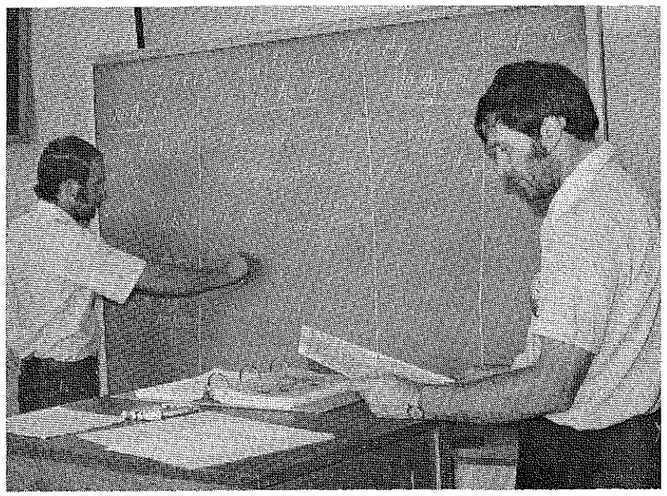

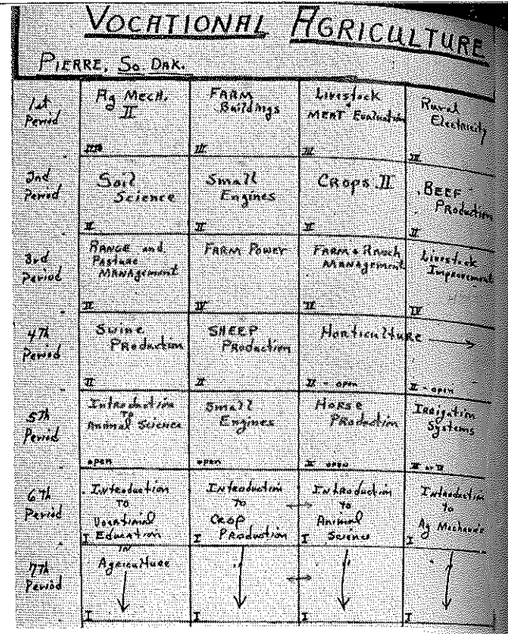

Stories in Pictures

by Richard Douglass

COOPERATION IS NEEDED FOR QUALITY PROGRAM

Representing state level cooperation (upper left) is Larry G. Nelson, State Supervisor, Ag. Ed., South Dakota. A local administrator (left)) is Mr. Gilbert Neiles, Principal of Riggs Senior High School, Pierre, S.D. Teachers of Vocational Agriculture (lower left) are Gary Grey, left and Larry Venner, right. Both are instrumental in fostering cooperation at Pierre, S.D. They are developing the schedule of quarter units to be taught this coming year at Riggs Senior High. The finished product is shown above. (Photos from Larry G. Nelson)

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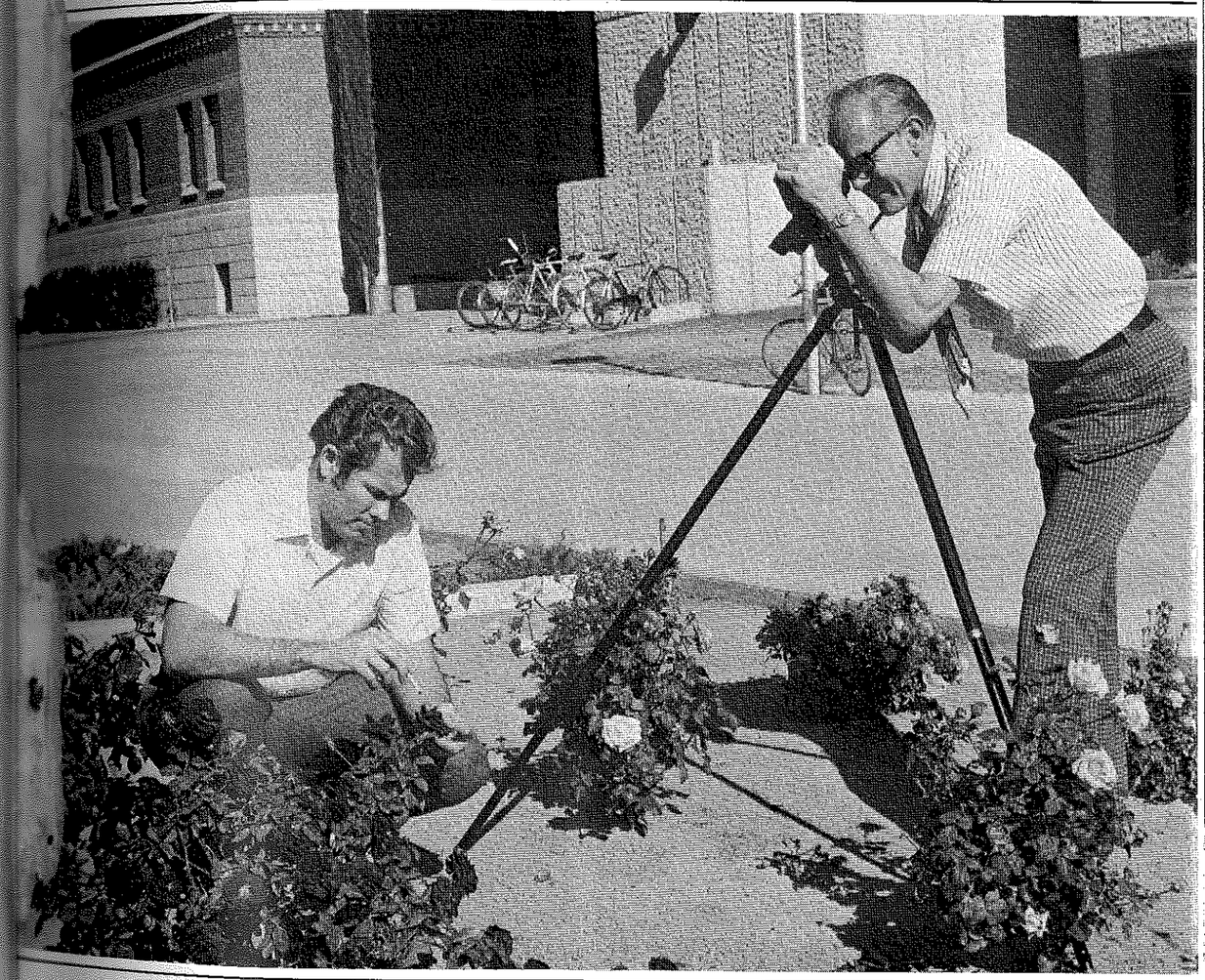

THEME—INSTRUCTIONAL TECHNOLOGY

The
Agricultural Education
Magazine

EDPRESS Vol. 47 October, 1974 No. 4

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COVER PHOTO:

Agricultural Educator, Clinton Jacobs (right), College of Agriculture, University of Arizona, produces his own Super 8 films. Students help Professor Jacobs make these skill-training films. The skills range from adjusting an oxyacetylene torch to finishing and curing concrete. After editing, sound is added. His material cost per 5-10 minute film is between $9.00 and $18.00. Formal evaluation of the films has been very satisfactory. (Photo from Paul C. Allen, Kodak Information Department)

Editorials

From Your Editor . . .

TEACHING AIDS AND TEACHER AIDES

Martin B. McMillion

Multiplication is more important than division in many different settings. It is especially true for the teacher who is attempting to individualize instruction. An hour of group instruction for 15 students suddenly becomes four minutes each when students are allowed to learn at their own rate and study different subject matter. Allowing for individual differences, in those cases where it makes a difference, is a sound idea; therefore, the teacher should always be searching for aids, non-human as well as human, to assist with the instruction of the student.

Self-instruction is facilitated by devices as old and as simple as the textbook and as new and complicated as the computer. Self-instruction is facilitated by commercially manufactured and prepared instructional aids. The hardware or mechanization provided by commercial sources seems adequate and far exceeds that which the typical high school can afford. The software or materials for use with and without the machinery is not as adequate and is not likely to become as adequate. The market for teaching aids and materials in agricultural subject matter is relatively small and is diminished further by geographical influences upon much of agricultural subject matter. This fact increases the need for the teacher to prepare self-instructional materials for his students.

The teacher should organize and systematize what is available in such a way that the student can use it to instruct himself. Organizing and systematizing the subject-matter filing cabinets so individuals can use them is a modest beginning. A departmental library and a curriculum materials center at the high school level at which students can find, use, and return equipment and materials should not be an impossibility.

Use of paid teacher aides received considerable attention a few years ago, but now is seldom mentioned in vocational education at the high school level. If a place cannot be found for paid teacher aides, there will be an even greater need to use instructional technology to expand the amount of teaching and learning that takes place per professional teacher.

—MBM

Guest Editorial . . .

PERSONALIZED OCCUPATIONAL EDUCATION

Gayle W. Wright, Chairman
Mathematics-Physical Science Division
Parkland College, Champaign, Illinois

G. W. Wright

Innovation in instructional technology has recently reshaped traditional educational delivery systems to include individualized, personalized approaches to learning. The naked truth is that some educators have liberated their students to learn at a rate prescribed by student ability, background and motivation. Some are further humanizing the system by matching methodology and media to each student's cognitive style of learning.

The missionaries of individualized, self-paced instruction claim that students who are free from competition and free from fear of failure preserve, for themselves, the right to be wrong. Properly nurtured, this matures into the ability to evaluate one's own work objectively—something few of us are capable of doing well.

As "now" educators in a society where educational accountability is occupying the front burner, we have the inherent responsibility to seek and search out techniques which will continually strengthen the platform for learning. Without dedication to this mission, institutional survival is threatened.

If you subscribe to this philosophy and share an ongoing enthusiasm for improving the instructional process, then I challenge you to consider, for inclusion in your educational delivery system, the following approaches and techniques.

1. Incorporate on-the-job training as an integral part of your occupational program. Systematize it to include a personalized plan of learning activities which aligns to the student's specific interest area.

(Concluded on next page)

2. Marry certain programs by the identification of "core" courses. These courses must hold enough commonality to justify the homogenization of students from several program areas. Students may then delay their career choice until late in their academic preparation.
3. Provide "spin-off" options for students who have acquired saleable skills but who do not meet academic degree requirements. Vocational certificates work well for certain skill areas.
4. If grades must be given, effect a liberal withdrawal policy and the provision for awarding a non-attendance grade. The assignment of non-quality grades and the subsequent accruement of fewer hours in pursuit of a degree penalizes the student in time only. Frequently a student who returns to a course after receiving an N or W successfully completes that course with A, B or C. Not only does this preclude a transcript blemish but also holds the advantage of double exposure to course materials. This may ultimately lead to greater understanding and a broader platform for technical competence.

Start a learning laboratory which caters to both the accelerated and the remedial student.

5. Start a learning laboratory which caters to both the accelerated and the remedial student. Such a lab should support the classes a student is taking and be manned with qualified instructors. Students should be allowed to visit the lab for individual help independent of credit or contract for credit through a variable credit structure.
6. Establish a test center where students are responsible for scheduling their own tests. This has the advantage of erasing the time barrier for exams. Further, the center may offer pretests which determine level of proficiency in subject matter. If mastery levels have been established, this could excuse those students who have performed at the mastery level from some subject areas within given courses.
7. Develop some courses using a derivative of the auto-tutorial system—that being audio-tutorial instruction. Consider dovetailing this system with an open, unmanned laboratory, when such is a part of the course structure. Of course some "wet labs" and some machine-oriented labs will require qualified monitors.
8. Provide mini-workshops on specific problem areas which reach a cluster of occupational areas.
9. Utilize instruction so that variable credit may be allowed within the confines of one course, and entry and exit can be accomplished based on the units of instruction desired.
10. Weld together disciplines and instructors through team teaching interdisciplinary courses.
11. Investigate the desirability of including difficult concept modules using computer assisted instruction such as University of Illinois based Plato. Graphic illustrations are handled quite nicely with such a system.
12. Explore cognitive style mapping using the expertise available at Oakland Community College in Michigan.

In summary let us be reminded that there is no such thing as instant success in education. The next best thing is hard work! In light of this, our educational delivery systems must do a more complete job of fitting folk for work than any other educational system has ever had to do in the history of mankind. That's an awesome task! Let this be our charge to pursue instructional innovation with serious determination. ◆◆◆

NOTICE

Some theme articles have arrived too late for the issue for which they were intended. Manuscripts must reach the editor nine (9) weeks prior to the beginning of the month in which they are to appear.

Themes For Future Issues

November — Improving the Profession — the Job and the Teacher	**March — Utilizing Resources in Teaching**
December — Better Teaching and Learning	**April — Informing the Public**
January — Urban Agricultural Programs	**May — Teaching the Disadvantaged and Handicapped**
February — Programs in Natural Resources	**June — Women in Agricultural Education**

INCREASED LEARNING: THE GOAL OF INSTRUCTIONAL TECHNOLOGY

Jasper S. Lee
Virginia Polytechnic Institute and State University

Jasper Lee

The true measure of any educational practice is best evaluated by determining the extent to which learning is enhanced. The area of instructional technology is for the specific purpose of increasing learning. In effect, through instructional technology the teaching-learning process is to be made more efficient. Teachers in agricultural education over the years have made use of sound instructional practices and, in fact, in many schools were considered to be the innovators in areas of instructional technology.

In recent years, the area of instructional technology has grown rapidly and has become a major force in shaping the structure of education. New terminology has arisen to describe an area formerly restricted primarily to audio-visual media. Some of the new terms include "instructional systems," "individualized learning packages," "learning resources centers," and "informal education." These newer terms are much broader and more inclusive than the use of audiovisual aids in teaching.

Instructional Technology Defined

Instructional technology is a systematic approach to planning for teaching and learning, carrying out the plans, and evaluating the effectiveness of educational activities. Instructional technology is process-oriented. As such, it includes the application of science-based knowledge to educational planning and problems. Instructional technology often manifests itself in the forms of study carrels equipped with headphones and projection systems or various combinations of study guides, laboratory equipment, and audiovisual media. These forms, however, merely represent a small portion of the area and are sometimes said to be only the "tip of the iceberg." In the background is a vast amount of learning and communication theory, sophisticated electronic apparatus, and professional expertise.

One of the primary purposes of instructional technology is to enhance the communications process. Recent advances in media have improved older means of communication and introduced new communication tools. All persons involved in providing agricultural education need to make optimum use of these new instructional strategies to improve learning.

Learning theories are very much a part of instructional technology. A few years ago B. F. Skinner wrote a book entitled **The Technology of Teaching,** (Meredith Corporation, 1968) in which he related that learning theories were very much a part of technology in teaching. Specific mention was made by Skinner of "learning by doing," "learning from experience," and "learning by trial and error." He further set about to show the relationship of these theories through reinforcement and the use of teaching machines.

Role of the Teacher

With the advent of instructional technology, the role of the teacher has changed. Attention is being shifted from the teacher as in imparter of information, to the learner as the focal point in the process of education. This demands that both the teacher and student assume different roles in the classroom. The student is increasingly involved in the active direction of his own learning. The teacher is to be an organizer, and, hopefully, is to serve in a more creative role. These changes have brought about the need for agricultural teachers, as well as other school personnel, to have at least minimal level of skill in the area of instructional technology.

Many school systems are employing specialized personnel in the area of instructional technology. These persons are responsible for the organization and administration of the resources used by teachers in providing learning activities and assisting in designing appropriate instructional systems. Teachers of agriculture need to utilize the skills and services such specialists have to offer.

The teacher of agriculture must also recognize another trend which instructional technology is fostering on the traditional educational environment. Learning resources centers are being established in many high schools and community colleges. These centers contain not only books, as found in traditional libraries, but also the newer learning tools, such as self-instruction systems and facilities for the use of media. Persons operating such centers must not only have training in librarianship but also in the various aspects of instructional technology. The kinds of agricultural materials kept in such centers range from books to video tapes, microforms, slide-tape presentations, and other materials. These materials are often available for independent use by students at any time during the school day and afterward.

Trends in Instructional Technology

Instructional technology has emerged as a result of distinction being made between the art and science of teaching. The scientific approach of research and experimentation in education is the very foundation on which instructional technology is built. Teachers of agriculture have made considerable use of research findings in agricultural subjects and in educational improvements. Just as agricultural practices have changed, so have educational practices.

(Concluded on page 82)

Tape That Expert

Jeffrey Owings
Teacher Education
University of Maryland

If you have had the experience of calling the office of an expert in a given area for a class presentation or keynote speech for a workshop, there is often frustration. The typical secretary message might include, "I'm sorry but he will be in Los Angeles on Monday, Houston on Tuesday, Minneapolis on Wednesday, Washington, D.C. on Thursday and in only to teach his class on Friday."

Leaders in education are sometimes difficult to schedule at convenient times. It is often very possible to schedule these people but not at the times they are needed for specific presentations. The Department of Agricultural and Extension Education at the University of Maryland encountered a similar problem. On the staff of the University of Maryland is Dr. Kenneth Hoyt, Professor of Counselling and Personnel Services and one of the nation's foremost experts on Career Education. Dr. Hoyt, currently on a leave of absence from Maryland, is serving as Associate Commissioner of Education for Career Education.

Therefore, the possibility of getting Dr. Hoyt to speak before an individual class seemed remote. However, the dilemma was solved without alteration of class schedules or Dr. Hoyt's busy schedule.

The solution was video taping an interview with Dr. Hoyt. The half hour presentation, produced by the author and Mr. Ulysses S. Glee, Jr., another instructor in Agricultural Education, was video-taped in the audiovisual center of the College of Education. The interview concerned career education in the total school curriculum. There was a special emphasis given to the place of the vocational agriculture instructor in career education.

The tape was first viewed by a graduate class in vocational administration. Since its first presentation the tape has become very popular and there is a continual demand for usage. Additional copies of the tape had to be prepared so sufficient numbers were available for showings. The tape has been used in education classes during the day and a community college in the same evening. A copy is available in the video-tape collection in the Undergraduate Library of the University for individual student viewing.

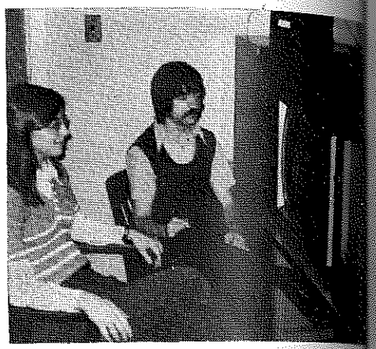
Presentation of the video-tape at the North Atlantic Regional Conference and Research Seminar on Agricultural Education at the University of New Hampshire expanded the demand even further. At the seminar the tape was presented over the New England Center for Continuing Education closed circuit TV system. Additional copies of the tape have been duplicated and sent as far as the University of Vermont.

After the original preparation of the tape, a new introduction was prepared because of Dr. Hoyt's change of job description. His new position as Assistant Commissioner of Education makes the tape even more valuable as a teaching aid.

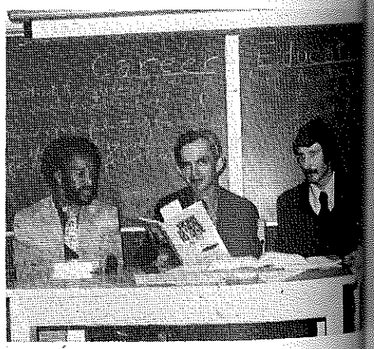
Implications for Education

Tape libraries can be developed at local high schools. Strategies similar to the above could be used by individual vocational agriculture departments to gather presentations from extension specialists and others from around the state for specific classes and programs.

Teacher education departments at universities could make similar use of video tapes. National FFA Officers can be taped when they are on their "Good Will Tours". State public speaking winners, outstanding agriculture teachers, and national experts can all be taped, saved and shown to classes. Copies can be put into the library where students can view the tapes again for study purposes. But most important of all is that video tapes of the experts can enrich the classroom presentations in agricultural education at the time the teacher wants them. ◆



Left to right: Eileen Monaghan and Eugene Owen (Two University of Maryland students) watching Dr. Hoyt's presentation on career education.



From left to right: Mr. Ulysses S. Glee, Instructor, Department of Agricultural Education and Assistant Director, Office of Student Aid, University of Maryland.

Dr. Kenneth Hoyt, Associate Commissioner of Education for Career Education, U.S. Office of Education.

Mr. Jeffrey A. Owings, Graduate Assistant, Department of Agricultural and Extension Education, University of Maryland.

Learning Resources Center— Instructional Support for Faculty

Jack Lindner, Supervisor
Learning Resources Center

Jack Lindner

The experience of the University of Minnesota Technical College-Waseca has been that there is a limited amount of instructional material available for a technical college for agriculture. What, then, is the next step?

"I guess you could say that we threw Jack (Lindner) a big curve when we said that our collection should stay directly tied to our mission of being a specialized technical college for agriculture," Provost E. C. Frederick explains.

That has meant that the building of the collection has been guided by three principles: 1) Material should be two-year, post-secondary, 2) Material should be technical in nature, and, 3) Material should relate to the broad fields of agriculture.

As a learning rescources center, it has been the aim to include nonprint materials as well as the traditional print materials. A new facility was opened in the Fall, 1973, and this building includes a television recording studio, audio recording studio, printing and graphics department, compensatory education center, and a campus-wide computer center. These support areas are in addition to the stacks and reference materials areas. Several small study rooms are also available.

Since there has been a limited amount of print and nonprint materials available, these support areas are proving to be extremely valuable in building the collection. Instructors are encouraged to work with the media production specialists to develop their own instructional materials.

These materials consist of television programs, 2 x 2 slide sets, transparency sets, posters, charts, line drawings, mounted pictures and photographic services. Although time consuming, such programs provide flexibility and allow instructors to continue to update materials and stay abreast of the changing technology which is affecting agriculture to such a degree. Other methods have also been used to provide reference and instructional materials.

An agreement with nearby Mankato State College provides government documents that relate to agriculture that are housed, on long-term loan, in the UMW Learning Resources Center. Mankato State officials found that they were running short of room and were considering dropping some government publications in the agricultural classification. Now the materials are still available for Mankato State College needs.

A wide variety of pamphlets and extension bulletins from Minnesota and other states are housed in the LRC as well. These are displayed in open shelving and through a vertical filing system.

Currently agricultural businesses and organizations are being requested to provide copies of their newsletters, house organs, and other publications to the LRC. There is a tremendous volume of material in this category and it, too, is displayed in open shelving. Although the material is not indexed, it is being retained to establish a historical selection of agricultural materials. It will also provide a resource for the agricultural communications major and for prospective job seekers who want to know more about a company.

To avoid costly duplication of some materials, the college has not purchased much in the categories of humanities, fiction and other general materials even though they are needed by students. Instead, the extensive collection of the LeSeuer-Waseca Regional Library is used by students and staff. The bookmobile stops regularly on the campus to bring some of these materials to the campus.

If certain materials are not available in the LRC collection or from the LeSeuer-Waseca Regional Library, they can be requested through MINITEX (Minnesota Inner Institutional Teletype Exchange) which provides access to materials in all of the institutions of higher education in Minnesota—two-year colleges, four-year state colleges, private colleges and the coordinate campuses of the University of Minnesota. More recently the system has developed an interface with some educational institutions in North Dakota and Wisconsin. Items that are loaned in this manner are books, microfiche, microfilm, and photo copies of periodicals. Service is usually within 48 hours.

The television capabilities include color studio and also portable color and black and white equipment which can travel to classrooms, accompany a field trip, videotape a guest lecturer and other similar uses for developing instructional and demonstration tapes.

Another capability of the television system is that the college is tied by a two-way cable television system in the Waseca community. Thus we can originate programs on campus and feed them directly into the cable system or use the system to send programs to Waseca High School.

With our collection in the Learning Resources Center, we do not use a reserve system. We do have a temporary reserve by which instructors can place live weed samples, seed

(Concluded on page 82)

Extend Your School to the Community and the University

*C. L. Nelson and A. J. Klavon**

University of Maryland has one answer to the "energy-crisis"—extending the University by phone. In the spring of 1973, the Department of Agricultural and Extension Education initiated the use of the conference phone in graduate course offerings and during the fall of 1973 to extend a course to another part of the State.**

Conference phones are available for rental from the telephone company. These units have a built-in amplification system that is suitable for a large classroom. They have two microphones for listeners to ask questions of the speakers, and they are portable for using at any location having the necessary phone jack. It is possible to have people from various parts of the country or state available on a panel at the cost of a conference call only. Individual and panel presentations have been made at the University of Maryland from as far away as Wisconsin.

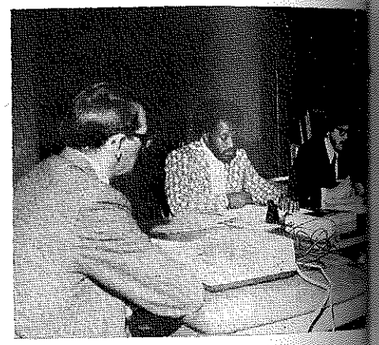
The initial cost of a conference phone is the installation of a phone jack. This is easily accomplished in most cases. Long distance tolls are considerably cheaper than paying mileage for in-state people to visit an individual class. For example, it has been found much easier to secure people to take part in classes and meetings when their time will be limited to their presentation only and when they can remain in their offices. This has even been the case while utilizing personnel on the Maryland campus. It is possible for the guest speaker to present multiple or consecutive presentations. This can be accomplished from one's office or home.

Easton High School, on the eastern shore of Maryland, was the site in the fall 1973 of the extension of RLED 427, Group Dynamics in Extension and Continuing Education, also being taught at College Park 75 miles away. There were seven enrolled at Easton. An instructor, Mr. Albert J. Klavon, was present at Easton during all but two of the classes to conduct discussion and to answer questions. The course professor, Dr. Einar R. Ryden, conducted the class from Easton on one occasion.

The principal and vocational agriculture instructor of Easton High School, saw additional opportunity with the addition of the conference phone to their school. The phone has been used to hold meetings of high school students with University of Maryland admission and student aid officials. The people at the University of Maryland conduct the meeting from a phone in College Park. Additional presentations are being scheduled with university specialists from the College of Agriculture on topics of general interest to high school students and of special interest to individual classes in the high school.

Agricultural Education classes at the University of Maryland have used the conference phone to enhance class content. Calls to individual agriculture teachers around the state as well as to national officials have been used to receive opinions and answers to student concerns. When a series of questions arose during a National FFA program last spring, a call to Mr. Coleman Harris, National FFA Associate Executive Secretary, was made and the questions answered in a ten minute discussion. It would have been impractical to invite Mr. Harris to visit the University of Maryland campus for the input needed in the introductory class. However, the conference phone allowed students to get the benefit of Mr. Harris' expertise without imposing unduly on his schedule.

Use of conference phones has great potential at the university level as well as the local school. High schools could make use of the phone to talk to people in their own community. If a senior class in agribusiness wishes to know what the local farm machinery dealer looks for when he interviews a prospective employee, the class could call the dealer and ask. The question can be answered from the desk of the businessman with only a short expenditure of time and the agriculture students have utilized the community rather than just classroom resources to solve a problem. ◆◆◆



University of Maryland personnel are conducting a meeting for college-bound students via conference telephone. Left to right are Albert J. Klavon, Instructor, Extension Education; Ulysses Glee, Instructor, Agricultural Education and Assistant Director, Office of Student Aid; and James C. Christensen, Admissions Counselor.

*Respectively, Associate Professor and Instructor of Agricultural and Extension Education, University of Maryland.

**The program was initiated by Dr. Einar R. Ryden, Extension Training Leader for the Maryland Cooperative Extension Service.

IN-SERVICE TRAINING FOR THE FORD 4000

C. O. Jacobs, Professor
Agricultural Education
University of Arizona

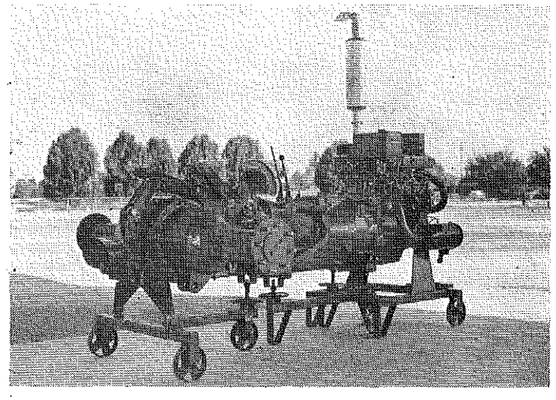
A shortage in the supply of materials has forced the management of Ford Tractor Operations, Ford Motor Company, to temporarily discontinue the practice of providing the Model 4000 Ford tractor power unit chassis to qualifying schools. Since the concept of the program, it is reported that some 1,767 units, valuing $7,490,500, have been provided to vocational agricultural programs in high schools, area vocational schools and community colleges throughout the United States.

Eleven of the sixteen units, which have been provided to schools in Arizona, have been donated to departments of vocational agriculture. It is safe to say that prior to this summer, ninety percent of the units were gathering dust. There were two basic reasons for this non-use. First, the units weigh approximately 4500 pounds each, they lack any form of convenient mobility, and are difficult to handle. Secondly, teachers of vocational agriculture are extremely busy people and simply had not found the opportunity to include the unit in their program of study.

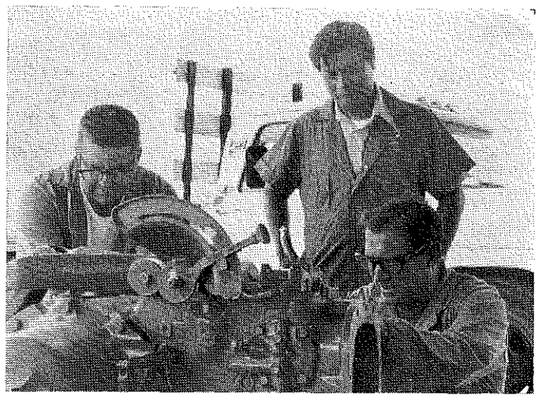
In response to the desire to see these power units be effectively used, the Teacher Advisory Committee to the Department of Agricultural Education, University of Arizona, recommended an in-service training workshop directed specifically toward making the units functional. As a result of their recommendation, a two-week workshop was conducted at the University of Arizona, June 17-28, 1974. The first week of the workshop was devoted to the construction of a chassis stand to make it physically possible to separate and handle each of the three sections of the tractor. The second week was allocated to a study of the functional parts of the entire tractor and to provide each teacher an opportunity to disassemble, inspect, measure, reassemble, operate and perform tune-up operations characteristic of those jobs and skills used by mechanics. The Western District Service Manager of Ford Tractor Operations, Mr. William Barngrover, in cooperation with Mr. G. A. Packard, Zone Manager, made the necessary arrangements to provide the technical supervision of Mr. Bill Veitch and Mr. R. G. Badua, also with Ford, to assist with instruction.

As a result of the first week's work, eight teachers made their tractors functional by constructing the chassis stand from pre-cut materials. This work also included completing the cooling, fuel, and electrical system of each tractor. The total cost of materials to make each tractor operational was $165.00.

Twelve teachers participated in the second week of "hands-on" instruction and worked in teams of two on each of six tractors. The five-day outline of activities involved the following experiences:



Although temporarily discontinued, Ford Tractor Operations has donated the 4000 power train to schools. The unit is made operational and functional for mechanic training by constructing a support stand and attaching the necessary accessories. Plans are available (see article).



Ford 4000 tractor units were awarded to Honorary American Farmer Degree recipients Mr. Frank Adams, Douglas, and Mr. Page Bakarich, Willcox. Supervising their work on the final drive assembly is Mr. R. G. Badua, Service Representative for Ford Tractor, Oakland, California during the workshop for instruction in the power unit at the University of Arizona, Tucson.

(Concluded on next page)

(Jacobs—from previous page)

A. *Disassembly and Inspection of Final Drive* — including brakes, final drive reduction, differential lock, PTO clutch and valve, bearing pre-load and pinion setting;

B. *Hydraulic System* — involving pumps, valve chest and linkage;

C. *Transmission and Engine Clutch* — adjustments and settings for pressure plate and linkage, bearing lubrication, shafting patterns, bearing pre-loads and independent PTO drive assembly;

D. *Engine Mechanics* — including valve timing gear train, cylinder head, valves, pistons, rings, cylinders and crankshaft bearings;

E. *Electrical System* — the wiring of both diesel and gas tractor components including switch, ammeter, generator, regulator, coolant temperature, oil pressure, starter relay and battery circuits;

F. *Fuel System for Gas and Diesel* — inspecting carburetor, checking injectors, timing injection pump, servicing filters, and bleeding system; and

G. *Tune-Up* — checking electrical system with volt-amp tester, setting dwell, ignition timing and advance, adjusting low and fast idle RPM, servicing air cleaner, testing vacuum, cylinder compression, and hydraulic pressure, and checking PTO, brakes and differential lock operation.

As a result of the workshop, a complete student-oriented job-operation procedure plan for the Ford 4000 was developed. The set of operations, blueprints and bill of materials for constructing the chassis stand can be obtained as follows: Purchase requests for $5.00 should be made payable to University of Arizona and sent to Hatch Sales, Department of Agricultural Education, University of Arizona, Tucson, Arizona 85721. ◆◆◆

(Lee—from page 77)

The trend toward increased use of instructional technology is definitely a significant area of change in education.

In a recent survey in Virginia*, David M. Moore and the author found a definite trend toward the increased employment of personnel in instructional technology by the public schools and community colleges. The study revealed that the number of such persons employed would almost double in the next five years. (There are currently 132 persons employed as technologists and combination technologists-librarians in the State of Virginia.) Many of these persons are employed by school systems which also have agricultural education programs. If the trend indicated by this study is true nationwide, there will be a considerable increase in the use of instructional technology over the next five years.

Important Areas for Agricultural Education

Several areas of instructional technology are emerging in agricultural education. Some of these have been used in various formats over the years and are changing in accordance with current trends in education. One of the most important areas is self-instruction, a procedure in which students progress through a learning activity, or series of activities, at their own rates of speed and more or less on their own time. This is sometimes known as individualized instruction, but the two are not necessarily synonymous.

There is considerable diversity in the way in which self-instruction is administered. Written learning packages which can be completed at school or at home may be used. Audio-tutorial systems may be established whereby students use audio tapes and a variety of other supportive media. The supervised occupational experience programs utilize a form of individualized instruction developed specifically for the student to engage in learning activities designed to develop the competencies needed to achieve job entry in pursuit of his occupational objective.

Another aspect of instructional technology currently increasing in use is the stating of competencies students are to develop and establishing a level of acceptable performance students must achieve before advancing to the next level or area of education. The development of the competencies and strategies for students to use in gaining the specified level of competency is definitely a part of instructional technology.

Students with special needs, explicitly the disadvantaged and handicapped, are best served when instructional technology is applied. Learning activities can be designed around the individual needs and capacities of students. Activities which improve the learning capabilities of such students can be developed and at the same time provide needed remedial instruction.

Summary

The goal of instructional technology is to increase learning. Through a systematic approach to education, objectives are specified and the necessary teaching-learning activities are developed to ensure achievement of objectives by the students. Agricultural education has been using a similar approach—the identification of problems and problem areas which were solved through the application of instructional technology. It may be that agricultural education will undergo some change in order to accommodate the newer technology areas in education. ◆◆◆

(Lindner—from page 79)

samples, typewriters, books, films, or other instructional materials on a temporary reserve. We have found this to be extremely useful. The building has small group study rooms and these work well for instructors to place items in a working practical reserve system.

Our goal is to provide the necessary support for our instructional staff. As a new college, and one with a single mission, there has been a real challenge to build and maintain a collection of instructional materials that is supportive to the staff.

The college has a motto, "This Place Is For Students," and if we do our job so the instructors can be about the business of instruction, we feel that we will have made tremendous strides in achieving that motto. ◆◆◆

*Jasper S. Lee and David M. Moore. "A Survey of Need for Personnel in Educational Media and Technology in the State of Virginia." Blacksburg: College of Education, Virginia Polytechnic Institute and State University, June 1974.

Sprayer Calibration Demonstrator

*James H. Whitaker**

Farmers are faced with several calibration problems every year. Fertilizer and lime must be applied at a suitable rate, then planting rates must be adjusted and checked to get optimum results. But in these days of environmental concern, there is probably no calibration job on the farm more critical than that of calibrating the sprayer. If the application is too small, the results are not satisfactory and time and money have been wasted. If the rate is too great, the results may be catastrophic. The crop may be ruined or neighbors or state officials become most upset over the results. At best, money has been wasted uselessly.

The sprayer calibration demonstrator (see photos) provides an excellent means to practice procedures used to calibrate field sprayers. Students learn to choose the correct size and type of nozzles, to adjust boom height and nozzle spacing for complete coverage and to determine a suitable operating pressure and field speed to apply the precise quantity of active spray material required.

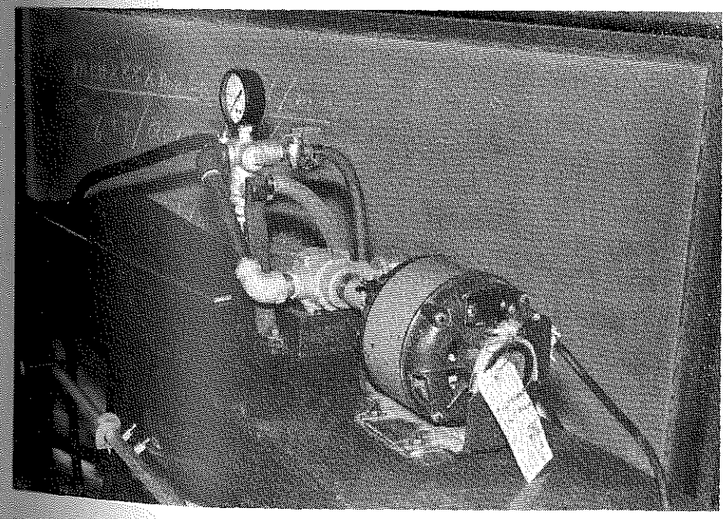
The demonstrator is assembled with a one-half horsepower 1750 rpm electric motor, a nylon roller pump, an adjustable pressure regulator and a pressure gauge. A high pressure jet agitator and an unrestricted over-flow return reduces the effect of varying flow rates on the pressure. The nozzle tips are easily interchanged and the boom height and nozzle spacing are readily adjusted.

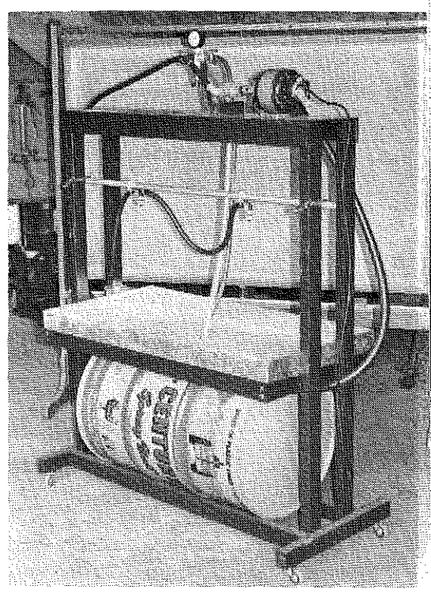
In using the demonstrator, the only assumption necessary is field speed. All other factors may be chosen arbitrarily or a value may be determined to fit with mixed parameters.

As the demonstrator has all of the components found in an actual field sprayer, it serves to illustrate the function of each part of the sprayer and the interaction between those parts.

Finally, in learning to calibrate a sprayer, the same principles used in calibrating other farm implements are involved. Consequently, the sprayer calibration demonstrator provides practice in a procedure of rather broad scope. ◆◆◆

*Associate Professor of Agricultural Engineering, University of Connecticut, Storrs.





The sprayer calibration demonstrator provides an easily portable and adjustable visual aid for teaching machine calibration.

SHOULD I TAKE FRENCH, PHYSICS, OR VOCATIONAL AGRICULTURE?

William Hamilton and Allan Goecker
Teacher Education, Purdue University


Wm. Hamilton


Allan Goecker

"Since you are planning to go to college, Joe, we probably should schedule you into French and physics rather than vocational agriculture. As you know, students who take college prep courses in place of vo-ag usually do better in colleges of agriculture."

Many students have received similar advice in high schools throughout the nation. However, past and present evidence simply does not substantiate the recommendation which was given to Joe.

In an extensive study of all 4,369 students who entered the Purdue School of Agriculture during 1963-72, we found students with and without high school vocational agriculture earned non-significantly different college grades. More specifically, students with and without high school vocational agriculture earned non-significantly different grades in agricultural and non-agricultural courses at the freshman level. Furthermore, the two groups earned non-significantly different grades in all agricultural courses and non-agricultural courses completed toward baccalaureate degree requirements.

Two factors were controlled in the study. Records of students having similar academic ability and home background were analyzed. It was necessary to control the academic ability factor in the study because individuals who entered the School of Agriculture with high school vocational agriculture had Scholastic Aptitude Test scores which averages 100 points less than persons without high school vocational agriculture. The one hundred point differential most likely reflects a high school counseling pattern in which higher ability students were counseled away from vocational agriculture.

Table A, Progress of Students Who Entered the Purdue University School of Agriculture With and Without High School Vocational Agriculture During 1963-68.

PROGRESS FACTOR	Students With High School Vocational Agriculture n=1067	Students Without High School Vocational Agriculture n=1180
	%	%
Graduated from School of Agriculture	55.4	35.9
Admitted to School of Veterinary Medicine	4.6	10.7
Withdrew from Purdue	17.7	19.4
Dropped from Purdue Because of Poor Grades	16.4	10.5
Changed to Other Schools at Purdue	4.3	22.0
Currently Enrolled in School of Agriculture	1.6	1.5
TOTAL	100.0	100.0

Successful completion of a college program of study is paramount when compared to college grades. Purdue School of Agriculture students who had completed high school vocational agriculture clearly were more successful in earning a baccalaureate degree in agriculture when compared with those not having vocational agriculture. Table A also presents other strong evidence that School of Agriculture students having high school vocational agriculture are more strongly committed to agriculture. Only 4.3 percent changed enrollment from agriculture to other degree programs compared with 22.0 percent of those without vocational agriculture.

Traditionally, high school vocational agriculture graduates have performed quite well in colleges of agriculture. Frederick K. T. Tom, in a February, 1960, article in *The Agricultural Education Magazine*, concluded, "The records of more than 17,800 students in twenty states were analyzed in thirty-two studies reviewed. Vocational agriculture seems to be equal to other high school programs as preparation for college."

SOME RECOMMENDATIONS

(1) Students planning to attend an agricultural college should select a high school program emphasizing agriculture, biology, chemistry, mathematics and English.

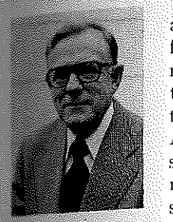
While modern languages may provide good general education, less than ten percent of the School of Agriculture students at Purdue earned or used any college modern language credits in their undergraduate programs of study. In contrast, nearly ninety percent of the students entered the School of Agriculture with high school modern language credits.

(2) Vocational educators in agricul-

(Concluded on next page)

Fitting Vo-Ag Programs into the School Organization

Guy E. Cain
State Supervisor
Vocational Agriculture
West Virginia


Guy E. Cain

There are probably as many different school organizational plans as there are states in the United States. All of these have strengths and weaknesses, and I am sure no one state follows a particular plan. One plan may fit a local situation while another plan would be more desirable in another community. Some states are divided into local school districts, while others have county-unit systems. Some of these school districts and county-unit systems operate on a 6-3-3 plan, others on a 5-3-4 plan, and still others on some other plan.

With the increasing number of area vocational schools come problems of articulation with the local school system. Students interests are divided between their home high school and the vocational school, and many do not attend the vocational school because it may mean giving up participation in the band or athletics. Every effort should be made for students to continue in these activities since they are important in the total development and growth of the individual.

Vocational Agriculture has traditionally been a four-year program, while other services have primarily had two- and three-year programs. The Future Farmers of America Organization has been geared to a four-year program. It has been necessary to make changes in the FFA to accommodate students who may be enrolled for only two years. The awards program has been broadened to provide incentives for students in the specialized training programs.

A four-year, production agriculture program seems to operate more efficiently in a comprehensive high school. There are numerous problems involved with a four-year, production agriculture program in a vocational school where students are transported to the school for one-half day. It is difficult and in some cases impossible for freshmen and sophomores to get their required courses and attend the vocational school for a three hour block. It is highly questionable whether they need this amount of instruction the first two years. It seems to be most desirable to keep the production agriculture or basic vocational agriculture program in the local high school and organize and fit specialized courses in agriculture and agribusiness into the area vocational school.

There are many problems involved in operating an effective FFA program where agriculture programs are established in the local high school and also in the vocational school. One of the greatest problems is a meeting time which is convenient to both the morning and afternoon students. Most vocational schools want vocational youth organization chapters and in many instances this distracts from the FFA chapter in the local high school. Ordinarily a stronger and more effective FFA chapter can be operated in the local high school.

It is most important that every student enrolled in a vocational agriculture course have an opportunity to belong to the FFA. The FFA is an integral part of vocational agriculture and the objectives of the organization are basic to each boy or girl who is enrolled in an agricultural program. The FFA is not an extracurricular activity as some would have us believe. The FFA offers many opportunities for those enrolled in programs that are two, three, or four years in duration. The local FFA chapter program should be geared to the needs of the members and the type of training program being offered. Every situation must be considered on its own and a plan developed that will provide training of the highest caliber and with the least number of problems involved.

It is most important that all concerned with the operation of the school program in a county or school district sit down and work out a plan for the articulation of the vocational program into the school organization. This includes vocational directors, vocational teachers, principals, superintendents, transportation directors, and guidance counselors. Many of the problems encountered can be prevented. After a plan is developed and put into effect, then it is up to all concerned to make the plan work. ◆◆◆

(Hamilton—from previous page)

ture must share these facts with students, parents, counselors and administrators. Correct information is the necessary pre-requisite to correct counseling and decision-making.

(3) Agricultural colleges must continually evaluate various factors which are strongly associated with the success of their students and present the findings to students, parents and educators. A pamphlet entitled, "Some Facts About College Performance of Purdue School of Agriculture Students Who Completed High School Vocational Agriculture" is available from the Purdue School of Agriculture, Office of Resident Instruction, AGAD Building, West Lafayette, Indiana 47907.

"If you are planning to go to an agricultural college, Joe, take high school physics and French if you can, but don't neglect to enroll in vocational agriculture." ◆◆◆

Nigerian Agriculture Students Have Poor Image of Agriculture

*John U. Okorie**

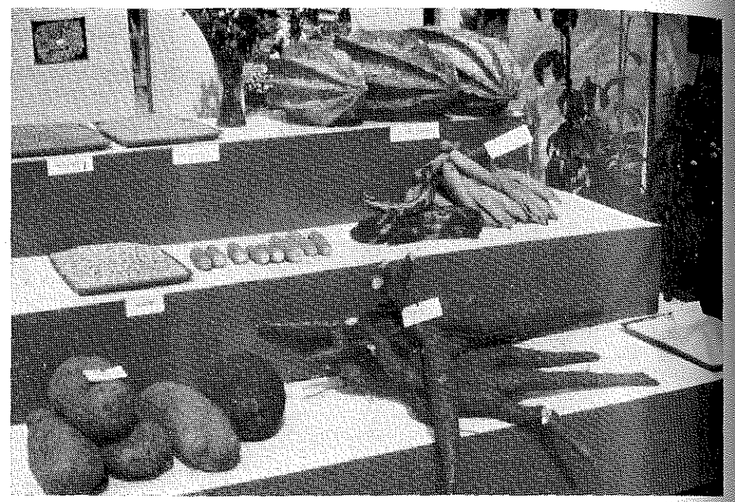
J. U. Okorie

The major occupation of a majority of the Nigerian population is farming. A characteristic farming pattern in the area is what many authors have designated as "land rotation cultivation." Each plot of land is cultivated to exhaustion after which it is abandoned and left to fallow during which period its fertility and productivity are restored. The same plot of land is ready to be cultivated after a period of 1 to 5 years.

Generally, most of the farmers cultivate only small- or moderate-sized plots usually scattered in different locations. The major farming implement is the hoe and machete. Thus, the amount of land under cultivation in a given year is greatly limited.

This humid rain forest area is characterized by the following commercial crops: oil palm, cocoa and rubber; and the principal food crops consist of yams, cassava, cocoyam, maize, rice, cowpeas, beans, bananas and plantains as well as a number of fruits and vegetables.

Agriculture is generally looked down upon, hence, the youth have no inclination to associate themselves with farming. Rather, the young men of today are willing to loiter in the cities indefinitely in search of jobs instead of going back to the land. Agriculture is viewed as the last resort for those who have failed in other occupations. Noticeably, there is a passive feeling by the younger generation towards the elderly citizens who have little or no alternatives other than farming.



A display of the principal food crops of Nigeria consisting of yams, cassava, maize, plantains, rice, and fluted pumpkins.

Therefore, any attempt to curb the massive exodus of the youth from the village as well as their indifference to farming will involve making all forms of agriculture more attractive. Undoubtedly, this could be achieved by a variety of ways, namely, by the introduction of improved farming implements, high yielding crop varieties, improved livestock breeds, better cultural practices and by lessening the amount of physical labor involved in farming.

Agriculture has been offered in most elementary and few secondary schools for several years where it is known as rural science and agricultural science respectively. There has been no evidence to show that some of the students who enrolled in agricultural science in secondary schools have gone into farming.

In as much as the government has good intentions in establishing the agricultural programs in secondary schools, the programs unquestionably require revitalization in order to make the course more attractive to a large number of the students. What may be lacking is the development of a basic philosophy underlying the study of agriculture in both the elementary and secondary schools. Such a philosophy needs to emphasize the value of agriculture in relation to other careers.

The danger in leaving the farming operations at the hands of the elderly citizens without replacement by the young ones is the perpetuation of the inefficiency in production of the much needed food and fiber for the increasing population. Thus, without injecting fresh blood into the present system of farming, the development of agriculture will undoubtedly continue to be a great hinderance to the development of other sectors of the country's economy.

(Concluded on page 88)

*This article is largely based upon John U. Okorie's Ph.D. dissertation: "The Impact of Agricultural Education on Farm Production in Eastern Nigeria." The author earned the B.S. and M.S. degrees from Colorado State University. He is due back in Nigeria to teach Agricultural Education in one of the Nigerian Universities.

TIME FOR THE UNCONCERNED

J. C. Atherton
Teacher Education, Louisiana

J. C. Atherton

How much time and effort should one expend with the trainee who is cold and indifferent and possibly resentful of the teacher, the educational program and the school itself?

This is a problem faced constantly by numerous educators. Especially is the young unseasoned teacher confronted with this decision. It is easy to rationalize that time is limited and the disinterested or rebellious student merely consumes time that could be used elsewhere more effectively.

When can one rightfully say that enough time has been expended on the individual? Realistically one should continue to work with and cultivate the student as long as there is a need that the program can meet. The needs of the student should be the basis for deciding upon the effort to expend, not the degree to which he responded to efforts put forth.

It is recognized that to make progress with the student the teacher must win his confidence and friendship. There must be a change of attitude which does not always come quickly. Indifference is not easily broken down. A continuing effort is required on the part of the teacher to overcome this apathy and even at times open hostility.

The student usually is not aware of his own personal needs. He may have been born into and lived in a family situation that is not conducive to development of good citizenship or of goals and plans for one's career. Broken homes, lack of parental care and love, and similar unfortunate circumstances may have left their psychological scars upon the youth. Overcoming these obstacles is no simple task. An ongoing program is required to help alleviate these deficiencies.

In order to convince youth that the teacher is concerned with their problems and needs, a prolonged period of cultivation of parents as well as students must be followed in some instances. Convincing the unconcerned that they are wanted and that one desires to assist them may be a slow laborious task. However, the effort is worthwhile, because a life is at stake. There is also a challenge for the instructor to do the seemingly impossible.

It is tragic, on the other hand, for the teacher or the school as a whole to give up on a young person and leave him doomed, almost certainly to mediocrity when there is still hope that the life may be salvaged for useful citizenship. It is recognized that some may never respond even to constant cultivation, but what a blessing it will be for those who do!

As educators and community leaders, we come in contact with these youth almost everyday, in school and out. These associations range from the highly involved to the casual, impersonal, and almost automatic. Some are warm and personal while others are cold and detached. Each of these contacts has some influence upon those about us; however, often one has not permeated through to the inner selves of the students. To do this they may have to be cultivated extensively. Planned activity should play a major role in "breaking the ice" and drawing out the reluctant ones. Unscheduled events occur, also, in which one can find opportunity to show recognition of the individual and to demonstrate concern for him. One's actions and attitudes often mean more to the youth than do the spoken words.

Some of the problems faced cannot be solved by the teacher of agriculture alone. And realistically, he should not attempt to do the entire job. Advice, counsel, and material assistance should be secured from other teachers, and in some cases from persons in the community.

There is no guarantee that the one for whom we are concerned will ever respond affirmatively. It is to be expected that some will not, but it is seldom that one bats 1,000 in anything. The purpose of the instructor is to bring about a modification of the understanding, behavior, and attitudes of individuals. This requires effective instruction and inspiration. The presentation must be clear, understandable and related to the life of those receiving the teaching.

There is often a relationship between teacher attitudes and his ability to communicate effectively with those he is attempting to influence. It is most difficult to conceal one's true feelings from those whom one is in close contact.

In working with the unconcerned as with any other group, the teacher needs some definite and precise goals. Without this, one direction is as good as any other. The good archer, it is said, is known by his aim, not by his equipment. Ways and means required to reach these objectives should be devised once there is a clearcut end to be sought. Procedures to follow will be dictated by the results desired. It is imperative that the teacher knows each person as an individual having a unique personality. This personal knowledge will indicate the methods to follow in relating to this specific person.

Many of these youth have had experiences that are not understood by others and frequently not by themselves. Their adjustment may require much more than just sympathy. Ill-advised remarks although made with good intentions, may adversely affect the youth.

Meeting the needs of this "neglected" group requires patience, insight, and concern. Emotional assistance may be one's greatest need. This can best be expressed in a normal atmosphere of friendliness. Building unity within the class to include all is a stabilizing influence.

(Concluded on page 88)

(Okorie—from page 86)

In a recent study conducted by the author, virtually all the 200 students interviewed wanted to see agriculture become a part of the secondary school curriculum in rural areas. Similarly, they expressed great need and interest for the establishment of a national youth organization for the promotion of agriculture.

The students were of the opinion that to be a good farmer required more than secondary education. This expression is a reflection on the present people engaged in farming. Apparently, they attributed the poor performance of the farmers to their lack of adequate education, hence, logically higher education is a prerequisite to good farming.

More significantly, the study revealed that lack of interest as well as students not being serious with their agricultural subjects are factors of great concern in developing agricultural programs in secondary schools. Several factors are attributable to their disinterestedness in farming and its related occupations. A sizable number of the students maintained that better trained teachers were needed to teach agriculture in secondary schools. There was an acute shortage of textbooks and materials. In addition, parents were not cognizant of activities being carried out by their children in the schools. The involvement of parents in some agricultural activities performed by the children would be beneficial in reinforcing such activities as well as help in the development of confidence and dedication among the students. There was a persistent complaint by the students that the use of the hoe and machete for the school farm activities, essentially taught them nothing. More than 92.0 percent of the students would like the introduction of farm machinery and equipment for use on the school farm.

A majority of the students believed that agriculture is a good occupation and that it has the potential for future rewards, yet many were not willing to accept the farm as the best place for young people. This information illustrates clearly the value placed on farming by secondary students.

There was a widespread popular expression by students and teachers concerning the indifference of the government towards agriculture in secondary schools. Journals, bulletins, magazines and other teaching aids were unavailable in most of the schools. However, it should be mentioned that the school syllabus deals specifically with basic facts in agriculture which are designed purposely to enable the students to pass their comprehensive final examinations. Thus, there is relatively not much emphasis being placed on modern agriculture per se. Although farm projects are not required by students who enrolled in agriculture, it was observed that a majority of the students expressed the need for individual farm projects. They considered such projects very meaningful and valuable in their overall agricultural programs.

In the study, agricultural students were requested to evaluate several occupations. The result showed that farmers, medical doctors, and engineers were rated highly by the students. However, the high rating of farmers does not imply a willingness or desire to choose farming as a career. Farmers were judged principally from the standpoint of their role in the society in producing food and fiber for the people. In contrast to the farmers, the high ratings of medical doctors and engineers emerged from the high concepts students have about the two professions. Their responses indicated both willingness and desire to be a part of these groups. In addition, prestige and financial remunerations were factors that influenced their considerations.

On the question of occupational preferences upon graduation, 14.3 percent of the students expressed a desire to become farmers. In the author's opinion, this percentage seems too high. Noticeably, it is not popular nor the pattern for students to enter into farming upon completion of secondary education. Usually many parents desire their children to secure employment with the government or other agencies rather than farming. Others want their children to further their educational training. It is the author's belief, that this section of Nigeria has not yet reached the stage in development where secondary students would not seek outside employment but would rely solely on farming for their livelihood.

A number of suggestions were made by the students for improving the secondary school agricultural programs. There was a demand for well-trained agricultural teachers who can make the subject appealing to students. A great deal of emphasis was placed on the provision of textbooks, laboratory equipment, money to purchase seeds, fertilizers and insecticides. The students expressed the need to have current agricultural journals and audio-visual materials about modern farming. The acquisition of these materials, they estimated, would deter other students from ridiculing those enrolled in agriculture. In addition, they called for the introduction of series of lectures by prominent agriculturists to help erase the bad image of agriculture in secondary schools.

The need for government support was mentioned by every student in the study. However, there were variations of need. Among those frequently mentioned were, encouragement for student tours and trips, provision of irrigation water, financing and encouraging agricultural societies, scholarships for agricultural students, introduction of machinery and equipment for use on school farms, employment of agricultural students on graduation, and enlargement of the agricultural curriculum. ◆◆◆

(Atherton—from page 87)

The unconcerned tend to avoid class, club and other forms of responsibility. They attend, but attempt to stay free from involvement and personal confrontation. It would be easy for the instructor to rationalize that the school class and special activity is here for them; let them take it or leave it. It's their prerogative and others shouldn't interfere. Besides, maybe they will come around in time once they "see the light." Unfortunately this pessimistic approach seldom gets positive results. It just sweeps the dirt under the carpet with the pious hope that all will work out well. This method rarely brings about well-adjusted, active, interested students.

Numerous obstacles prevent us from being the effective teacher we should be with the students who tend to deviate from the norm. Some of these are short sightedness, a lack of planning or poor planning, and a lukewarm commitment to our task.

Working with the so-called unlovely can be very frustrating. It is a time-consuming process. Yet, it produces marvelous dividends for those who are dedicated and tenacious. ◆◆◆

AGRICULTURAL EDUCATION AND OSHA

Ronald A. Brown
Agricultural and Extension Education
Mississippi State University


Ron Brown

Most agricultural educators are aware of and concerned about safety as it relates to their occupations, their educational programs, and their students. Very few agricultural teachers fail to include safety instruction in their educational programs for in-school and out-of-school students. Yet, the accident rate in agricultural occupations has increased in the last decade, while the rates in other major industries has decreased. Because of the increased awareness of the need for safer and more healthful work environments, teachers of agriculture should be interested in and become familiar with the implications of the Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA). This law was enacted to assure, so far as possible, a safe and healthful work environment for every working man and woman in the nation.[1] This goal should also be desirable for agricultural employees, employers, and students.

Why Should Agricultural Educators Be Concerned With OSHA Regulations?

At the present time, schools are not compelled to comply with regulations under the Federal OSHA Act (PL91-596). However, before considering the Act to be irrelevant to safety education programs, teachers of agriculture and other school personnel should consider the following statements.

1. The OSHA standards provide a comprehensive guide to occupational safety and health for employees and employers, and may be considered a safety and health "Bill of Rights."
2. It is assumed that fewer and less severe accidents will occur as a result of OSHA standards having been met. This should be a high priority goal for agricultural educators. In addition, it is probable that teachers and their employers will be less liable for litigation in case of accidents involving students once OSHA standards are met.
3. Each individual state is encouraged to enact its own OSHA legislation. Before federal control is relinquished, however, several requisites must be met. One is that each state must establish and maintain a program applicable to all employees of public agencies of the state and its political subdivisions.[2] This means that schools and employees of schools will be covered under any state legislation that is accepted by the Federal Occupational Safety and Health Administration, including agricultural education teachers and facilities.
4. The Comprehensive Employment and Training Act of 1973, PL 93-203, ensures that appropriate standards for safety and health are established and maintained. Thus, institutions operating under this Act must comply with OSHA regulations.[3] This same requirement could very well be included in future legislation involving other monies under which vocational education programs are administered.
5. Agricultural students are potential employees and employers and should, therefore, be familiar with their duties and responsibilities under OSHA. In addition, many students are placed in off-farm and on-farm cooperative work situations and should certainly be knowledgeable enough to comply with OSHA standards and to cooperate with employers who are in compliance.
6. Individuals from agribusiness firms and farms who are enrolled in adult and young farmer agricultural education classes may need and desire information regarding OSHA standards and compliance procedures. Individual members of communities may also seek such information from teachers of agriculture.
7. Compliance with OSHA regulations could prove to be economical for agricultural and educational organizations. Some companies in the United States now pay reduced insurance payments as a result of action taken in developing improved occupational safety and health plans. Officials of the DuPont Corporation have, at national meetings, reported a return of three dollars for every one dollar invested on OSHA and OSHA plans.[4] This return on investment came as a result of a reduction in workman's compensation payments and down time and does not include such intangibles as increased morale. Similar benefits could accrue to agricultural businesses and educational institutions.

Considering the above statements, it seems that compliance with OSHA standards by agricultural educators and educational institutions is now desirable and could soon be compulsory.

How Can Agricultural Educators Implement OSHA Standards?

Even though provisions for mandatory compliance of covered industries with the standards are present in PL 91-

1 Occupational Safety and Health Act of 1970, Public Law 91-596, 91st Congress, S2193, December 29, 1970.

2 Ibid., p. 19.

3 Bjornson, Rolf T., *School Shop*, Vol. 33, No. 8, p. 26.

4 Glaze, James R. "The Development of Educational Programs for Environmental Safety and Health Use." Unpublished paper, Division of Environmental Health & Safety, University of Illinois, Urbana, Illinois, July, 1974.

(Concluded on page 91)

Horticulture at Deming, Washington

by Grace Muente

Mr. Jay Booth, a Vocational Agriculture teacher at Mount Baker High School in Deming, Washington had a dream. He wanted to specialize and teach horticulture in a workable greenhouse-classroom, with a career education direction. Mr. Booth presented his plan to the superintendent, William Castles, who directed this achievement and helped it become a reality.

The structure is a thirty by ninety feet commercial facility, but only from the floor up. The floor plan as designed by Mr. Booth to facilitate student traffic, is student oriented. Mr. Booth feels, "that a greenhouse is a tool itself to propagate plants, and in the best possible way by students." Here a class of twenty students can work together. The way commercial greenhouses are designed would not meet classroom needs. "For one thing," Mr. Booth explained, "the isles are much too narrow and do not lend themselves to student traffic."

Mr. Booth jokingly referred to Mount Baker's "growing interest" in horticulture and related nursery skills.

Inside the building, Mr. Booth divided the space into two separate working areas, both of which are separately heat and moisture controlled. The forward, smaller working area is used for several purposes. One is the mixing of different soil combinations, such as pasturized sand and peat moss to be used as a soil medium. Here too, a refrigerator is used to winterize tree seeds. A stove is used to pasturize soil in the oven at a temperature of 140 degrees Farenheit. Mr. Booth explained, "This temperature will pasturize but not sterilize the soil. A temperature of no more than 140 degrees Farenheit will kill detrimental organisms, but will not harm beneficial organisms."

The second larger area contains thirteen growing benches plus two propagating benches where Mr. Booth built overhead plumbing designed to spray mist over plant cuttings which are growing roots. These two benches have overhead wooden frames from which plastic sheets have been hung under easily removed bolted sections. The plastic sheets help to control humidity. Mr. Booth and his students decided on the best height for maximum student convenience. Just under the table surface are heating cables to help warm the plants and aid growth.

The width of the bench is 52 inches, and the area between each bench on the concrete is forty-eight inches. The height is thirty-two inches. These propagating and growing benches were designed and built by Mr. Booth and his students. Together they decided the best height and width of the bench, so the majority of students, who stand at the edge of the bench could reach comfortably to the center of the bench. They also had to consider and plan the bench design so it would support the flats and pots of growing plants.

Under each bench is a twenty inch layer of course gravel. "The gravel itself has greater surface area, as compared to solid cement, and gives off more moisture to help maintain the needed humidity," Mr. Booth explained. Also the gravel channels drainage water coming down from the bench as plants are watered.

Six students have ample working room at one bench, with three on a side. The space between benches provides room for movement by students. A central isle is widest of all and gives even greater space for mobility.

The students grow everything from seeds. After a plant such as the Coleus has matured, sections are pinched off and placed in the propagating bench for rooting.

Mr. Booth planned and ordered fifty varieties of seeds to be grown by the students. These plants include ornamentals, vegetables, trees and other outdoor plants.

An individual student starts working with a six by six inch flat, when he starts planting seeds, perhaps in three rows with ten seeds in a row. As these seeds grow in his specially prepared soil, a student will transplant the crowded plants into other flats or small containers where they will be less crowded. A student will plant seeds into many six by six inch flats, Mr. Booth explained, "Many of the seeds are dust thin, so the number of seeds planted into rows are dependent on the seed size."

Some of the seeds which grow into healthy plants may be transplanted to the land laboratory. A well planned outdoor area will shortly become a reality on two acres of land. "This includes," Mr. Booth said, "a forest nursery and Christmas tree plantation, a small fruit garden, ornamental and vegetable gardens, a fruit tree orchard, a landscape display area, and turf management plots."

Students who wished sold many of their plants at the all-school Spring Festival. Other students felt very possessive and did not want to sell their plants. Mr. Booth felt that the decision should be the students' own decision.

The tree seeds which students planted included, Colorado Blue Spruce, Scotch Pine, Sugar Pine and Mugo Pine. These seeds were started in cylinders, and will be transplanted into larger pots, and finally transplanted outside into the three sections of the land lab. Eventually these trees will be sold as Christmas trees.

In planning the overall curriculum, Mr. Booth remarked, "My number one objective is building positive and constructive student attitudes." He does this in a number of ways. First, he introduces his students to the mechanics of the greenhouse itself, the temperature controls, and the moisture controls. Together they experiment to find out the best growing conditions. Results from different daytime and nighttime controls are examined. Experiments to discover the best fertilization rates are tried. Mr. Booth calls these skills his "how to grow plants and keep them healthy methods."

Then he helps individual students achieve success. Students can see plant growth while they can feel their own occupational growth, because they acquire plant "know how." Growing plants is something that students can do their entire life. They can grow their own plants and even trees and edible foods. As vegetables and fruits become more expensive, home grown foods can ease the grocery bill. As the students learn to grow plants, they can see wonderful results, and thus feel more confident. They are producers. Other people come to them to learn from them, and even take advice from them, including their own parents. This will give the students more status.

Horticulture teacher, Jay Booth of Mount Baker High School at Deming, Washington, shows his students the new tree cylinders.

Growing plants can become a career for interested students. Mr. Booth's class work provides skills relative to an assorted number of occupations. Different occupations are studied and introduced to students such as: outdoor turf occupations which include: highways, parks, golf courses, landscape design, cemetery management, gardening, and forestry. Mr. Booth also introduces olericulture or vegetable growth and hydroponics, or greenhouse soiless production.

Mr. Booth's philosophy in working with students is of considerable interest. It does not consist of the usual teacher-student relationship, but rather that of potential employer, employee relationship. He relates his classroom practices to the working world. He demonstrates how and why advancement is given in the world of work, for example from seed planter to crew boss, or even how a disinterested employee can be given his walking papers.

Awareness of the work involved will give these students a tolerance and an appreciation for all growing things, both wild and cultivated. One of Mr. Booth's students put it succinctly, "Learn today for a greener tomorrow."

Mr. Booth has enthusiastic plans for second year students, such as individual projects, continued time spent in experiments in soil mixes, both for indoor and outdoor plants, fertilizer experiments, plus study in weed control, and other experiments of the student's own choice. A search for the most ideal conditions for plant growth will never end. The most up-to-the-minute knowledge of herbicides and insecticides will also be examined. Charts and records will be kept and studied.

Because of adult interest and requests, an adult class may be organized by this quiet softspoken man with a dream that came true. ◆◆◆

(Brown—from page 89)

596, voluntary compliance is encouraged. Agricultural educators and institutions in which they are employed should begin immediately to plan and implement an effective safety and health program.

To obtain information and assistance in planning and implementing safety and health programs, teachers of agriculture may want to consider in-service education courses, institutes, and workshops. Publications from various organizations may also be useful, including those from OSHA offices.

To identify and appraise the problems which may be present in a school situation, teachers may make a mock inspection of their facilities and "write-up" violations just as an OSHA compliance officer would do. Most of the inspection is visual and can be made without any special equipment. Equipment such as sound and light meters may be rented or purchased by the school district.

The next step, developing prevention and/or correction procedures, should be planned on a sequential basis, since everything cannot be corrected at once. Highest priority should be placed on the problems which are considered to be most dangerous.

After prevention and correction procedures have been developed, they should be communicated and implemented. An important concern here is education. For example, an agricultural mechanics shop may meet all OSHA regulations, yet, if students are not adequately instructed regarding their responsibilities in using tools and equipment in a safe manner, accidents will be likely to occur. Safety instruction should be integrated into the total agricultural curriculum and should involve students who are in the program. Traditional techniques such as films, demonstrations, and lectures may be supplemented by student OSHA committees, FFA safety campaigns, field trips, resource persons, and merit and/or demerit safety programs.

To determine the effectiveness of the procedures which have been implemented, teachers should conduct a thorough evaluation. Another mock inspection may be performed to analyze the effectiveness of procedures used to correct problems with school facilities. The educational aspect of the plan should also be evaluated. Many teachers do this by developing a safety quiz and requiring a certain score before students are allowed to use shop equipment and facilities.

Agriculture is the "back-bone" of this nation. The ability to produce agricultural products is the one "big stick" the United States still wields in the world market. If teachers of agriculture become concerned and implement the above, or similar models, employees and employers in agricultural occupations should be benefited. ◆◆◆

STUDY PLUS EMPLOYMENT EQUALS HIGHER EARNINGS

George W. Forgey
Teacher Education
Illinois State University

This study was attempted to determine characteristics of work situations which tended to increase post-college earnings of junior college graduates. These characteristics, if defined, could be helpful in counseling students and planning cooperative educational work programs for the purpose of securing maximum wage earning power of junior college graduates. The work reported here represents a follow-up study, conducted in 1973, of 151 junior college graduates who were employed while attending junior college. The original study (Forgey, G. W., *Selected Economic Benefits From Illinois Junior College Programs,* 1971) revealed that those who were employed while attending junior college had significantly greater mean earnings than those who were not employed during college years.

Further investigation showed that the significant difference in mean earnings of those who were and those who were not employed during college years was found in the occupational male group. There was no statistical difference in mean earnings between those who were and those who were not employed during college years in reference to occupational females, transfer males and transfer females.

At this point, it may be appropriate to remind the reader that the subjects included in this study embraced only those junior college graduates who entered the field of work immediately after graduating from junior college in 1968. In this sense, the transfer program graduate was abandoning his original goal, that is, to go to a four-year college or university. Also the subjects included only those who graduated from high school in 1966 and began their junior college work in the fall of that year.

The hypothesis explored in the follow-up study was: "Junior college graduates who were employed as students in jobs related to their post-college occupations will have greater mean earnings than those graduates who were employed as students in jobs unrelated to their post-college occupations."

The hypothesis was first examined by comparing the 1970 mean earnings of those who were and those who were not employed as students in jobs related to their post-college occupations. The same procedure was followed for all male subjects and all female subjects.

The data revealed that the hypothesis was tenable for the entire group. Further, the data support the hypothesis in reference to the female subjects. However, the hypothesis was not supported by the data in this study where male subjects were compared, i.e., males employed as students in jobs related to their post-college employment did not receive significantly higher mean earnings than those males employed as students in jobs non-related to their post college employment.

In order to determine more clearly where significant differences in earning power existed, the subjects were divided into groups; by sex and program.

Interestingly, with the exception of males graduating from transfer programs, males, whether or not student employment was related to their 1970 occupations, earned significantly greater mean earnings than their female counterparts. There was no significant difference in the 1970 mean earnings of transfer males and transfer females nor was there any significant difference between the 1970 mean earnings of occupation female and transfer females. This lends support to the conclusion that earnings were largely determined by type of programs males pursued. These data also support the conclusion that sex is a significant determinant of earnings. The strength of the sex variable is further indicated by the observation that males earned significantly greater 1970 mean earnings than females whether or not their student employment was related to their post-college employment.

In this study, as in the original study, it was clear that those who were employed a greater number of hours per week while in college had significantly greater mean earnings in 1970.

Relationships between student employment and post-college employment were further explored by asking the following questions: 1) were you employed in the same occupation in 1970 as you were while attending junior college? and 2) did you have the same employer in 1970 that you had during junior college as a student? The purpose of these questions was to determine characteristics of work situations which might influence post-college earnings.

Analysis revealed that 40.5 per cent of the junior college graduates were employed in occupations in 1970 that were related to their student employment. Of the total group studied, 29.8 per cent had the same employer in 1970 that they had as a student in college. The data for those subjects whose earnings were in the upper 20 per cent indicated that 43.8 per cent were employed in the same occupation in 1970 as they were during college years. Of this group, 50 per cent had the same employer in 1970 that they had as a student in college. In comparison, fewer of those whose earnings were in the lower 20 per cent were in the same occupation in 1970 (31.3 per cent) and only 18.18 per cent of them had the same employer in 1970 as they had during college.

A comparison was made of 1970 mean earnings received by those in the upper and lower 20 per cent earning brackets on the basis of whether or not the subjects were employed in the same occupations and by the same employers as in their college employment.

It was found that those who remained in occupations related to their college employment had significantly greater mean earnings. Those in the upper 20 per cent who had the same employer in 1970 as in college received significantly greater earnings than those who had different employers. This was not true for those in the lower 20 per cent earnings bracket.

Conclusions

The following conclusions appear to be warranted from the analysis of the data encompassed by this study:

1. Junior college students employed in jobs related to post-college employment will have greater earnings than those employed in jobs not related to their post-college employment. This conclusion was supported by the fact that the 1970 mean earnings of junior college graduates was significantly greater for those who were employed as college students in jobs related to their post-college employment than the earnings of those who were employed in student jobs not related to their post-college employment.
2. Sex was a main determinate of earnings as evidenced by male junior college graduates having significantly greater 1970 mean earnings than did female junior college graduates.
3. Pursuit of an occupational program increased the earnings of male junior college graduates. Male occupational program graduates had significantly greater 1970 mean earnings than did female occupational program graduates who entered the field of work immediately after graduating from junior college.
4. The number of hours employed per week as a student contributed to the earning power of graduates. Those who were employed more than 20 hours per week as students had significantly greater 1970 mean earnings than those who were employed 20 hours or less per week. Extensive employment during college may have had a beneficial effect since occupational competencies were gained or seniority was acquired with a subsequent escalation of the wage scale.

TABLE 1

COMPARISON OF EARNING POWER BY SEX AND PROGRAM

Groups	N	1970 Earnings Mean	1970 Earnings Std.	t-value
All Males	48	$7884.74	$2588.70	3.51[a]
All Females	34	6100.00	1635.67	
Occupational Males	29	8465.52	2777.78	3.21[b]
Occupational Females	22	6372.12	1289.53	
Transfer Males	14	6600.00	2096.60	1.43[c]
Transfer Females	9	5288.89	1992.45	
Occupational Males	29	8465.52	2777.78	2.17[d]
Transfer Males	14	6600.00	2096.60	
Occupational Females	22	6372.12	1289.53	1.73[e]
Transfer Females	9	5288.89	1992.45	
Males (Related Student Employment)	30	8190.00	2725.92	3.51[f]
Females (Related Student Employment)	23	6626.09	1376.26	
Males (Non-Related Student Employment)	18	7312.50	1665.41	2.99[g]
Females (Non-Related Student Employment	11	5000.00	2337.05	

[a] A t-value of 2.02 is necessary for significance $\alpha = .05$.
[b] A t-value of 2.00 is necessary for significance $\alpha = .05$.
[c] A t-value of 2.07 is necessary for significance $\alpha = .05$.
[d] A t-value of 2.02 is necessary for significance $\alpha = .05$.
[e] A t-value of 2.04 is necessary for significance $\alpha = .05$.
[f] A t-value of 2.02 is necessary for significance $\alpha = .05$.
[g] A t-value of 2.05 is necessary for significance $\alpha = .05$.

Recommendations

It is possible that the findings of this study would not be found among junior college graduates and in other time spans. With the foregoing considerations the following recommendations are given:

1. Follow-up studies of this type should, where appropriate, follow the original study as quickly as possible. The extreme mobility of the general population makes it very difficult to re-establish communications after a lapse of two years.
2. The compilation of essential competencies for each occupation should be made and constantly revised as technology dictates. This would greatly benefit the assessment of benefits contributed by a specific work situation, counseling of students, and formulating educational programs. Educational programs should be developed which will, where possible, incorporate competencies common to a cluster or family of occupations. The program should strive to teach for transfer of learning to more adequately meet the needs of those students whose occupational goals or occupational choices may change either during college or during post-college years.

(Concluded on page 95)

An American Farmer Success Story

Don Weston

Charles Knight

Don Weston and Charles Knight
Vocational Agriculture Teachers
Franklinton, Louisiana

Building on his FFA training and his early work experiences on his father's dairy farm, Gary Bond owns and manages one of the most successful dairy farms in Washington Parish, (La.).

At 28, Gary feels his dairy herd is large enough and now intends to increase efficiency while reducing labor and time costs on the Stoney Point farm. His dairy herd's average production is 40 to 45 pounds of milk per cow per day, averaging 10,000 pounds per cow per year. The Louisiana statewide average is 7,500 pounds per year. He feels that good grass and feed play a major role in maintaining his herd's good production. Gary keeps 30 acres in permanent pastures and plants 150 acres in winter pastures. Oats and rye grass are the backbone of the winter pastures and Bahia dominates his summer planting, totaling 8,000 to 10,000 bales of hay a year. Corn and soybean meal round out the grass diet. His herd is fed according to production, and he feels that the key to better producing cows lies in breeding them. He is now experimenting with the Chianiana breed in an effort to establish a successful beef herd.

About a year ago, several Holsteins were artificially bred to pure Chianiana stock and will soon breed the half Holstein-half Chianiana back to pure Chianiana.

Gary began experimenting with Chianianas because they are big, fast growing animals suitable for a beef herd. Since he feels his dairy herd is large enough, he is considering going into the beef business as an alternative means of expanding. "But," he said, "I'll have to find me another piece of land somewhere. The 230 acres of this farm can't support too many more animals."

Thirteen heifers and 18 bulls now comprise his Chianiana-Holstein herd. Herd replacements are bred artificially. The young dairyman feels that good breeding practices are largely responsible for improving the production and quality of his milking herd.

Herd health is emphasized and all calves are vaccinated at six months for brucellosis, blackleg, and leptospirosis. Bond said his calves have a low mortality rate of four percent. He guards his herd against mastitis, an infection of the udder, with a dry antibiotic treatment when the animal is out of production.

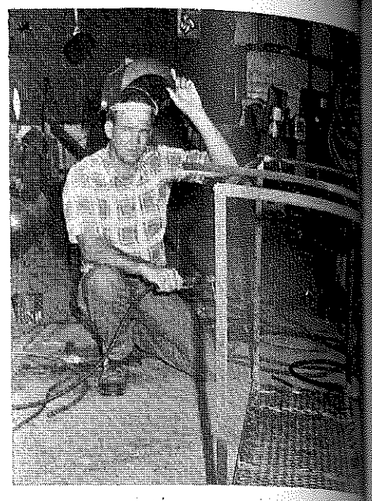
Gary is always looking for new ways to increase efficiency and reduce costs on the successful farm.

He participates in the Dairy Herd Improvement Association program (DHIA), a record keeping program to determine the animals' exact milk production.

A recent efficiency addition to the farm was the oxidation pond. After the afternoon milking, the cement floor of the holding pen is hosed down and the water flows into the pond which is equipped with a pump to recycle the water, thus reducing water costs.

Another money saver is the farm shop. "We couldn't make much profit if we couldn't handle nearly all our repairs," he said. While in school at Franklinton High, Gary was named Star State Agriculture Mechanic in FFA competition.

Gary was an outstanding FFA member in his high school years and now holds the American Farmer Degree, the highest FFA degree awarded for



Gary pauses momentarily from welding a squeeze chute with a catch gate for baby calves to be vaccinated in. Welding is one of the many jobs he does in his shop. His shop skills earned him the Star State Agricultural Mechanics award in FFA competition while in high school.

out of school programs. He received his State Farmer Degree in 1963, the year he graduated. He was also President of the Franklinton FFA Chapter in his senior year.

Gary's first calf was a chain heifer he received through a civic club. He's shown he hasn't forgotten the valuable experience he gained from caring for that calf by his donation of a steer to the Franklinton FFA Chapter to begin a beef chain.

J. C. Simmons, his former Vocational Agriculture Teacher and now an Area Vo-Ag Supervisor with the Louisiana State Department of Education, assisted him in getting his start soon after high school graduation with the Junior Livestock Loan Program. With the loan, Gary bought his basic herd of about 20 animals which he combined with his father's herd.

Gary gives his high school Vocational Agriculture training and the follow-up assistance given him by the local Vocational Agriculture teachers much of the credit for having the type of successful farming operation he now has. He shows his appreciation of their assistance by cooperating in many ways with the Franklinton High School Vocational Agriculture Department and FFA Chapter. ◆◆◆

BOOK REVIEWS

PRINCIPLES OF DAIRY SCIENCE, by G. H. Schmidt and L. D. Van Vleck. San Francisco, California: W. H. Freeman and Company, Copyright 1974, 558 pp., $15.00.

This book is designed for use as a text for courses in dairy science. The dairy farmer and other professionals will find it useful as a reference, as will students of agronomy and farm management. The emphasis of the book is on applying the principles of physiology, nutrition, genetics and the economics of the dairy farm situation. The book is divided into six major parts: Introduction; Milk Secretion and Harvest; Dairy Cattle Breeding and Selection; Feeding Dairy Cattle; Dairy Cattle Reproduction and Dairy Cattle Management. These six major areas are further sub-divided into individual chapters dealing with more specific areas as related to the titles.

The authors have considerable experience in dairy and teaching. G. H. Schmidt, Professor of Animal Science at Cornell University, has taught courses in dairy production and physiology of lactation. He has conducted research in milk secretion, mastitis control, milking procedures, nutrition and physiology of lactation. He has also managed an 80 cow dairy herd. L. D. Van Vleck, Professor of Animal Science at Cornell University, holds the 1972 award in animal breeding and genetics of the American Society of Animal Science. He teaches introductory and advanced animal genetics, as well as dairy cattle breeding.

This text will be most useful for students taking courses in dairy cattle production and management. People who supply services, such as extension agents, consultants, feed dealers and technicians will find this book to be an excellent source of current information about dairying. The book covers well the small, often overlooked but very important details connected with the different aspects of dairying. Some examples of such areas are mastitis prevention and control, milking procedures, milk machine operation, and production records. The use of a wide variety of graphs, charts and up-to-date pictures make the book easy to read and make difficult areas such as genetics, reproduction and nutrition a lot easier to understand.

As a text, this book would best serve senior high school and post-high school students enrolled in dairy production or dairy management courses.

James J. Kastanek,
Vo-Ag Instructor
Albany Area Schools
Albany, Minnesota

ECONOMICS OF AMERICAN AGRICULTURE, by Walter W. Wilcox, Willard W. Cochrane, and Robert W. Herdt, Englewood Cliffs, New Jersey: Prentice-Hall Publishers, Inc. 1974, Third Edition, 503 pp., $14.95.

In this new edition the authors, all of whom are well known agriculture economists, explore the latest available information in the agricultural sector of the economy with relation to production, marketing, consumer behavior, non-farm agencies and institutions, and government involvement.

The book is organized into six parts. The titles of these parts are: The Production of Farm Products; Marketing Farm Products; Toward an Understanding of Farm Prices; Farmers in the National and World Economics; Human, Material, and Financial Resources of Agriculture; and Price-Income Policy Problems. Each part is further divided into three or more chapters.

The descriptive material contained in this edition is well substantiated by updated statistical data, charts, and graphs. The organization of the chapters is very good and contributes to the readability of the text. Points for discussion are given at the end of each chapter and are comprehensive of all major concepts presented in the chapter.

The book is written primarily as a comprehensive introduction to agricultural economics in that it describes each segment or problem area in American agriculture giving the latest available information (as of 1970) and introduces modern economic analysis as a means of helping readers understand the forces at work in these areas.

This new edition is a readable, teachable text for a college level course in the economic developments of a highly dynamic agriculture. It has some chapters that may be useful as specific reading assignments for advanced agricultural students at the high school level and should prove useful as a reference for vocational agriculture teachers who are interested in up-to-date data and information on the national farm economy.

Howard I. Downer
Occupational Education Department
The University of Tennessee at Martin

(Forgey—from page 93)

3. Counseling of students should include a continual assessment of individual goals and their economic implications. Students should be counseled on the feasibility of their advancement in a chosen occupation. Educational institutions, students and society in general can ill afford to expend money, effort and student talent in training programs which offer little to society and individual advancement.

4. Junior colleges should be sensitive to the needs of their constituents. New programs should be considered as community needs change. Similarly, programs once established should be modified as societal needs change. ◆◆◆

From the Book Review Editor's Desk . . .

BOOKS TO BE REVIEWED

AGRICULTURAL GENETICS: SELECTED TOPICS
Edited by Rom Moav
Halsted Press, A Division of John Wiley & Sons, Inc. (1974)

INSECTS IN RELATION TO PLANT DISEASE
By Walter Carter
John Wiley & Sons, Inc. (1973)

TEACHING VOCATIONAL AGRICULTURE IN THE PHILIPPINES
Edited by Dolores Barile, Harold Cushman & Severino Santos, Jr.
University of the Philippines (1973)

APPROVED PRACTICES IN RAISING AND HANDLING HORSES
By Donald Ulmer and Elwood Juergenson
The Interstate Printers & Publishers, Inc. (1974)

LAW FOR THE VETERINARIAN AND LIVESTOCK OWNER
By H. W. Hannah and Donald F. Storm
The Interstate Printers & Publishers, Inc. (1974)

AGRICULTURAL WASTE MANAGEMENT: PROBLEMS, PROCESSES, APPROACHES
By Raymond C. Loehr
Academic Press, Inc. (1974)

ENVIRONMENTAL CONSERVATION EDUCATION
A Selected Annotated Bibliography
By The Conservation Education Association
The Interstate Printers & Publishers, Inc. (1974)

HOW TO EAT BETTER AND SPEND LESS
A Complete Guide to Vegetable Gardening
By Eddy Rice
Reston Publishing Company, Inc. (1974)

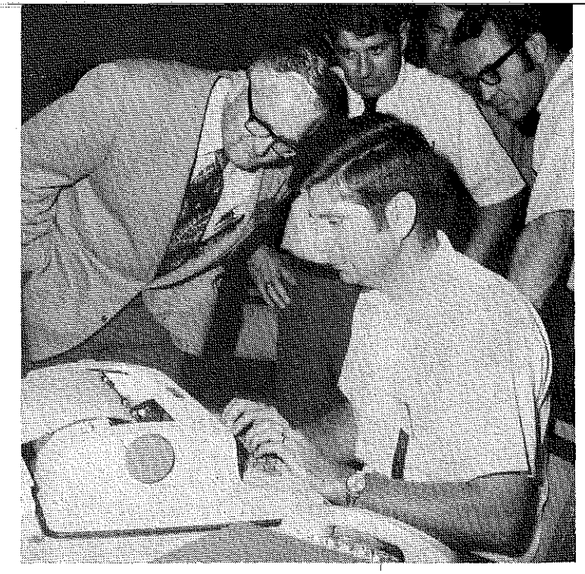
SWINE PRODUCTION IN TEMPERATE AND TROPICAL ENVIRONMENTS
By Wilson G. Pond and Jerome H. Maner
W. H. Freeman and Company (1974)

EDUCATORS GUIDE TO FREE FILMS
Edited by Mary Horkheimer and John Diffor
Educators Progress Service, Inc. (1974)

CROSSBREEDING BEEF CATTLE: SERIES 2
Edited by Marvin Koger, Tony J. Cunha and Alvin C. Warnick
University of Florida Press (1973)

DAIRY CATTLE BREEDS: ORIGIN AND DEVELOPMENT
By Raymond B. Becker
University of Florida Press (1972)

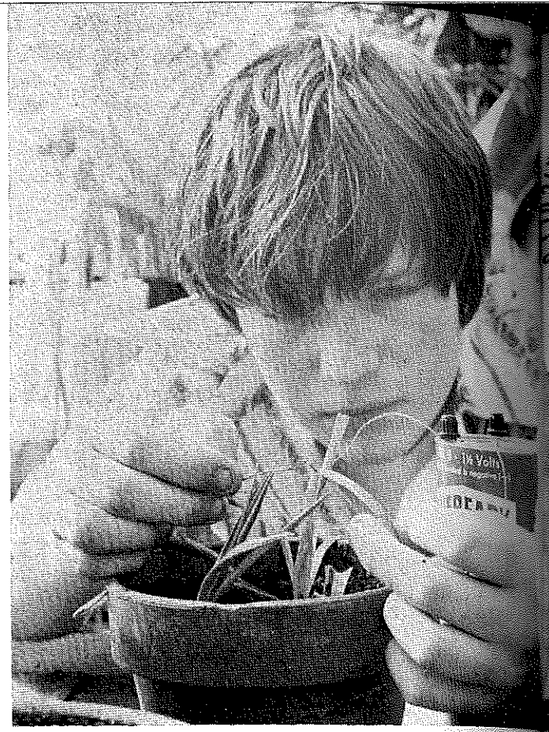
If you feel qualified to review one of these books and desire to do so, write the Book Review Editor and he will send the book for review. Once reviewed, the book becomes the property of the reviewer.—James P. Key, Book Review Editor, Agricultural Education Department, Oklahoma State University, Stillwater, Oklahoma 74074



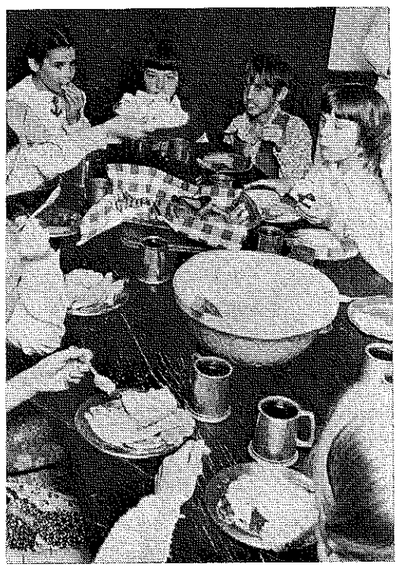
Computers in Agriculture — that doesn't mean much until you've had hands-on experience with one. Dr. Ben Byler, Iowa State University, interacts with a Nebraska Computer via typewriter terminal and telephone line connection. Looking on (above center) is Dr. Gary McVey from the University of Minnesota, Crookston Campus. (Photo by Richard Douglass)

Stories in Pictures

by Richard Douglass



Motivated Student — Kerry James, 12, uses a 1½ volt battery to induce "shock treatments" in experiments which alter the normal growth of plants. It's one of the many career education research projects at Harbor Heights Elementary School in Washington State (Photo by Alex Crewdson, Voc. Ed. Program Specialist, Washington State Council for Occupational Education)



A Bicentennial Idea — Pennsylvania children relive 1776 on an 18th century farm in Chester County. They learn by doing and touching not simply looking. While visiting Hopper House (left) they enjoy a 1776 meal. The children help prepare the food. They also try their hand at "hetching" flax (right). Hetching is drawing the fibers through metal spikes to comb the fibers. Additional information is available from Anne Cook, 451 Schoolhouse Lane, Devon, Pa. 19333. (Photo from Pennsylvania Bicentennial Commission)

AGRICULTURAL EDUCATION

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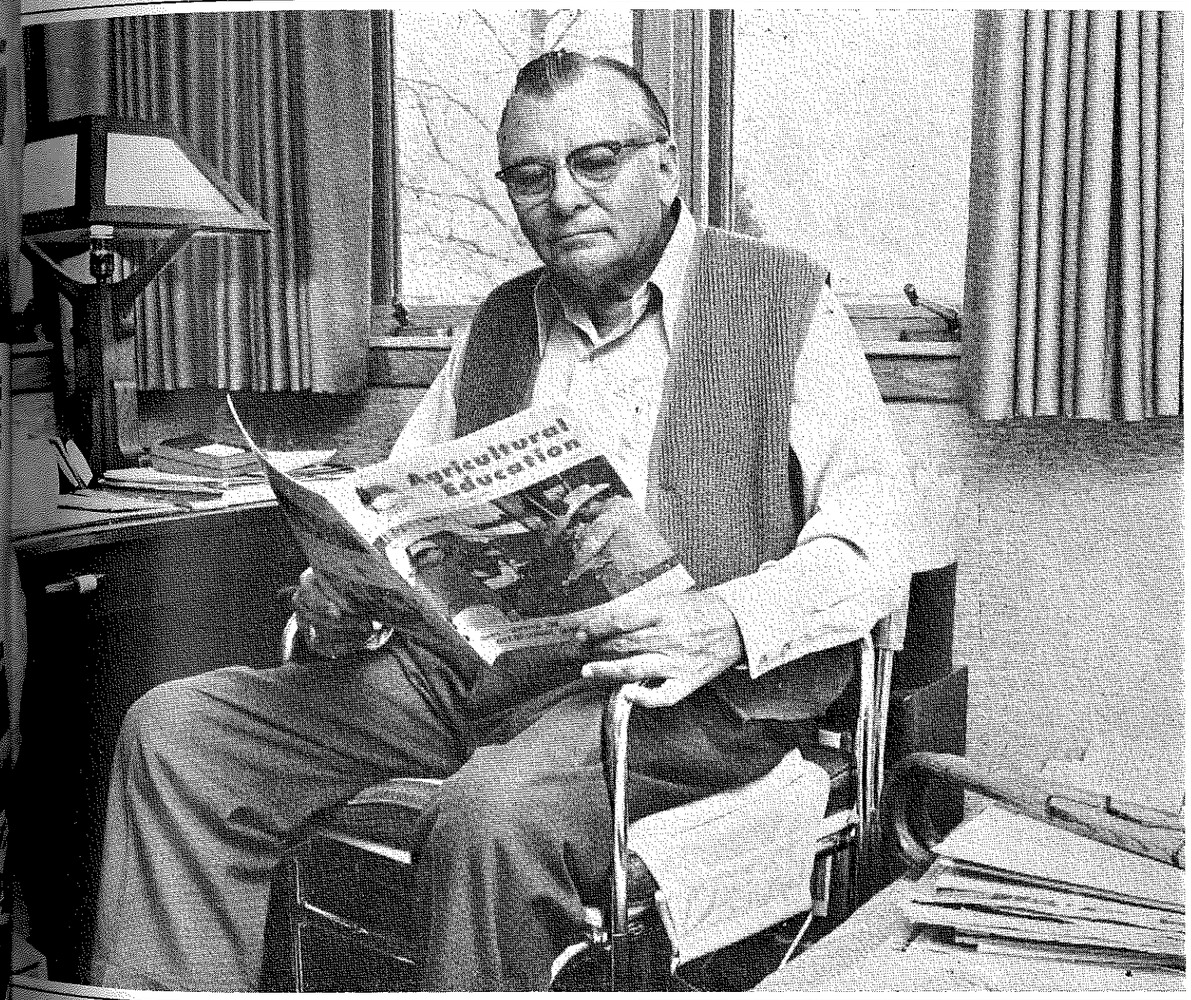

THEME—IMPROVING THE PROFESSION