 1980 funded a project at the University of California, Davis, to study the inservice education needs of agricultural instructors in the area of computers and provide awareness workshops.

Assessing the Inservice Needs

A project advisory committee of teachers, university faculty, and computer experts was organized to advise the project. Through a review of the literature and discussions with the advisory committee, four possible areas of inservice emerged:

(1) Hardware type and availability;
(2) Computer use and software availability;
(3) Instructor competence; and
(4) Constraints to using computer-assisted instruction.

Using these basic areas, a telephone questionnaire was developed to further assess inservice education needs of teachers in each of the above areas. Agricultural department chairs from each of the 55 California Community Colleges providing agricultural programs were selected for interviews via telephone.

Interview data were collected from 45 department chairs, or 80 percent. The data revealed that 95 percent of the agricultural departments had access to computers. However, the majority of computers were minicomputers or main frame, while only 17 percent had access to microcomputers.

Approximately 33 percent of the departments surveyed indicated that they had agriculturally related software programs and that the minority of the programs were written in some form of "basic" language. The data suggested that software development had taken place in all instructional areas. Most of the software development, however, was in the areas of horticulture and agricultural economics.

The survey further revealed that one out of every four departments had at least one instructor in their department who could operate the computer and write software programs. Nevertheless, department chairs rated improving instructor competency in operating computer hardware and utilizing existing software as the primary inservice needs of teachers. However, the need to develop additional software programs in all instructional areas, limited funding, instructor time, and computer terminal availability were listed as important topics to consider when providing inservice education.

It was apparent from the survey interview data that the majority of chairs did not perceive instructors as wanting to learn computer programming, but rather as becoming wise consumers of existing software.

Developing and Conducting the Workshops

Based on the needs assessment data and project advisory committee knowledge and experience, the project staff developed a series of one day workshops. The major objectives of the workshops were to provide an opportunity for key teachers from each community college to be exposed to the instructional potential of the microcomputer through "hands-on use" and demonstration of a variety of software programs.

Each was held at a Radio Shack Computer Store in California. The primary reason for selecting industry locations was based on the need to provide enough terminals to

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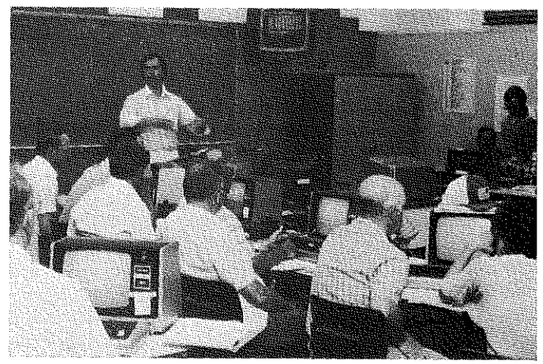

An Inservice Workshop on Microcomputers is being conducted by Russel Wilkins, a Teaching Assistant in Agricultural Education at the University of California, Davis.

Computers in Agriculture — A Program For Postsecondary Teachers

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allow every participant to operate a terminal, thus providing "hands-on" involvement. Also, it made it possible to hold the workshops in a variety of geographic locations. In addition, it provided an opportunity to demonstrate how a classroom set of microcomputers could be used in teaching and enabled teachers to get acquainted with company representatives in their area.

Microcomputer Resource Guide

It was the consensus of the project advisory committee that a series of one day workshops throughout the state would be helpful in raising the awareness level of community college agricultural instructors toward the potential of the microcomputer. However, it was the feeling of the committee and the department chairs surveyed that additional information was needed to provide instructors with background information and example software to enhance their understanding. With these ideas in mind, the project staff developed a Microcomputer Resource Guide for Agriculture. The contents included:

(1) A discussion of hardware and software available;
(2) Hardware selection;
(3) An agricultural software program index (using the Agdex System); and
(4) A list of user clubs, computer manufacturers, references and a glossary of computer terms.

This Guide was disseminated as part of the workshop and has been used in California for a variety of secondary vocational agriculture teacher workshops. Plans are to update the software section of the Guide during 1981-82 because of its popularity with teachers at both secondary schools and community colleges.

Microcomputer Motivation

Teacher evalutions of the workshops confirmed in the minds of project staff that the workshops had not only been successful in introducing the idea of computer assisted instruction, but also motivated teachers to do everything from purchasing a classroom set of microcomputers for their agricultural department to enrolling in a series of courses to learn programming. However, in the main, most teachers still wanted to become intelligent consumers of existing programs rather than programmers.

One workshop on microcomputers or one workshop on any new innovation seldom fulfills all of the individual's educational needs on the subject. It was evident from our experience that additional inservice is needed in specific areas of software and courseware developments. Furthermore, the development of a preservice computer course is needed to provide the kind of preparation that vocational agriculture teachers will need to be successful in the years ahead.

ARTICLE

Introducing Computer Awareness To High School Students

By Dan Swafford

(Editor's Note: Mr. Swafford is Vocational Agriculture Instructor at Buckingham Vocational Center, Buckingham, VA 23921. He previously taught in Savannah, Missouri.)

How much computer technology should be taught to high school vo-ag students? While at Savannah, Missouri, I developed a computer awareness unit for the farm management class. It worked well to inform and motivate students about the use of computers in agriculture.

Having very little background in computer science, I felt that I could not adequately teach a unit in operation and programming of hardware. I incorporated resource persons and field trips as a major portion of the unit on the application of computers in agriculture.

The Instruction

The unit was taught over five class periods. The first class period centered around basic computer terms and a discussion of general uses of all types of computers. From this point on, the topics would center around different types of computer hardware and how they can be used in agriculture.

The second period of instruction was lead by the local adult instructor, Milton Schroder. His topic was the TI-59 programmable calculator. He demonstrated basic operations and explained uses of the calculator in agriculture. Mr. Schroder ran several sample programs to better demonstrate how the machine may be utilized by farmers. The programs included vehicle cost analysis, swine ration analysis, feeder pig worksheet, farm loan analysis, and combine ownership. He was an excellent resource person for the discussion. He uses the TI-59 in his work with young adult farmers in the Savannah area.

The third period of instruction dealt with the use of portable remote computer terminals. Bill Wedekin, area farm specialist, University of Missouri-Columbia, was the resource person. He demonstrated the operation and application of the remote terminal for farmers. He explained and demonstrated to the students how the terminal could be connected with computers over the country. He ran several sample problems which included pig finishing budgets, family budgeting model, and investment analysis.

The fourth and fifth class periods involved field trips to nearby St. Joseph, Missouri. One field trip was made to the Data Processing Center at Missouri Western State College. Here the director of the center explained the function of the computer hardware and demonstrated its uses. Personnel from the Agriculture Department explained how the College utilized the computer in making decisions for the college farm.

Another field trip was made to Computerland, a retail computer store in St. Joseph. Here the store's programmer demonstrated several major types of personal computers currently being used by the farmers in the area. He then explained how local farmers could utilize the personal computer to keep records such as inventories, livestock production recoreds, accounts payable records, and enterprise analysis. He aided the students in using one of the computers to develop a program in maintaining the production records for one of the class member's dairy herds.

Student Reaction

Upon completion of the unit, the students' reactions were very favorable. They expressed numerous ideas on how they could utilize computer technology on their farms and what hardware they thought was best suited to their family's operations. The most mentioned comment was how glad they were the instruction unit did not center around any specific type of computer, but that it covered several different types. These types included programmable calculators, remote terminals, and personal computers. This allowed them to make comparisons and to decide which type of computer hardware might be best utilized in their farming operations in the future.

ARTICLE

Where To Find Computer Programs In The Midwest

By George L. Gille

(Editor's Note: Dr. Gille is Associate Professor of Agricultural Education at Northwest Missouri State University, Maryville, MO 64468.)

More than 200,000 home microcomputers have been sold in the last few years. Some of these microcomputers are being used effectively on farms as management tools. Unfortunately, many of these home computers are used only to play computer games. The reason is simple. There is a bewildering variety of complex, intelligent, and fascinating computer games available for each of the different home computers and there have been few, if any, programs available for these machines, which would allow a farmer to use a home computer as a management tool.

However, there is a light at the end of the tunnel. There is now a growing number of sources of microcomputer programs which have specific agricultural applications and can be used in the vocational agriculture classroom. The computer programs are written for the three most popular home computers: (1) the Radio Shack TRS-80, (2) the Apple, and (3) the Pet. The farm programs appear to be most available for the Radio Shack TRS-80, which is the biggest selling of the home microcomputers.

Oklahoma

Oklahoma State University now offers 22 programs for the Radio Shack TRS-80, including programs dealing with machinery management, grain storage, general bookkeeping, and commodity charting. The programs are available on cassette tape or floppy disk and cost $10 to $30 each. Write Ted Nelson, 613 Ag Hall, Oklahoma State University, Stillwater, OK 74074, for a catalog.

Missouri

Northwest Missouri State University offers 19 programs for Radio Shack TRS-80, which can also be entered into most of the other home computers. The programs deal with sprayer calibration, livestock performance testing, feed mixing, soil erosion, pasture management, and fertilization. For a catalog of the available programs contact George Gille, Department of Agriculture, NWMSU, Maryville, Missouri 64468.

The programs are available on cassette tape or as program listings. The cost per program is between $4 and $20. The program listings allow the programs to be entered into home computers other than the Radio Shack TRS-80.

Illinois

Western Illinois University will have a group of farm management programs available for the Radio Shack TRS-80 in the near future. Contact Keith Rogers, Department of Agriculture, Western Illinois University, Macomb, Illinois 61455, to get on their mailing list.

Iowa

If you own an Apple or Pet home microcomputer, the Computer Center of Waterloo, Iowa, will be offering farm programs dealing with land valuation, grain drying, cattle feeding, hog feeding, and grain marketing in the near future. You can contact them by calling toll-free (in Iowa) 800-772-1726 or 319-232-9504. The programs will cost between $25 and $50 each.

The microcomputer is rapidly changing the management decision-making process in agriculture. Those of us involved in teaching vocational agriculture at the secondary and postsecondary levels must include instruction in the use of microcomputers if our programs are to keep up with the continually changing technology in agriculture.

ARTICLE

How To Get Computers Into Schools

By Leslie Bouffard

(Editor's Note: Ms. Bouffard is with Hayden Publishing Company, Inc. 50 Essex Street, Rochelle Park, NJ 07662.)

Learning about personal computers can boost a high school graduate's starting salary by as much as $1,000 a year, but U.S. schools are failing to teach the subject, reports Personal Computing magazine in a recent series of articles.

The series quotes an official of the National Science Foundation as saying "computer literacy is a basic workforce survival tool for the coming generation," noting that few schools have established programs for teaching about computers.

Tips for Teachers

The series, in the September through December issues, suggests practical steps for getting computers in the schools:

— Start with one motivated teacher. Don't try to convert the whole school at once — it won't work.

— Show and tell your home computer at the school. Teachers and students will catch the bug.

— Don't let the math or science teacher get first grabs on a new personal computer — it will probably get buried in a lab somewhere.

— Hold adult education courses on personal computing in your school and let teachers use the computers during the day in classrooms.

— Set up a model automated office so students can be prepared for computerized offices. Teach typing at the elementary level.

— Look for other uses of personal computers in schools: in media scheduling, library cataloging, administrative office word processing, for example.

— Look into TI logo, a new personal computer language that preschool children are using to learn geometry, algebra, and other advanced subjects. The language reverses things: the student learns by programming the computer, creating animated "movies" and taking charge of their own learning.

Personal Computing magazine focuses on practical applications of personal computers rather than the technology and features a monthly department on educational computing.

ARTICLE

Using The Microcomputer In Shop Planning

By Carl L. Reynolds

(Editor's Note: Dr. Reynolds is Assistant Professor of Agricultural Education, University of Wyoming, University Station, Box 3374, Laramie, WY 82071.)

One of the most difficult problems faced by a teacher is knowing what sizes of steel shapes to suggest to a student who is designing a major shop project. With present costs of materials steadily rising, the teacher faces the job of recommending to a student the minimum size and least costly materials. At the same time, the teacher wants to maintain a reasonable safety margin to prevent failure of the project. The problem is complex; keeping weight and costs down while at the same time maintaining the necessary strength in the project.

Recently, a program was developed for the "Apple" microcomputer that helps answer these design problems. Presently, students at the University of Wyoming are using the program to assist in the selection of beam sizes and shapes for the shop projects they plan to construct.

The Approach

In selecting the materials for a project, students follow a systematic procedure in solving the problem. First, the maximum load weight for the project is determined. If for example, a student wished to design a flatbed trailer that is to be used for hauling hay, it is determined that three tons will be the maximum load.

Next, the axle placement is selected, usually at a point where 60-65 percent of the weight is in front of the center point of the axle assembly (Figure 1).

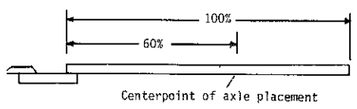

Figure 1. Trailer Axle Placement

The student then determines the variable needed to solve the problem (Figure 2).

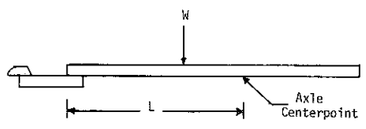

Figure 2. Trailer Design Variables

The computer will ask the student to select a shape of beam (angle iron, pipe, channel, box tubing, etc.), the design load, "W", and length of beam "l". The machine then solves the problem using the appropriate formula based upon the shape of beam selected. For example, if pipe is selected as the desired shape the formula[1] is:

$$W = \frac{667\,(AD - ad)}{L}$$

W = maximum weight of a given size beam
L = length of unsupported beam
A = sectional area of beam, sq. in.
D = depth of beam, in.
a = interior, sq. in.
d = interior depth, in.

The proper size of beam for the shape selected that can safely support the load will then be flashed on the monitor.

To insure that an adequate safety margin is maintained, the formula uses a value of one-fourth the strength of mild steel. This provides for a safety factor of four, a normal practice followed by design engineers.

The student has the option to select another shape of steel, input the same variables, and obtain another solution for the size of beam needed. In this manner, several different shapes may be considered for the project.

An Example

A student wishes to design a hoof trimming table for bulls. He selects a design load of 3,000 pounds, distributed evenly over the table surface. The plan calls for a rectangular frame, supported at each corner by heavy pipe. The longest beam on the frame is selected, which is 8 feet in length. Since the load is supported by the two beams, one-half of the load, 1500 pounds, is fed into the computer. Pipe is selected as the shape desired. The answer is given; 3 inch pipe is required.

Other Applications

Cost is a factor which is becoming increasingly important when planning shop projects. Rising costs of materials have made many projects prohibitive for most vocational agriculture students. The microcomputer has made cost comparisons an easy task in the selection of the most economical materials.

Since the computer is able to solve the metal beam problem in less than a second, the student is able to enter the same input data for several different shapes of metal. Given the recommended size for each shape of steel that can be used, comparison shopping is easily done. For example, in the problem described above, the student decides that pipe, box tubing, channel, or angle iron may be used. He or she then finds that used pipe can be bought in the recommended size at a lower price than the other shapes.

Summary

The microcomputer has proven to be an excellent tool to assist in the planning of shop projects. Several advantages were recognized:

1. Time was saved in performing laborious calculations.
2. Students followed a more systematic approach in thinking through the planning process.
3. Several solutions were quickly obtained.
4. Cost comparisons of available materials were easily made.
5. The solutions provided by the computer provided more specific data as to choice of steel sizes.

Conclusions

Use of the microcomputer to solve shop project design problems was not a total panacea. Several limitations with the program should be noted:

1. Only sizes for beams which support evenly distributed loads are programmed for solution.
2. Not all available sizes are included in the program for the various shapes of steel.
3. The calculations do not provide for solving the problem when better quality high strength steels are available.

Plans are being continued to add to the program in the future. Eventually, as additional programming is done, solutions for wood structures as well as steel may be obtained.

The use of the microcomputer in assisting with shop project planning has added an exciting dimension to the agricultural mechanics instruction at the University of Wyoming. Teachers in the field are also beginning to call for assistance in solving problems related to the planning of their students' shop projects.

Reference

[1]Baumeister, Theodore and Lionel S. Marks. Standard Handbook for Mechanical Engineers, McGraw-Hill Publishing Company, Seventh Edition.

Photographs for the Magazine

The Agricultural Education Magazine needs quality photographs depicting the activities of agricultural educators, their students, and their programs. These photographs will be considered for use on the front cover, Stories in Pictures section, and to enrich articles.

Clear, well composed, 5x7 black and white photographs should be sent to the Editor. A complete statement of explanation should be attached to each photograph. (No photographs will be returned without a specific request.)

THEMES
The Agricultural Education Magazine
1982

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ARTICLE

A Scholarship Program That Really Works

A scholarship program has been developed in Oklahoma that will help finance the college education of high quality FFA members and vocational agriculture students. It's a program that's working, and it will absolutely work in your state. It's actually a shame that this approach has never been attempted previously!

This successful scholarship program takes the involvement of rural youth, FFA, vocational agriculture, interested individuals, and agricultural business and industry. These individuals and groups are already present in communities.

In Oklahoma, there is a vocational agriculture program in nearly every town or community. Local support has always been present, so why not take this support and translate it into a state-wide program of scholarship aid for those high quality high school students wanting to become vocational agriculture instructors?

That local support can be organized to support the scholarship program on the basis of these selling points: 1) It will help finance the college education of the FFA and vocational agriculture students, some of whom may be in your local community, and 2) it will feed quality vocational agriculture teachers back into this and other local communities across the state.

How It Works

The idea for a state-wide scholarship program was actually spawned in the Teacher Education Committee of the Oklahoma Vocational Teachers Association in the summer of 1976. The idea was there, it just needed to be developed. In the spring of 1977, an independent Board of Directors was formed to develop and implement a new scholarship program for agricultural education in Oklahoma. The Board was made up of eight (8) former vocational agriculture teachers who had been successful in other areas of agriculture after having left the

By Jack Pritchard
(Editor's Note: Dr. Pritchard is Professor, Department of Agricultural Education, Oklahoma State University, Stillwater, Oklahoma 74074.)

teaching profession. The early work by the board of directors and the faculty advisor was given to the development of a constitution and by-laws of the organization.

The first scholarships were awarded for the fall semester, 1978. In the summer of 1978, four (4) $300 dollar scholarships were awarded to outstanding students who planned to become teachers of vocational agriculture. Since the fall semester of 1978, a total of 29 scholarships at $300 each have been awarded to outstanding students in FFA and Vocational Agriculture. This is a total of $8,700.

Obtaining contributions for scholarships was successful through the efforts of many people who made contacts in selling the program to individuals, organizations, businesses, and industry. It should be pointed out that the by-laws of the scholarship program made provisions for scholarship recipients to be selected on the basis of scholastic ability, leadership in the FFA and/or college organizations, and need for the financial assistance.

Making Trusts Work

Well, enough of the historical phase of the rather ordinary part of the program. The most unique aspect of the entire scholarship program is the development and implementation of the "Local Community Trust" plan. It was an easy job to make contacts and sell the new program on a year-by-year, contribution-by-contribution basis. But, how about a more stable base or structure for the program? We were told quite early that we just couldn't keep coming back to previous contributors year after year and ask for financial assistance.

Therefore a new plan had to be adopted to insure that the program would have a long range, self-sustaining characteristic. In order to initiate this community approach, a determination was made to select a "pilot" community for a trial effort. The Cushing Community located near Stillwater, Oklahoma, and Oklahoma State University was selected. This "pilot" community was selected for basically two reasons: a former National FFA President (1944) was a successful and highly respected business man in the community, and the Cushing Community had a record of strong support for the local FFA and vocational agriculture program.

A group of key community leaders was assembled to hear about this new scholarship program. This nucleus of people must be sold on the importance of the scholarship cause. All agreed to proceed with the drive with several large pledges received during the course of the meeting. The $5,000 goal was reached in a matter of days. The Cushing Chamber of Commerce elected to make the scholarship program a part of its annual budget; therefore, insuring a $1,000 annual contribution to its trust account.

The red carpet is rolled out for a special recognition program at the Annual Vo-Ag Teachers Convention. Each donor who had contributed $300 dollars or more is presented with a special recognition plaque. Group pictures are taken for the local community newspaper. The Cushing Community convinced us that the plan does work and that the "Community Trust" route is the way to a successful agricultural education scholarship program in Oklahoma.

Since the initial "trust" drive, a very successful drive has been completed in the Shawnee Community. A goal of $12,000 dollars was reached in a matter of two months. Again, the agricultural task force of the Chamber of Commerce voted unanimously to support the scholarship efforts during the drive.

A drive is presently underway in Kingfisher. This community has appointed a "Scholarship Committee" to direct the "trust" fund drive. The local FFA chapter kicked off the drive with a calf-fry in which key community business and industry people were invited. The drive is presently at the $5,000 dollar level on the way to a $10,000 goal.

Other individuals and businesses have set up trust accounts within the program. The program has inherited a $6500 trust from the friends and coworkers of Byrle Killian, former state supervisor for vocational agriculture. The $6500 dollar scholarship fund was a gift from Mr. Killian's many friends at the time of his retirement. Just recently Don Ramsey of Blue and Gold Sausage set up a $5,000 dollar trust. Mr. Ramsey serves on the Board of Directors of the scholarship program and is the program's largest individual contribution.

The OSU-Agricultural Education Scholarship, Inc., is still in its formative stages, but to everyone involved the goals are realistic. The "trust" goal for this year is to have $50,000 on deposit with the Vocational-Technical Foundation. The three year goal for the trust is $100,000 dollars. A sound scholarship program can be built and maintained with this financial base.

Other Benefits

There are extra benefits generating from this program. It's true that the main goal is to encourage top quality young people to enter the teaching profession but there are other benefits from such a program. It's quite realistic to believe that as communities become involved in the program that an increased support base is built for vocational agriculture. In every case, the scholarship activities have provided a forum for selling FFA, vocational agriculture, and agricultural education. It has been stated that in the "long-haul" increased support for the total vocational education program in the state may just be the major product of this scholarship effort. At this point in time, it would seem to appear as a by-product.

One Last Item

This program can work for your state just as it is working in Oklahoma. There is just one precondition or "must" for program success: the public image of FFA and Vocational Agriculture must be strong. If the strong image is present, it's an easy program to sell.

ARTICLE

More Farmers Turning To Less Soil Tillage

More and more North American farmers are discovering they can save on high fuel and labor costs by using conservation tillage. As a result, many are yielding more crops with less erosion.

Most fields can be prepared in a single pass if the tillage disk is heavy enough and properly matched to the power being used. This helps maintain adequate ground speed, which delivers substantial savings in fuel and time for the farmer.

As many as 88 million acres of United States' cropland are estimated to have undergone reduced or conservation tillage last year, says Arnold King of the USDA's Soil Conservation Service. This compares to 55 million acres in 1979.

Part of the 1980 increase is credited to a wet, late spring planting season in many areas. Reports indicate that time-consuming moldboard plowing and cultivation would have further reduced the already shortened planting period, causing farmers to miss the best yield planting dates.

Whatever the reason for the acreage jump, last summer's drought paid many conservation tillage farmers a soil moisture bonus they won't likely forget.

By Paul Castner
(Editor's Note: Mr. Castner is Agriculture Newsfeature writer for Sperry New Holland, New Holland, PA 17557.)

Delaware farmer William Haas found that reduced tillage systems really could increase yields. By using reduced tillage, Haas set an all-time state record of 291.62 bushels of irrigated corn per acre, reports University of Delaware agronomist William Mitchell. That's 56 bushels more than the previous irrigated yield record for the state and was achieved in a drought year when much non-irrigated corn yielded only five to 15 bushels per acre.

University of Missouri agronomist Roger Hanson is also a believer of conservation tillage. He reports the best corn he saw last year was grown under a minimum tillage system.

"With minimum tillage, we saved more moisture in the soil, so more moisture went into the plants," Hanson explains.

Requires Attention

Reduced-till farming is not easy, warn a host of farmers who have tried it. Many researchers, extension specialists, and soil conservationists agree that reduced-till farming needs to be studied and tried initially on a limited basis.

John Doran, head of a USDA research team working with University of Nebraska ag scientists, says by practicing reduced tillage, organic matter and nitrogen gradually increase with a resulting beneficial effect on soil productivity. But it takes a few years for the nitrogen reserve to build up under reduced tillage to be in a form available to crops, Doran explains. Farmers may need to apply more nitrogen to reduced tillage corn for awhile after they change tillage systems.

On fertile soils, though, corn yields for minimum tillage and conventional tillage under different rates of nitrogen application are about equal, according to tests conducted by University of Maryland agronomist Allan Bandel.

Bandel is working on the problem of

(Continued on Page 22)

More Farmers Turning To Less Soil Tillage

(Continued from Page 21)

nitrogen deficiency in soil, and has found on poor soils, reduced tillage yields fall behind when less than 120 pounds of nitrogen per acre are applied. He adds that reduced tillage corn grain yields were up about 24 bushels per acre when nitrogen is injected into the soil rather than broadcast.

New Tools Developed

Depending on the form of conservation best adapted to particular soils, the farmer is faced with having to choose between 11 to 16 different herbicides to determine the proper weed killer combination. In the future, selecting conservation-till herbicides will be made easier for those farmers considering minimum tillage, as a result of research underway at the USDA Washington State University, Prosser Center.

Jean Dawson, a plant scientist at WSU says treating commercially available lime-coated alfalfa seed with a large dose of the herbicide EPTC does not harm the seed, as might be expected. The resulting grass and weed kill in alfalfa plantings has been spectacular and costs far less than conventional spraying, Dawson adds.

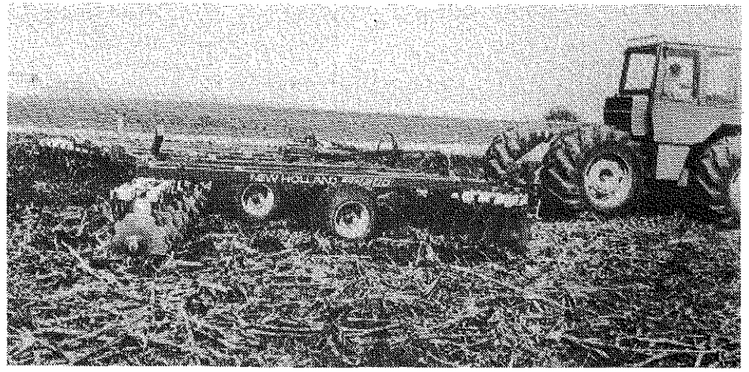
Along with the new methods of soil savings and updated herbicide applications, new equipment is being developed across North America to help farmers who want to practice reduced tillage.

Retired SCS agronomist, Bill Hayes of Nebraska, is working with an equipment manufacturer to perfect a till planter engineered to help solve seedling emergence problems. This machine will be suited for reduced tillage on cold, wet, Northern soils.

Clarence Johnson, an SEA ag engineer, is also hard at work modifying a commercial drill for Pacific Northwest reduced till farmers. Designed to fertilize and shove aside trash prior to planting, the drill combats residue-related disease outbreaks.

Canada Research

In Canada, C.W. Lindwall, of the Agriculture Research Station, Lethbridge, reports that with two and three-year crop rotations, conservation tillage costs were 80 and 84 percent respectively, of those with conventional tillage.



Most fields can be prepared in single pass if the tillage disk is heavy enough and properly matched to the power being used. This helps maintain an adequate ground speed, which can deliver substantial savings for farmers.

K.E. Bowren, tillage and cropping program leader for the Agriculture Canada Station, Melfort, Saskatchewan, says his tests indicate about 25 times more fuel is required to cultivate than to just spray a field.

Ag Canada research has also shown that tillage can be effectively discontinued in early August and herbicide used to control perennial weeks, in the fall, Bowren says.

The story of fuel cost reduction, increased crop yields, soil conservation, and reduced tilling equipment expenditures is being echoed by conservation tillage farmers throughout North America.

To further illustrate the possible savings of reduced tillage systems, a northern Iowa Extension Service survey revealed some 100 farmers felt conservation tillage saved an average of $1400 per farm.

Multiply this amount by the number of farms practicing reduced tillage across the United States and Canada, and the potential increase in the nationwide farm profit picture looks better than ever.

BOOK REVIEW

AGRICULTURAL FINANCE, AN INTRODUCTION TO MICRO AND MACRO CONCEPTS, by John B. Penson, Jr. and David A. Lins. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1980, 546 pp. $19.95.

The purpose of this book is to introduce the student of agricultural economics to micro and macro concepts in agricultural finance. Some important but difficult topics, such as capital budgeting, risk and the cost of capital, have been included and the mathematics used has been limited to elementary algebra.

The book contains 23 chapters and covers a wide variety of macro and micro concepts of agricultural finance.

The coverage of many topics is very thorough and numerous examples have been provided to illustrate the concepts discussed.

The book was written by John B. Penson, Jr. of Texas A&M University and David A. Lins of The University of Illinois. It was designed for use in undergraduate courses in agricultural finance. It could also be used in undergraduate courses in farm management. The book would be useful as a reference in teaching agricultural finance to high school students and in preparing teams for the National FFA Farm Business Management Contest.

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LETTERS

"Letters to the Editor" is a feature to encourage dialogue among readers of the MAGAZINE. *Selected letters will be printed without comment or editing. Your letter will be welcomed! (Send letters to: Editor,* THE AGRICULTURAL EDUCATION MAGAZINE, *P.O. Drawer AV, Mississippi State, MS 39762.)*

Editor:

One of the few advantages of growing older is that you can see the same questions coming around again! Your very interesting editorial in the October AGEDMAG brought back memories of earlier efforts to find "the best place" for AdEd programs at the national level. There was a time in the late 40's when the question of moving AgEd from USOE to USDA reached the stage of public hearings. Some, Elton Rhoad then at University of Nebraska was one, felt that the future of AgEd would be better in USDA, but the large majority apparently felt that we should remain in USOE. Anyway, we did.

Still earlier, in the 30's considerable discussion centered around the question, "Whither AgEd?" There was a booklet published under that title. Still further back (even before my time!) there was official consideration of what is now the Extension Service and vocational agriculture being under the same federal law. Bills were developed for that purpose from about 1910-14. Readings of efforts leading to the Smith-Lever and the Smith-Hughes Acts are very interesting. So, here we are 70 years later trying to decide where we belong!

As indicated in your editorial, the role of AVA enters the national picture. Through the years the feelings of people in AgEd have varied all the way from "Let's get out of the AVA, what has it ever done for us?", to the feeling that "If it had not been for AVA we would have died long ago." The latter was heard more often when vocational people in USOE were being reduced or effectiveness cut by little funding for personnel or even travel, office supplies, and secretarial help.

There are some built-in problems with any national organization, NEA for example, because by the time you go national, an organization is likely to be composed of members with widely differing interests. The "vocational family" is no exception. From the beginning we have known little of each other except as we happened to be located in local programs. For example, Ag & Home Economics have been closely associated because of being in high schools throughout the country. Frequently in earlier days of small high schools, these two were the only vocational units in the school. The only time the Ag & Home Ec teachers ever saw a T&I person was at the annual state vocational meeting or at AVA. The hearings and resulting VocEd Act of 1963 were designed to eliminate the isolation of separate programs giving emphasis to vocational results of programs in terms of specific training for specific jobs.

Some advocated the total evaluation of any vocational program to be the placement of those enrolled in specific jobs. Some of the people in some vocational programs who were endorsing this "narrow view" have never seen VoAg or HomeEc as vocational. My own feeling is that the AVA has been an important vehicle for all in vocational education programs to work together on their own. In fact, for many years, I advocated that we in AgEd should have furnished the finances for support of a full-time Executive Secretary for Agricultural Education in the AVA Office in Washington (See Editorial on this subject when I was editor of AGED MAGAZINE).

You asked for suggestions — I am not sure that we will have a choice of where we go at the national level. Regardless of our home in Washington, I believe that the crucial question is at the LOCAL LEVEL. In the earlier consideration of moving to USDA this was a major issue. What would be the role of the local teacher of vocational agriculture? Would he (only **he** in those days) be an Assistant County Agent and remain out in the high school? If so, would 4-H and FFA be combined into one program? Would the County Agent then become the immediate supervisor? This could have been one possibility, especially since some county Extension programs at the time included some assistant agents placed out in the county for closer contacts with local people.

Relationships at the state level are also important considerations. The official tie that the county Extension people have to the state agricultural college has been a very important link in the Extension programs through the years. Many arrangements are possible and prediction of results is difficult. I think that the most important consideration is that there be a good possibility that the local program at the community level be enhanced by whatever organization exists at the national and state level. If any major changes do occur I would hope that one of these would be that one or more people at the local community level would have time alloted for education work outside the classroom. As long as the one teacher teaches all day at school, the local program of vocational agriculture will most likely remain a secondary in-school program.

I hope that you will keep these issues before the profession. They are extremely important for the future, it seems to me. Best wishes.

Sincerely,
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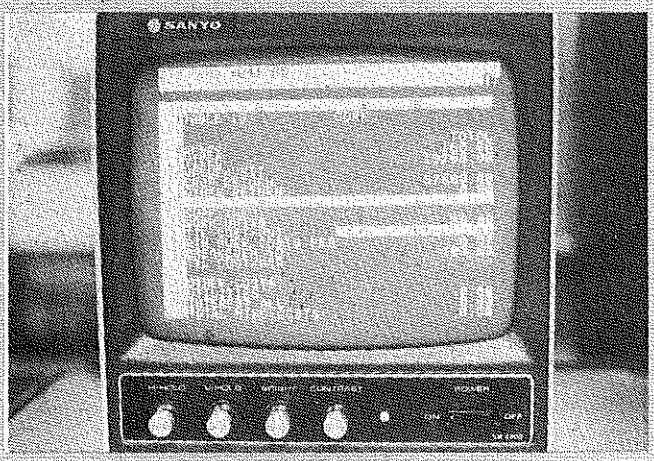
Stories in Pictures

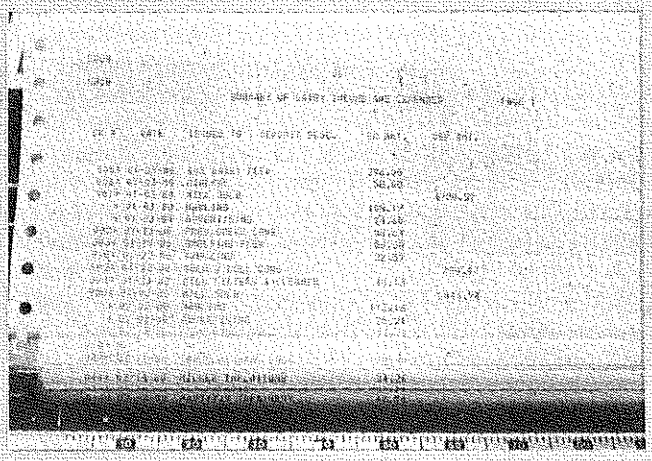
An interesting look at some innovations that can greatly enhance vocational-technical education in agriculture is presented here. (Courtesy of Myron A. Eighmy, Farm Management Instructor, University of Minnesota Technical College, Waseca, MN 56093. Photographs made by Bruce McKeed and Sharon Andrews of University of Minnesota, Waseca.)

The Trans-Lux ticker-tape provides up-to-the-minute reports of commodity markets for use by students studying farm commodity marketing.

Many farm management problems are made simple by using the programmable calculator. Students use the programmables to calculate depreciation, livestock rations, and other management problems.



Students learn to use microcomputers and computer terminals as management tools.



Computer print-outs of farm records can provide up-to-date management data for farms and agribusinesses.