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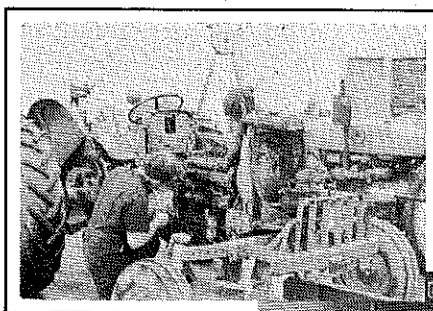

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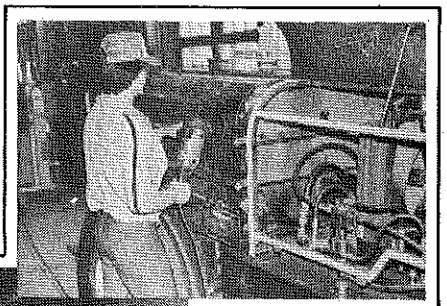

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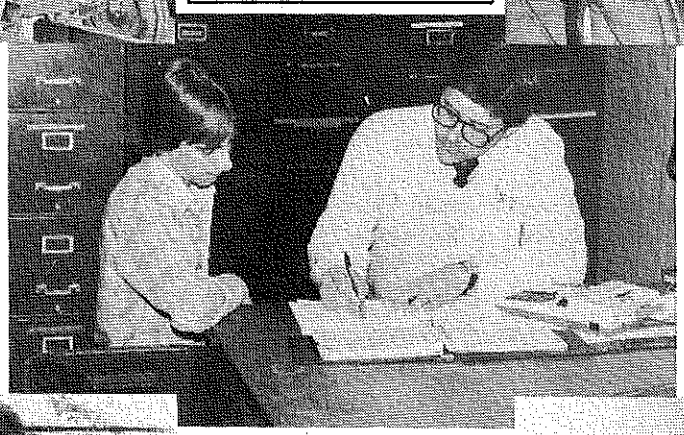

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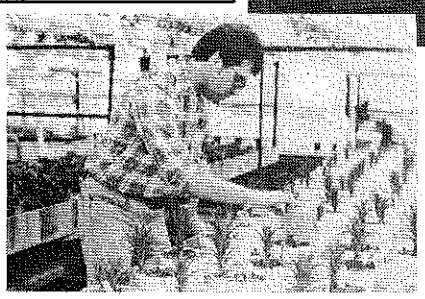

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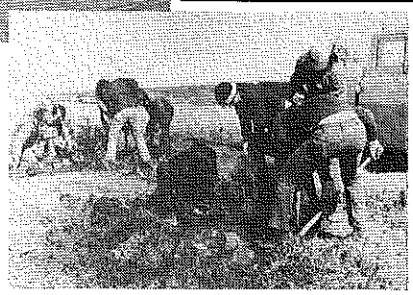

Students & Pines

THEME: Achieving Quality Laboratory Projects

THE
AGRICULTURAL EDUCATION
MAGAZINE

September 1983 **Volume 56** **Number 3**

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ARTICLE SUBMISSION

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

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THEME

Projects Affect Our Image

LARRY E. MILLER, EDITOR
(The Editor is a Professor in the Department of Agriculture Education at The Ohio State University.)

Projects produced by students of vocational agriculture provide one of the most visible indicators of the quality of our programs. The wedding bouquets, the hog house, the livestock trailer, the lumber, the overhauled tractor or lawn mower, etc., constitute just a few of the numerous examples of projects completed each school day by vocational agriculture students. These projects mirror the quality of instruction conducted in the program.

All projects, unfortunately, do not reveal quality instruction. Poor planning, materials, skills, or construction which results in projects of poor quality do not speak well for the program.

This issue of the magazine presents strategies for achieving quality laboratory projects. The articles describe the fundamentals of the construction of quality projects from planning through exhibiting. Inherent throughout the articles is the general concept that quality instruction is provided that results in projects of high quality.

The functional utility of the project is also inherent in the message of the articles. To be meaningful to students, projects must be practical and appropriate for vocational agriculture. An often discussed issue in the profession centers around what constitutes an appropriate project. When the vocational agriculture laboratory is used to construct projects that have no agricultural application, the issue arises. Should automobiles be repaired in the agricultural power and machinery laboratory? Should the skills taught be developed on agriculturally related projects? These questions remain unanswered. However, when critics of our program are looking for things to criticize, this is often a point which is attacked. Constructing projects with agricultural application would leave such critics short of ammunition.

Quality projects serve as good public relations tools for the program. Graduates often brag of the projects they built in vocational agriculture and often, perhaps years later, demonstrate the product or skill. Such projects are good for the image of the vocational agriculture program.

THEME

Project Quality Is Job 4!

BY GLEN C. SHINN, THEME EDITOR
(Editor's Note: Dr. Shinn is a Professor in the Department of Agricultural and Extension Education at Mississippi State University, P.O. Drawer AV, Mississippi State, Mississippi 39762.)

It is September, and the new school year offers opportunities for accomplishment. Remember last year when you wished for time to "do it differently?" We have the time to do it right only if we plan, organize, execute, and evaluate. This cycle does not guarantee quality but it sure improves the odds. The national news media calls for improved educational and product quality and workers with a competitive edge. We have admired the Japanese Quality Circle. Yet, many vocational agriculture programs have a "quality circle" in place and demonstrate it through laboratory projects.

Quality does not happen by coincidence. It is a result of a well planned, four step sequence of classroom instruction, demonstrations, student try-out, and practice. Projects provide an excellent vehicle which transports abstract theory into practice. Well planned projects encourage the development of life skills in problem solving, applied mathematics, time management, and real economics. Projects also foster an understanding of productivity, work, craftsmanship, and individual responsibility. I am continually amazed that you, as a vocational agriculture instructor, can take "Cinderella" students and help them to develop these skills and understandings.

When selecting projects, we should consider several criterion questions. Are the skills required an outgrowth of our instructional goals and objectives? Is it a safe activity? Is it reasonable in scope? Is it economical? Does it have utility? There are several sources of ideas for laboratory projects, such as Instructional Materials Laboratories, Research Coordinating Units, Cooperative Extension Service,

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Project Quality Is Job 4!

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popular magazines, farm shows and fairs, and commercial firms.

Some of these sources are in the public domain and others are private. Products ranging from pop-up bale loaders to roses which are patented or copyrighted deserve our respect and should not be duplicated for sale. Perhaps the best source for projects is an identified problem by an interested student who is challenged by instructors, peers, and individual accomplishment.

Too, you can share the satisfaction that comes as you watch the student's expression as their engines start or their poinsettias bloom.

The Cover

Quality projects are undertaken in many instructional areas of vocational agriculture which develops much pride in the students. (Photographs are courtesy of John Wallace, Ava, Missouri; Robert Pearcy, Visalia, California; Wilbur Chancellor, Ackerman, Mississippi; Richard Makin, Edenburg, Pennsylvania; and Joe Farrell, Hill City, Kansas.)

THEME

Competent Students Through Quality Laboratory Projects

"In these days of adversity it is well that we take time to check up on our agricultural mechanics teaching. All vocational education is undergoing the acid test. Continually we hear rumors of reduced salaries and curtailment of expenditures. To survive we must do an excellent job. In other words, we must justify the course in the community in which we teach. To do this it is necessary to organize our work to fit the needs of the community."

By David M. Agnew

(Editor's Note: Mr. Agnew is a former Vocational Agriculture Instructor at Selmer, Tennessee; and is currently a Graduate Assistant at Mississippi State University, P.O. Drawer AV, Mississippi State, Mississippi 39762.)

Does this sound familiar? This statement is the echoing plea for quality which has been with us for many years. This particular quote came from the October, 1932 issue of The Agricultural Education Magazine. Although the subject matter and technology is as relative today as it was when it was written. The fact that agriculture has progressed as far as it has in the last 50 years is in part due to our forefathers' commitment to those ideals.

We, as vocational agriculture teachers, must also hold fast to those ideals stated above if we are to prepare students for employment in today's agricultural industry. In preparing students for careers, we use classroom and laboratory instruction, supervised occupational experience (SOE) programs and the FFA. Laboratory projects can be a way of practicing and developing skills learned in the classroom and/or laboratory. Laboratory projects can also be used by students to meet their needs for SOE programs. When selecting lab projects, teachers and students should carefully select those projects which are consistent with the philosophy of vocational agriculture and reflect a current level of technology and practice in line with students' career goals.

Concerns & Problems with Project Selection

There are several major concerns and problems teachers face when selecting laboratory projects. When you are faced with project selection, ask yourself these questions.

Are the Projects Purposeful?

Teachers cannot teach everything that students must or should know. Thus, it is important to select content and laboratory activities which can best meet the needs of students and lay the foundation for future skill development and learning. Research is one source of information upon which to base selection of content and laboratory activities.

Research which has been conducted to determine jobs performed by farmers, tractor mechanics, greenhouse operators or managers and others, could be a source of this information. For example, Crabb analyzed the jobs performed by two John Deere tractor dealerships in Mississippi. By knowing what jobs are being performed in tractor dealerships, teachers can better prepare students for employment in those businesses.

You do not need to conduct an elaborate research project like this one. There are results of research projects similar to this one that are available for your review, synthesis and adaptation to your program. If related research data are not available; then you can, through an advisory committee, farmers and agribusinesses, identify the jobs performed in your community which will help in program development and project selection.

The main point to keep in mind is to select projects and activities from those that are performed on-the-job which will best prepare students for future employment.

Am I Capable?

Teachers, as conscientious as they are, sometimes teach only those skills and activities which they know or enjoy. As a result, laboratory projects reflect those interests. Some woodworking projects have very little or no place in a vocational agriculture program; yet, gun cabinets, deer stands, picnic tables as projects often displace more agriculturally oriented projects. Teachers sometimes lack the technical knowledge required for those agriculturally oriented projects. For this reason it is important for inservice education programs to reflect the needs of industry. Teachers' personal interest and lack of knowledge should not be criteria by which projects are selected.

Is the Project Instructionally Sound?

Good teachers recognize the importance of properly balancing instructional time with laboratory time. The amount of time allowed for projects should be balanced with classroom/laboratory instruction, practice time for those skills required, and follow-up activities. Laboratory projects for some teachers are attractive because they see projects as supervisory activities for which they do not need to prepare lesson plans, lectures, demonstrate or conduct the usual school activities. However, when the project is not clearly related to a farming operation or business principle taught through classroom/laboratory instruction, its effectiveness is short circuited.

Other problems may arise if students are allowed to select projects without clearly established criteria. There are always some students that will shoot for big elaborate projects which will require more time, skill and material than is available to them. There are other students who will select very simple projects with expectations of an easy grade and getting through early. This can be a problem in grading and evaluating projects.

Grading can also be a problem when considering group or individual projects. Whatever the case, criteria for grading should be stated before projects begin.

The teacher would also do well to recall some of Ralph Tyler's criteria for selecting activities. According to Tyler, the teacher should select activities which are satisfying, teach more than one principle and allow ample time for development of the component skills. Professional educators should consider this a priority since a good portion of their time in college was devoted to the development of pedagogical skills. Completion of projects within a certain time period, with experience and skills used and acquired which are important to students' career goals should be the end result of projects.

What are the Logistics of the Project?

After deciding that a particular project is relevant, several other concerns of equal importance need to be addressed. These concerns, relating to the problem of logistics, should be asked and answered long before the expected project time arrives. In deciding about a project, these points should be considered: Who will furnish the material? Is there enough space for all the students to work safely? Is there enough storage space for all projects? Will the project obstruct other classes? Are there enough tools for students to work at a satisfactory pace? Will specialized tools be required? Will students be able to complete the project in the allowed time? How will materials or parts be ordered? How far in advance should materials or parts be ordered? Who will pay for material and parts and how? Can materials and parts be properly identified to prevent confusion? Will students be working individually or in groups? And last but most important of all, is the project safe?

What Resources are Available?

Three aspects of resources that cause teachers concern is money, facilities, equipment and materials. There is not much that can be said about funding except that it is a function of local and state attitudes and priorities. We do need to spend wisely what we have.

The importance of program planning can be seen when the school year is half gone and 90 percent of the funds for the programs are spent. The cost of materials or parts for projects is one big drawback to many programs. In the past, teachers have encouraged students to bring projects from home. Today, with the diverse background of students, it is unreasonable to expect all students to provide their own projects. In recent years, FFA Alumni and young farmers chapters have aided in providing students with projects. There can be problems of suitability of projects acquired this way.

Teachers can, however, look to the community for help. In most communities there are businesses or factories which have a by-product or scrap which could be useful to your program. One of the most needed materials for projects is metal. Places that sell metal sometimes have scrap bins which are filled with odd lengths which have been scrapped from stock orders. This usually can be acquired for a reasonable price. Some factories will give material to the schools and some will swap.

There are hundreds of possibilities which exist and you may never know until you ask around and search. You can find out about possible donors by word of mouth, through advisory committees or by scanning a manufacturers' directory for your state or region. This directory can be found at most public libraries or in some local businesses. Businesses do not mind helping because they also help themselves at the same time. Most businesses and companies are aware, but if they are not you can tell them, that the Internal Revenue Service recognizes deductions for donors to schools and school organizations.

Improving Projects

Teachers are in a difficult position. As the prime mover in the program, they are to weigh the concerns we have discussed and decide what projects to attempt. When the problems posed such as teacher ability, tools, space, and money are of little or no concern, then selecting quality projects that can meet the students needs is easier.

One possible improvement that teachers could make to their program is to standardize projects. Standardizing takes the responsibility off the student for finding project ideas and puts it on the teacher. There are advantages both to teachers and to students. The major advantage is that students can each have similar experiences with better supervision from teachers. Students completing a program

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Competent Students Through Quality Laboratory Projects

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competent in a set of foundation skills are more desirable than those completing a program with wide range of experience and varying levels of skills. It becomes increasingly important for teachers to select projects which can best develop those foundation skills required for a variety of career goals.

Model of a Standardized Project

Appomattox County (Virginia) High School has conducted a standardized project in its Agricultural Machinery Services class for the last 12 years which has been very successful. According to Mr. Richard B. Carter, Vocational Director for Appomattox County Schools, this year the county school board purchased seven Ford tractors from the Virginia Department of Highway which the senior Agriculture Machinery Services class has overhauled. Two or three students are assigned to each tractor for the complete overhaul. The teacher, J.W. Morgan, starts in October with a Dynamometer test of each tractor before the overhaul. Students then proceed to overhaul the tractors. At the end of the year, the tractors are sold at public auction. Mr. Carter states that this means of conducting a project has many advantages. The tractors are all the same make and are no more than a few years apart. The teacher, especially one who does not have experience, can keep up with specifications and system design easier than a variety of makes or models.

Before students enroll in this class they must have successfully completed the required vocational agriculture courses which prepare them for this project. Students spend an ample amount of time receiving classroom instruction before they begin certain aspects of the overhaul. Emphasis is placed on systematic use of manuals for troubleshooting, testing, measuring, servicing, ordering parts, adjusting, and repairing the tractor.

In a nutshell, all students have sound experiences with better supervision and finish with a similar set of competencies.

This project may be beyond the capabilities or needs of your program but the principle of standardizing projects with its advantages can be applied to any program. Other advantages which may result from a standardized project are: less problem in ordering supplies and parts, fewer tools required, only one set of specialized tools needed, one set of manuals or books, a more systematic grading procedure, easier to supervise from the standpoints of having to remember technical information, increased students participation and motivation, and systematic progression through phases of the program.

Conclusion

Whatever approach is used, the project should be as well planned and organized as any other part of the program. F.A. Hagans, in the October 1929 issue of THE AGRICULTURAL EDUCATION MAGAZINE, said it this way:

> "The value of work in any farm shop must be judged primarily by the practicality of the job undertaken in its adaptation to the home farm of the particular boy concerned. The training of a boy to construct or repair in a first class way those jobs related to the farm he is now on will fit him to handle the construction or repair of whatever job he may come up against on any other farm. The pride once instilled into a boy by having things done right and taking a more keen interest in them because he did the work himself is bound to stay with him."

Today, young men and women are involved in laboratory projects which were unheard of in 1929. The fact that these skills change rapidly should not deter us from seeking the highest level of skill development possible. To do so we must be ever conscious of the needs of the community, the students, and the importance of the projects selected.

References

Carter, R. Personal communication, May, 1983.

Crabb, T.J. MAINTENANCE TASK PERFORMED IN TWO JOHN DEERE DEALERSHIPS. Unpublished masters thesis, Mississippi State University, 1982.

Hagans, F.A. Making the farm shop practical. THE AGRICULTURAL EDUCATION MAGAZINE, 1929, 1 (10), 16.

Spafford, E.N. Organization for effective teaching of mechanics. THE AGRICULTURAL EDUCATION MAGAZINE, 1932, 5 (4), 54.

Tyler, R.W. BASIC PRINCIPLES OF CURRICULUM AND INSTRUCTION. Chicago: University of Chicago Press, 1950.

1984 THEMES

SOEP:	Entrepreneurship	January	
SOEP:	Placement Programs	February	
SOEP:	Cooperative Experience Programs	March	
SOEP:	Laboratories	April	
SOEP:	Urban Programs	May	
SOEP:	Recordkeeping	June	
SOEP:	Sales and Service	July	
SOEP:	Horticulture	August	
SOEP:	Mechanics	Sept.	
SOEP:	Forestry, Conservation & Recreation	October	
SOEP:	Adults	Nov.	
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THEME

The School Farm: Educating Through Laboratory Experience

BY JOE FARRELL

(Editor's Note: Mr. Farrell is Vocational Agriculture Instructor at Hill City High School, Hill City, Kansas 67642. He is a Past President of the Kansas Vocational Agriculture Teachers Association.)

In 1947, the Hill City Vocational Agriculture Department inherited a 160 acre farm. This farm, located nine miles south of Hill City, has been a blessing in disguise for the youth of Graham County. The FFA chapter began farming the land on a 1/3 : 2/3 basis from the vocational agriculture department in 1953. As a tenant farmer, the FFA started without any equipment of their own. They had to rely on the individual FFA members and their parents to furnish the needed equipment to carry out the farming operations. With the two-thirds share of the crops, the FFA chapter began investing the profits in farm machinery of their own. They have continued this practice as well as securing loans from the department to build an inventory of over $60,000.

Wheat and milo are the major crops produced on the farm. Fields of grain and a few pumping oil wells are the concrete signs of prosperity on the farm. However, a more unique type of prosperity has been reaped from the farm. This is the knowledge which the students have acquired from this learning laboratory.

Providing Practical Experience

Many of the students do not have a production agriculture background. Usually farming is a new experience for them. They must be taught to operate the tractor and various pieces of farm machinery correctly. To accomplish this, one of the tractors has a special seat mounted on it for the instructor. The student is given hands-on experience in independently performing the tasks, but has the security of knowing the instructor can assist with problem situations. Once the competencies and confidence needed to continue are developed, students are permitted to work on their own. For an experienced operator, this usually takes about half a day. Operating the hydraulics, using the turning brakes and manipulating the tractor and equipment on turns are a few of the basic maneuvers they must learn.

Along with learning to operate the tractor and other equipment, students also get impromptu mechanics lessons. Most of the equipment was purchased used; therefore, the unavoidable repairs and adjustments are made as the need arises. Learning to properly service the tractor and machinery is also a valuable part of the students' learn ing experiences. The students who have learned to operate equipment on the school farm are in demand by area farmers. Employers want student workers who know how to operate, adjust, and care for the equipment with which they are working.

Cooperatives Are Formed

Another area of student involvement in our farm operation has been designing and constructing attachments for the farm equipment. Examples include the anhydrous am-

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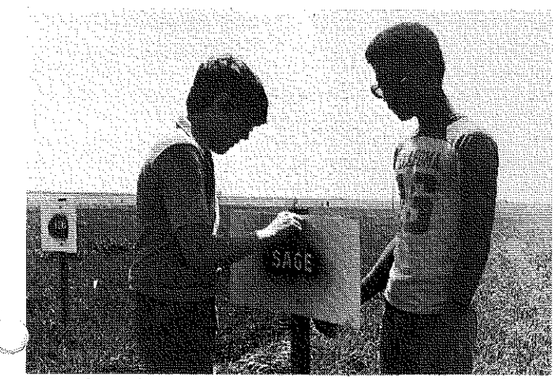

Our chapter has worked with numerous groups in conducting demonstration plots. They have been valuable teaching aids and have made an impact on agriculture in our community.

The chapter farm provides our young members an opportunity to learn the safe and proper way to operate farm equipment. The tractor is equipped with a special seat for the instructor so on the spot instruction can be given to the inexperienced operators.

The School Farm: Educating Through Laboratory Experience

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monia tank mounting brackets and applicator, treaders for the undercutter, and a special tool bar for mounting the minimum tillage "buffalo planter."

The students working on the school farm are paid an hourly wage. Our pay scale starts at $2.50 and goes to $3.00 per hour, depending upon experience. The chapter retains .25 cents per hour of the members' wages and places the money in a labor cooperative fund. They are paid dividends of 6 percent on the money in the cooperative. All the money is returned to the students in September following their graduation. Most of the graduates choose to use the money from the labor cooperative to pay their chapter dues for the next three years. Some have applied their earnings toward purchasing a life membership in the FFA Alumni.

To give members a feeling of ownership, a wheat cooperative was formed on a 10 acres of wheat. The students purchase $5.00 shares in the wheat crop. When the wheat is harvested, the stockholders decide by voting whether the wheat will be sold at harvest time. The profits for the wheat cooperative are calculated at the time of sale or September 1, whichever comes first. As students graduate, their stock and dividends are repurchased by the incoming freshmen. The income the FFA receives from the sale of shares has been used to purchase some of the attachments for our farm machinery. This cooperative arrangement stimulates a great deal of interest in the members and gives them a feeling of ownership.

The students are eager to be a part of these cooperatives. They reap financial rewards as well as becoming actively involved in the farming operation. Long after they have graduated, alumni often recall events in which they were involved on the chapter farm during alumni gatherings.

The cooperative attitude is also evident in the FFA executive committee which serves as the board of directors for the chapter farm. Their responsibility consists of making many decisions and presenting major problems or ideas and suggestions to the other FFA members for approval. Problems relating to the farm that have been studied in the classroom are often discussed and practical solutions reached by the students. By having to make decisions on everything from land preparation to selling of the crops, students are provided with practical learning experiences.

Teaching on the Farm

The farm is an excellent teaching aid in illustrating crop production techniques. Planting dates, variety selection, fertilizer trials and recommendations, crop rotations, chemical weed control, insect and disease control, and farming procedures and practices are clearly demonstrated. Timeliness and proper techniques can be observed on the field trips taken to the farm. First hand information is available through the students, as they share their actual experience from the previous summer.

Finally, the harvesting, storage and marketing of the products of the students' toil complete the production phase of the farm operation. Students living on farms may have the opportunity to gain this experience at home, but for the town student the chapter farm give the classroom-related study a more realistic meaning.

As the students master the production aspect of crop production, they become more involved in the management phase of the farm. Making marketing decisions is a very challenging task for high school students. Deciding when to market a crop for the highest return is certainly not an easy one to solve.

They must also select from several other options available to them. Should part of the crop production be marketed through "Promark," a marketing program offered through Farmland Industries? Should they take out a warehouse receipt? This last method may offer a lower price at the time but would allow the option of redeeming the loan and selling the grain at a higher price later.

These experiences become as real to the students as they do to the farmers in the area. Over the years, the students have had to make decisions affecting the farm operation as it relates to the various government programs that have been offered. They certainly learn more about these programs as a result of the decisions they have to make as it affects the chapter farm.

To help with such decisions, the department purchased a computer that has become useful to our farm operation. Crop analysis information and programs that assist in determining the advantages and disadvantages of entering the PIK-program are just two examples of computer uses on the farm.

The FFA is a member of the local cooperative, so we are able to experience first-hand the benefits of doing business through the coop. The dividend checks received from the coop make a lasting impression on students.

Conservation Practices Employed

Sound conservation practices have been implemented on our farm. With the assistance of the soil conservation service, a wide variety of soil and water conserving structures and practices have been established. Two types of grassed waterways were seeded and are now well established. These waterways, a flat channel and a parabolic, have a water pit at the outlet end. The object of the pit is to provide a water supply for wildlife. A variety of terraces can be observed on our farm. This was purposely done for educational value. Students can compare level, grade, flat channel, and parallel terraces; and see how they control water erosion. When the terraces were constructed, we had some of the level terraces constructed from one side and others were constructed from both sides. In this way, students were able to observe the methods used and what kind of equipment was required to construct various types of terraces.

Since some areas of the farm had slopes too steep to farm safely, these areas were seeded back to thirty-eight different varieties of native grasses by the students. These grass plots have been a source of study and comparison for several years. The tall varieties also make excellent cover for wildlife which we have attracted to our farm. The soil conservation and wildlife plan on our farm has been maintained through crop rotations, strip cropping, stubble mulching, wildlife plantings, brush piles, and food plots.

A Part of a Total Program

The farm has been useful for our FFA chapter program of activities. We have tied various areas of our program of work into our farm plan. These areas include numerous ones:

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM (SOEP) — The farm provides a work experience program for FFA members not living on a farm.

COOPERATIVE ACTIVITIES — Through our farm we have been able to work with the Soil Conservation Service, Extension Office, seed companies, and an area experiment station. We have also formed a Christmas tree cooperative with a neighboring chapter.

COMMUNITY SERVICE — Various groups tour our farm every year. The soil conservation office takes all county fifth grade students to our farm to see conservation and wildlife practices each year. The two hour tour through the farm consists of presentations and questions and answer sessions led by FFA members. We also plant wheat and sorghum demonstration plots for area farmers to view and compare.

EARNING AND SAVING — The farm has been a helpful source in providing ample funds for chapter activities.

RECREATION — Recreation on our farm consists of hunting. Our wildlife habitat program has improved hunting conditions in our farming area.

PUBLIC RELATIONS — The activities on our farm have been a major part of our yearly thirty minute television program during National FFA Week. We have also presented talks to civic groups and have included pictures of our activities in our banquet program. Our local and school newspapers do a tremendous job of keeping our organization in the limelight.

ALUMNI — We have received a great deal of help and support from our alumni. We rely on them for use of farm equipment, seed samples, and assistance with our conservation projects.

SAFETY AND BUILDING OUR AMERICAN COMMUNITIES (BOAC) — Our award winning safety and BOAC programs had their origin on the chapter farm. We promoted safety through fire extinguishers, slow moving vehicle emblems, agriculture chemicals, and conducting a farm wives safety day. Some of our BOAC awards were achieved through wildlife conservation and community beautification.

The teacher must be careful not to regard the school farm as a substitute for the student's individual supervised occupational experience program. With guidance from the instructor, the school farm can aid and supplement the student's SOEP and also serve as a meaningful teaching aid. The school farm provides students an opportunity to apply field trip concepts as well as classroom concepts to their own SOEP program.

Impact on the Teacher

The school farm justifies the summer program of an instructor, but it also limits other areas of accomplishment. Undoubtedly, the biggest drawback of a school farm is the amount of time the teacher has to be available to work on the farm. The teacher must be present everyday, and sometimes into the night, when the students are working on the farm. We have reduced this time somewhat by having two tractors with equipment that can be used at the same time. Although having more equipment adds to the cost of operating the farm, it does provide more learning experiences for the students.

The school farm also puts the instructor in a "Learning by Doing" situation. One of the aspects that is often overlooked is the educational value an instructor will receive from managing the farm. The farming experiences give a better understanding of the farmer's problems. Supervising and managing a farm provides first-hand information and facts needed to determine necessary production goals and to recognize the standards of efficiency needed by a farmer to stay in business. This knowledge and understanding will be taught to the students.

THEME

Quality Laboratory Projects: Occasion Or State

By Richard C. Makin
(Editor's Note: Mr. Makin is a former Vocational Agriculture Instructor at Admiral Peary Area Vocational-Technical School, Edenburg, Pennsylvania. He is currently beginning graduate study at The Ohio State University.)

A purpose of vocational agriculture is to teach saleable skills that lead to gainful employment in agricultural occupations. What difference does a feedscoop, brooder, a bench of poinsettas, or any of an endless list of laboratory projects make? Why do teachers simply not instruct a student in how to pot, water, and fertilize poinsettas or how to properly use a hammer and saw?

Obviously, the student not involved with laboratory projects is comparable to the physician without patients. In both cases, much time, effort, and money have gone into skill development with no useful outcome. Neither the student nor the doctor can practice the knowledge and skills that he or she possesses.

Are your students engaged in quality laboratory projects or "dead-end" skill development with no end product? Ideally, quality laboratory projects are a goal of every vocational teacher. Four aspects of laboratory projects in the total agriculture program are:

— the basis of quality laboratory projects
— instruction for quality laboratory projects
— advantages of quality laboratory projects
— the importance of quality laboratory projects today.

What Makes a Quality Laboratory Project

A quality laboratory project is a useful, observable end-product that evidences proficiency in certain agricultural skills and knowledge; such projects are characterized by planning, meeting or exceeding predetermined standards of excellence, and adaptability.

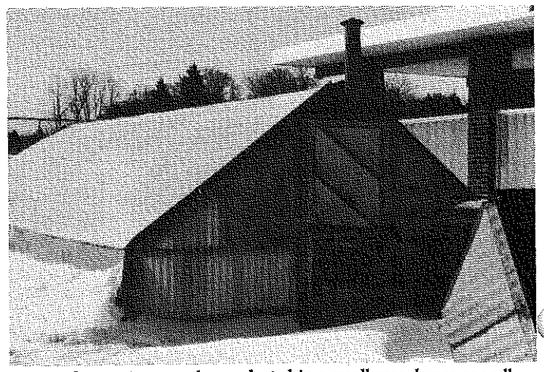
Some agriculture teachers initiate and supervise poor laboratory projects. Even worse, there are agriculture programs rooted in alleged laboratory projects that are nothing more than busywork or at best, custodial responsibilities. Fixing cafeteria chairs, plowing snow, mowing grass, pouring and curing sections of concrete for the principal to use at home. These and other "projects" are very limited in their value as a structured learning experience.

Quality laboratory projects can begin with either the teacher or the student. Regardless of origin, planning is the cornerstone for success. Although important to a quality laboratory project, teachers all too often consider the dimensioned drawing an adequate plan and turn the student loose. For any undertaking to be successful, there must be a plan outlining the purpose, resources available and needed, procedures, evaluation, and hopefully a time table. Student laboratory projects are no exception and are more apt to possess quality with prior planning than those based on the plan-as-you-work procedure.

Quality laboratory projects meet or exceed predetermined standards of excellence. Again, these standards can be outlined by the student, teacher, or both. It is essential that the standards be understood by the student prior to the beginning of the project. During the evaluation of the project, the student should lend input.

Lastly, laboratory projects are not restricted to agriculture mechanics. Quality laboratory projects can also be adapted to the greenhouse, land laboratory, forestry plot, or home farm.

Quality projects result in satisfying learning experiences and employability skills.



Quality projects can be conducted in a small greenhouse as well as agriculture mechanics laboratories, land labs, or the home farm.

Instruction For Quality Laboratory Projects

Quality laboratory projects begin with quality instruction. However, is it wrong for a teacher to totally repair a small engine rather than directing a student in a trouble-shooting approach? Should a teacher occasionally construct a floral arrangement that meets industry standards? Should teachers work on projects for other than a demonstration? A teacher must establish credibility with his or her students in terms of tangible projects as well as explanations and demonstrations. There is a distinct difference between demonstrating a correct bead and designing and welding the table for that demonstration.

As a teacher of agriculture, you must prove your ability to complete a quality project with quality being a primary concern. Observational learning takes place in your classroom and laboratory each day that you teach. Teachers are examples for students and quality in their work will help to insure quality in the students work also.

Once a teacher learns more about his or her students, and in particular what motivates them, competition can enter into the picture. Competition can be used as a catalyst to insure quality in laboratory projects. In some cases, a comparison and close scrutiny of hitch pins or nail boxes can bring sustained efforts at meeting or exceeding the standards for the project. Interestingly enough when it is understood that an outsider or peers themselves will determine the best, quality can nearly become an obsession.

Other students may respond better to the anonymous challenge. Upon entering the laboratory, students find selected silk flowers designed in a hogarth curve. Beside the arrangement a challenge: "Can you do better with the same materials?" Results can be surprising. Again, the anonymous designer may be a retail florist, another student, or even you.

In any case, quality laboratory projects can become a state rather than an occasion when rightfully recognized. The means for arriving at this end are countless: exemplary laboratory projects displayed at the local fair; the FFA banquet, or in the school superintendent's office; a newspaper article highlighting quality laboratory projects during National FFA Week; or a county-wide contest to determine the outstanding laboratory project. Regardless of the approach used, it is not the teacher or school that should be recognized, it is the student.

Commitment Through Quality Laboratory Projects

Students will benefit most from quality laboratory projects. Skills are honed and confidence grows. There are also other somewhat subtle advantages to quality laboratory projects. One of these, commitment, is extremely important to the well-being of the agriculture program.

Quality laboratory projects can insure commitment from the school and the community. When a school administrator or board member pays the unexpected visit, which would be more likely to result in a positive image: a bat turned on the wood lathe or a portable farrowing unit? There are too many projects that do nothing for the credibility and reputation of the program or instructor. Consider the following as a guideline in regard to laboratory projects. Each instructor should be sufficiently satisfied with the quality of a project to the extent that he or she could comfortably witness the presentation of that project to parents, other teachers, or school administrators as typical of the agriculture department.

Students can complete projects while developing unique creative skills.

Again, such a standard would benefit most the student. At the same time, these projects greatly benefit the agriculture program in schools where budgetary cuts may well pit vocational areas against each other regarding funding for materials and supplies, equipment, field trips, or even as a course offering.

Going one step further, the life of the school is and must be closely related to the life of the community. With this in mind, teachers can use quality laboratory projects as a natural public relations tool. Quality laboratory projects can strengthen the position of the agriculture program in the community. People become aware of what the vocational agriculture means and is doing. The new park benches, trusses for the swine barn at the fair ground, residential landscape designs, and bluebird nesting boxes for a conservation project provide ways to contribute to the community than through quality laboratory projects. At a time when community support is growing increasingly important, agriculture teachers can ill afford anything less than quality in any aspect of the agriculture program.

Quality Laboratory Projects Today

Due to the nature of today's agriculture student, quality laboratory projects are more important than ever. First, school enrollments are declining and so are or will the number of vocational agriculture students. Programs may be cut. What justification is there for a vocational agriculture department experiencing a continual decline in numbers with those who are enrolled not capable of quality work? It becomes imperative that all or most students can perform "quality-wise". A decline in enrollment will produce smaller classes which in turn can lead to improved student achievement in the basic skills (Gardner and Shakeshaft, 1983). Critics will be quick to point out that this improvement should be visible in laboratory projects.

Secondly, agriculture teachers are no longer dealing

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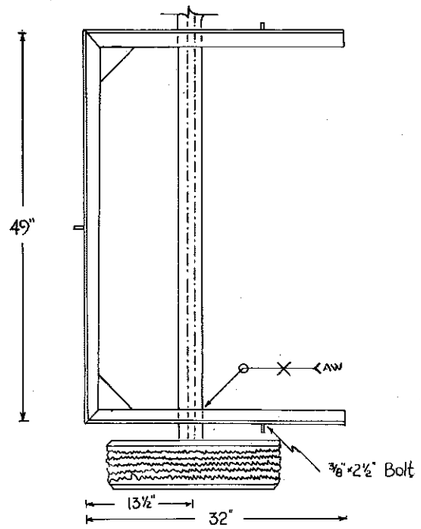
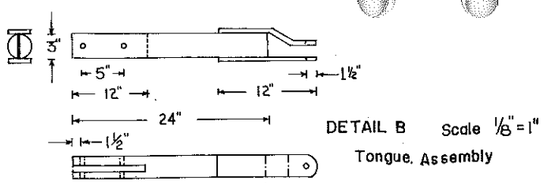
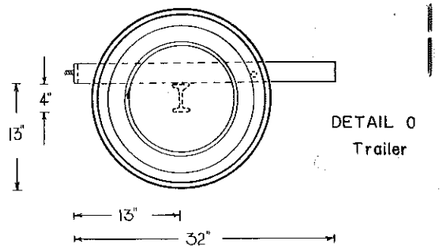




DETAIL B Scale 1/8"=1"
Tongue, Assembly



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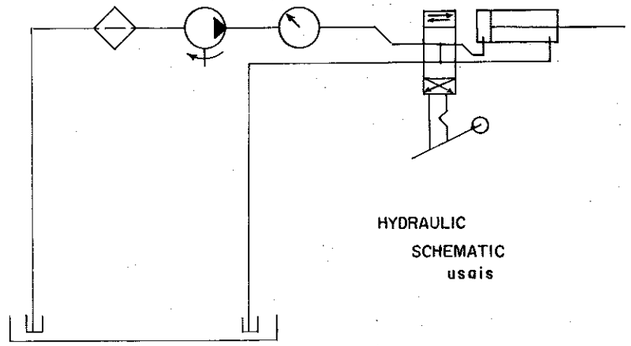

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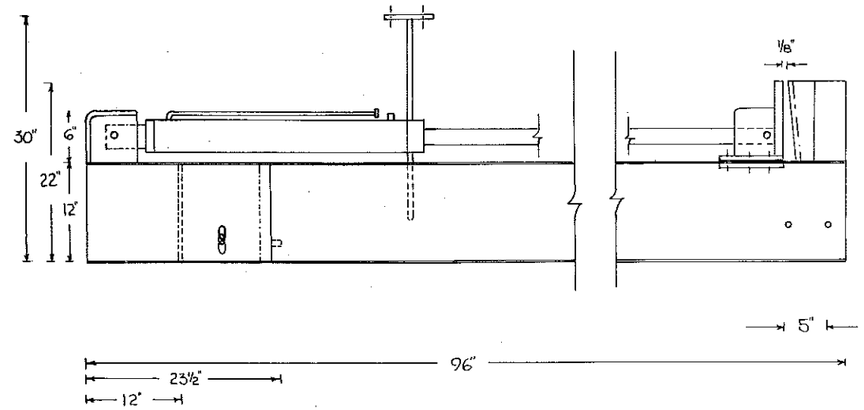

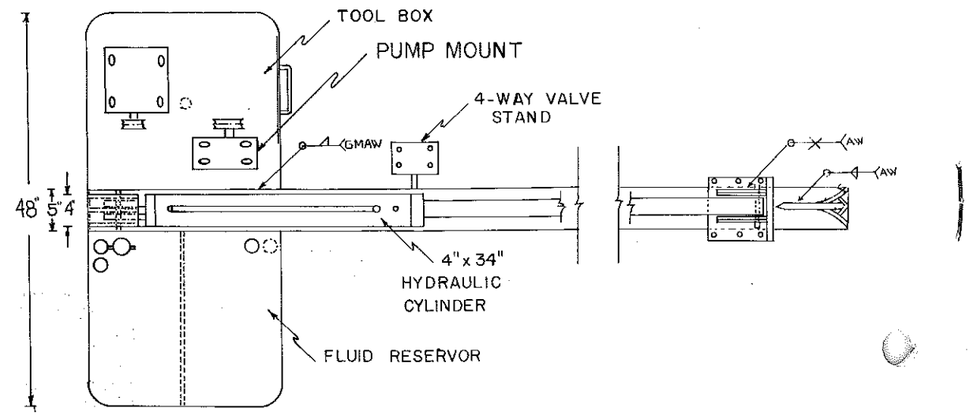

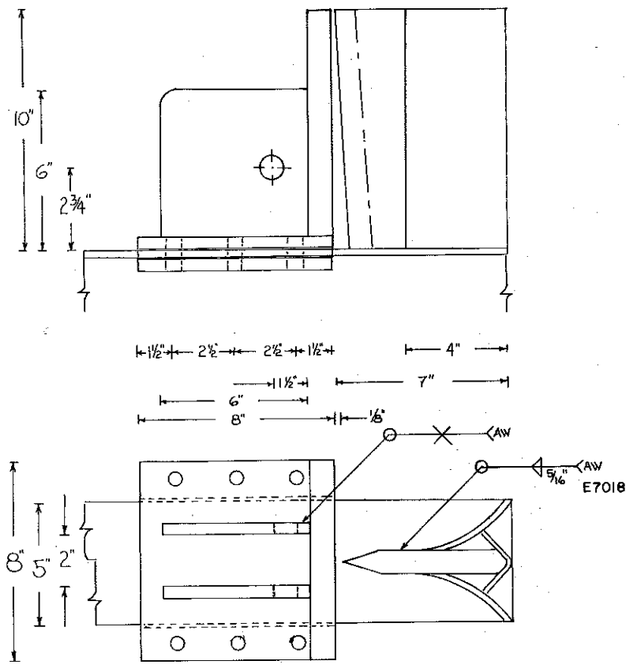

DETAIL A Scale 3/8"=1"
Block & Wedge Assembly

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AWS WELDING SYMBOLS		
MISS. STATE UNIVERSITY		DRAWING NO. 099-[illegible]

Quality Laboratory Projects: Occasion or State

(Continued from Page 11)

with students predominantly with farm backgrounds. Generally, farm students had a good understanding of the quality concept upon entry into the vocational agriculture program. Anything less than quality work meant fewer dollars on the farm. Students today may not identify with a farm or agribusiness and so overlook the importance of quality while striving to simply achieve skill development.

The quality of American products is said to be diminishing. It is ironic that corporate executives are spending time and money to study Japanese strategies and practices to insure quality and industrial settings. If the United States is to continue to pace the world in agriculture production and the agriculture sciences, quality must remain the watchword. Are individuals in your classroom charged with this tremendous responsibility? As teachers of agriculture, we cannot allow quality to erode from laboratory projects or any component of the agriculture program.

References

Gardner, David W. and Shakeshaft, Charol. "Declining to Close Schools: Alternatives For Coping With Enrollment Decline", PHI DELTA KAPPAN, 64, Number 7, March, 1983, p. 494.

THEME

Organizing, Operating and Financing Laboratory Projects

BY JOHN WALLACE
(Editor's Note: Mr. Wallace is the Vocational Agriculture Instructor at Ava High School, Ava, Missouri 65608.)

What is a successful laboratory program? Is it a program that builds several big projects? Or is it one that builds a few smaller ones and teaches skills? How do teachers determine what constitutes an acceptable laboratory experience for students and also fulfills some of the project needs they have at home? How are these projects financed? Where is the money to build tools and equipment to be found? These are some of the questions I asked as a beginning teacher and are problems many of us still face. Building a successful laboratory program is not an easy task. It takes a great deal of planning, organizing, negotiating, and many hours of hard work.

There are many variables with which each teacher must deal. No two teaching situations are the same. Each teacher must analyze the local situation, list priorities, and work with the administration to implement them. The success of a program will be based on the quality of student work, the skills he/she learns, and the financial soundness of the program.

Quality laboratory projects fit into regular instruction. They may be a supplement to Supervised Occupational Experience (S.O.E.) programs or may be used as foundation skills to be further developed by post-secondary training.

How We Operate Our Program

Being in the Ozark hills, we engage primarily in livestock, dairy, hay, and pasture production. Most of our laboratory projects are items to be used in these areas. We are a two-teacher department with an enrollment of 102 students, most of which come from the farm. Each first-year student receives 6 to 9 weeks of actual laboratory experience. After 2 to 3 weeks of classroom instruction, and demonstrations, each student completes four basic skills: arc welding, oxy-acetylene welding and cutting, power and hand tool woodworking, and cold metal. Only after satisfactorily completing these areas are students allowed to construct a laboratory project. This project must relate in some way to their S.O.E. program. What they build is also determined by their competencies, their needs on the farm, their ability to finance the project, and by how much time is available. Second-year students develop advanced skills. They have more laboratory time and build more complicated and expensive projects. Third- and fourth-year students are involved in advanced laboratory classes. Specialized agricultural courses include Construction, Mechanics, Structures, and Power. These courses can either have larger individual projects or class projects to be made and sold.

Financing Laboratory Projects

Financing may be a stumbling block to a successful program. Many instructors are faced with shrinking budgets. At the same time prices for tools, equipment, and materials keep going upward. Yet, we are expected to maintain the same standards as in the past. Our laboratory programs should not be expected to make a profit. Nor should we compile insurmountable deficits. Some departments are unable to manage their operating funds. The key to a financially successful program is to work out a suitable operating budget with administrators. The awareness and support of these people are essential for quality laboratory programs. The needs of the program should be presented by realistic data. The current laboratory situation should be correctly presented. Then, submit a list to upgrade the program. This plan might include these budget items:

1. *Tool and equipment purchases.* In many states, federal formula money is made available to vocational departments for this purpose. In Missouri, state matching funds are provided, upon approval, to help purchase equipment. The amount of these monies vary each year. Local school money may be needed to supplement this budget area. Needs should always be ranked according to priority.

2. *Upkeep and repair of tools and equipment.* Of what good is a new Cadillac if there is no fuel to operate it? By the same token, what good is a laboratory full of tools in need of repair? Equipment should be kept in good working order. A reasonable amount of money should be set aside for this purpose.

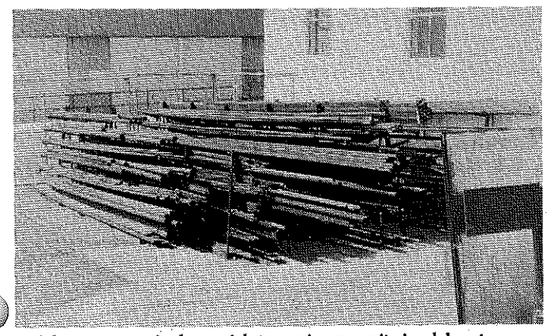
3. *Supplies in teaching basic skills.* Before project construction begins, the basic skills of that area must be taught. Consumable materials are used without a way to recover the cost. This should be pointed out to administrators. These costs should accurately be estimated. It does not take long to use several dollars.

4. *Resale supplies and materials used in project construction.* This budget area will require the most money to operate. The raw materials needed for project construction should be estimated, include in this amount the supplies used to work with these materials such as electrodes, saw blades, oxygen and acetylene. By using a cash flow record keeping system, the teacher should keep a running balance of the resale account.

These accounts should be budgeted under four separate codes, if possible. This will simplify record keeping and indicate clearly how much money was used in each area. Copies should be kept of all purchase orders, and sales tickets when recording purchases.

How Much Supplies and Materials Should Be on Hand?

This depends on your situation. Money can often be saved by buying in volume. If the facilities have ample storage room and there is a well planned budget, the instructors should buy in volume. More planning is required when buying this way. If facilities and budgets are small, supplies and materials should be bought as they are needed. If there is a convenient local source, you may choose not to tie up large amounts of money. A teacher can overstock, thus spending an entire budget leaving no additional money until previously purchased items are used and resold. A good supply of nuts, bolts, screws, nails, paint brushes and paint may be kept on hand. This will reduce those countless trips to the hardware store.



Adequate, organized material storage is a necessity in a laboratory program. An instructor can better determine what materials are in current inventory.

What the Student Should Provide

Students should provide materials for project construction not available in the department. A teacher should not spend time running errands for the students when they could be doing more important things.

The students, if possible, should provide their own measuring tape. School owned tapes have ways of disappearing during the year. If the students furnish the tape, they show more concern about their care.

If suitable project plans are not available, they must be supplied by the students. The instructor should check each plan carefully and give approval before project construction begins.

Do not discriminate because of a student's economic situation. When building smaller projects, the instructor should try to find a way for that disadvantaged student to work out the cost. Perhaps extra work around the department can be done by the student after school. The cost can be absorbed if necessary. The pride of completing that first project and taking it home gives self-confidence a boost. When the students advance to more expensive project construction, they should be allowed to build projects financed outside the department. The students may also construct items to be used in the department or work on a B.O.A.C. project built in the laboratory.

Always give an estimate of the cost of a project before construction begins. This will almost eliminate unpaid accounts and unclaimed projects. A materials price list should be posted for the students. When calculating project cost, an additional 20-30 percent service charge should be included in each bill for the consumable supplies. This is an easy way to recover some costs without guessing.

Keeping a resale budget in the black can be a difficult task. Several practices can help maintain a solvent account. Accurate records should be kept. Every purchase and sale should be recorded. Values for all supplies and materials used in skill exercises should also be identified. An accurate inventory of supplies and materials should be maintained.

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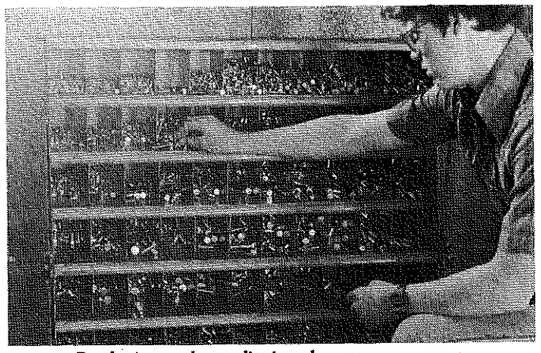

Purchasing resale supplies in volume can save money as well as countless trips to the hardware store.

Organizing, Operating and Financing Laboratory Projects

(Continued from Page 15)

At the completion of the academic year an inventory should be made. All receipts and expenses should be totaled and the balance or deficit should be compared to the value of supplies and materials remaining in inventory. A balance of plus-or-minus $200 is a successful operating year. Any deficit exceeding that figure could warrant further auditing to determine the cause.

Cutting Cost Corners

The inflated cost of supplies, materials, tools, and equipment has reduced the purchasing power of the budget. Therefore, devising ways to save laboratory project money is even more important. Saving a few dollars here and there can amount to a considerable sum over a school year. Some ways to stretch the dollar are:

1. Laboratory equipment can be built. Many items used in a laboratory could be constructed rather than purchased. Wood and metal storage racks, arc and oxy-acetylene welding stations, tool cabinets, work benches and electrical display boards are just a few items that can be built much cheaper than purchased.

2. Shop for supplies and materials. This can require more time but the benefits can be great. The instructor should shop as though it is his or her money being used rather than the school's.

3. Used materials should be substituted whenever possible. Not all laboratory projects require new materials to make them functional. Adequate used material can sometime be purchased at a fraction of the cost of new. Salvage materials from local factories, lumber yards, metal yards, or construction sites can be used.

4. Scrap should be completely used. A department can accumulate a considerable amount of short pieces of metal and wood. Shop projects should be designed to make use of these pieces. Minimizing scrap can result in considerable savings.

5. White elephants should be avoided. Equipment purchases should be planned with ample justification before buying. Industrial quality tools and equipment are the best buy. The increased cost will more than pay in longevity.

An annual inventory of tools and equipment is an essential task a laboratory instructor must perform. Tool serial numbers, purchase dates, and current operating condition can be included in this list.

6. Tools and equipment that are not functional should be sold. Items that are no longer needed may be sold, upon proper approval, at auction or by sealed bid. This money could be used to purchase needed items.

7. Repair the equipment if possible. Service manuals should be kept to use in repair and for ordering replacement parts.

8. Match student capabilities to the difficulty of laboratory projects. The cost of damaged projects can be greatly reduced.

9. The laboratory should be scheduled during the warmer months of fall and spring. This can result in savings in heating costs to the school, which indirectly could mean more money for the department. Point this out to the administration when presenting the budget.

10. Projects should not be removed until the account is paid. Stress can result from trying to collect a bad debt from a student or parent. This policy should be established early. It will result in considerable savings.

Indirect Savings

Clean, well organized facilities should be maintained. Extra effort should be made to see that the laboratory is the cleanest, best-organized department in the school. When not in use, tools and equipment should be in their proper places and in good working condition. It not only teaches the student good work habits, it indicates to the administration and public that the program is well planned and under control. Many teacher's contracts have not been renewed due to a lack of laboratory organization. Budget dollars can be cut severely if administrators consider the laboratory poorly managed. On the other hand, budget dollars can be increased for tools and equipment if they are being properly managed.

Organized storage can speed project construction. Less time spent searching for correct materials enhances project completion, thus increasing the turnover of resale dollars. Poorly constructed projects should not leave the department. Low quality projects reflect directly on the instructor and program.

Ample time should be allowed for project completion. Many dollars can be tied up in incomplete projects. The taking in of additional outside projects after regular project construction has begun can lead to delays in project completion dates. Policies should be established pertaining to this. A program can be abused by individuals with all kinds of good intentions.

A tight rein should be kept on tool and equipment loan. The well-equipped laboratory can be the source for tools needed by every other department in the school. A strict loan policy should be established using a check out system. Replacing lost tools can unnecessarily use up budget dollars.

High quality, financially sound laboratory programs are an asset to vocational agriculture. Establishing and maintaining a superior laboratory program is determined by desire, planning, cooperation, patience and hard work. Maximum effort in all these is a prerequisite to achieving a quality program.

THEME

Laboratory Projects As A Stairway to Success

By James D. Summers
(Editor's Note: Dr. Summers is Assistant Professor of Agricultural Engineering at Oklahoma State University, Stillwater, Oklahoma 74074. He is a former vocational agriculture stuudent who participated in the National FFA Agricultural Mechanics Contest and exhibited the Grand Champion Farm Mechanics Project at the Missouri State Fair.)

Laboratory projects are one method for students to demonstrate skills previously learned. One important aspect of projects construction is quality. Everyone expects purchased products to be reliable and of sound craftsmanship, and the same consideration should be given in all phases of constructing laboratory projects. Quality projects will have several virtues which set them apart from ordinary projects. Three major virtues are design, craftsmanship and finish.

The design of projects is the foundation of quality projects. Students, with the aid of the instructor, should analyze the functional requirements of the proposed projects according to what the projects are to do, environmental conditions and service requirements. All of these factors are considerations involved in the selection of materials for each projects.

The sizes of the selected materials should be sufficient to withstand the conditions to which the projects will be subjected. Figure 1 shows the construction of the front axle of a four-wheel wagon using available material. The kingpin and axle have adequate strength for normal usage without specifically being designed by an engineer. If any question exists as to the proper strength, local extension service agricultural engineers can be contacted for further help. Several years of supervising construction and following the usage of projects yields valuable experience to the instructor in selecting proper material.

Good projects will also be original in design. Figure 2 shows a three-point hitch carrier which is unique in flooring attachment method. New designs can originate from determining the positive and negative attributes of similar machinery and equipment. The positive attributes can be combined into designs used for projects. Figure 3 shows a hitch for a bale carrier which has been designed by combining positive attributes of other bale carriers.

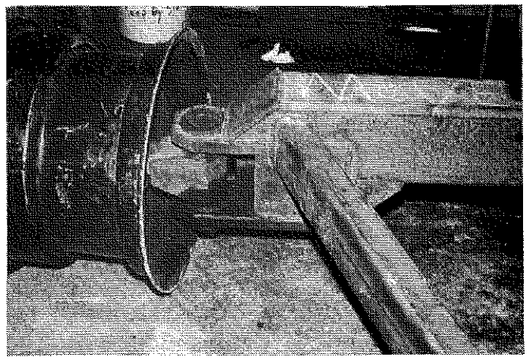

Figure 1. Close-Up view of the spindle assembly constructed from readily available materials.

Craftsmanship

Quality is not an accident, it is the result of craftsmanship. Well designed projects are enhanced by the demonstration of craftsmanship during construction. Shop projects often contain both metal and wood which require similar but distinct skills.

These skills are acquired through demonstration and practice prior to construction of projects. Metal working skills such as welding, cutting, joint construction and edge finish are all acquired through practice with guidance. Woodworking skills such as cutting, joint construction and fastening do not occur easily.

Metalworking and woodworking skills are not rapidly developed but require time and devotion. If it is desired to have students demonstrate developed skills by frequent construction of projects, small projects are desirable and can be used to show specific skills. Large projects such as machinery should only be constructed after at least two years of skill development.

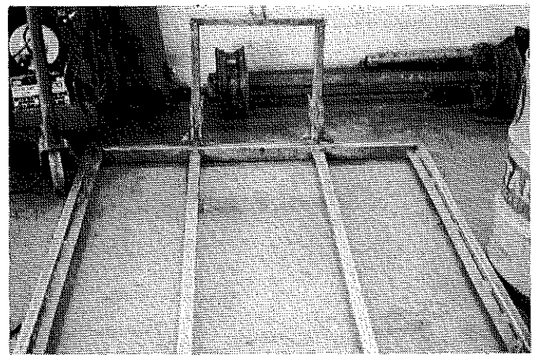

Figure 2. Floor structure for a three-point hitch carrier.

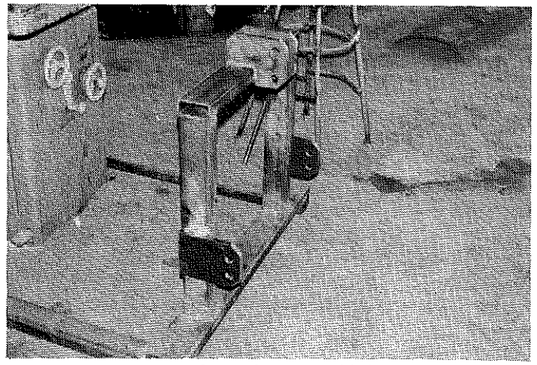

Figure 3. Hitch on a large, round bale carrier.

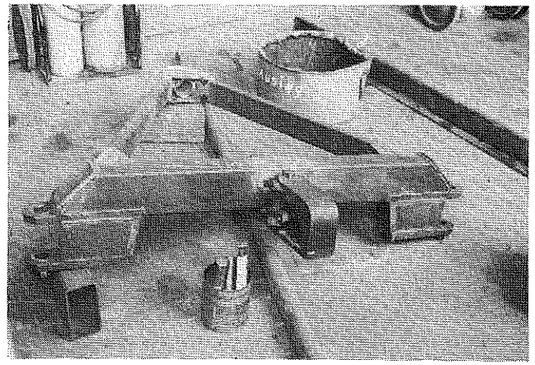

Figure 4. Enhancement of project neatness by material selection and construction techniques on the front axle of a four-wheel wagon.

Previous skill development time is an important consideration in the initial selection and design of the project. The demonstrations conducted by the instructor should be well planned, showing proper use of equipment and craftsmanship. Neatness is often considered an indication of quality craftsmanship. The front axle of a four-wheel wagon in Figure 4 shows the use of materials and construction techniques which enhance the neatness of the project.

Finishing

No project is complete without proper finishing. The use of the project is an important factor to be considered in selecting the finish materials. Enamels and lacquers are paints which have different applications for projects depending upon severity of use.

Wood finishes range from enamel paints for exterior and interior conditions to varnishes for interior conditions. The students should be given guidance in selecting finish products which are best for their projects. Material preparation prior to finishing assures the quality of the finish. The surface finish is the final touch to a good project.

Quality Begets Quality

Quality projects result from sound design, good craftsmanship and proper finish. But how do students become inspired to create quality projects? Students follow the examples demonstrated by others.

Basic instruction in shop skills should be planned and executed with the thought in mind that the instruction is helping the students develop basic skills. Neatness and shop techniques should be practiced by both the instructor during demonstrations and the students during hands-on practice. The self-discipline created by proper instruction will help develop the students. Before any skills are demonstrated, the instructor should be adequately prepared to show quality craftsmanship in the demonstrations.

Laboratory tools should be demonstrated to the students to introduce them to methods of achieving desired construction. Quality projects will not occur without the completion of the original designs. The techniques used in metalworking such as joint construction need to be demonstrated and practiced prior to usage to ensure achieving the desired designs. Demonstration of good fitting joints which are proper for the application will leave the students with the impression of good craftsmanship.

Before starting shop projects the students should be adequately prepared. Each student should analyze the use and design of their project. Plans and guidelines should be completed by each student showing the construction details of their project.

Instructor review of the plans for improvements in design and construction details is important. Constructive comments should be made and the plans returned to the students for revision. Individual help during the revision may be required to achieve practical designs. Such designs result from experience which the instructor has acquired and the students lack. Everyone learns from mistakes, but the finished projects are too late for students.

Basic skills demonstrated to the students in previous classes or earlier in the school year are important to the success of projects. Before each weld is made or joint is cut, the students should practice the techniques required to execute the particular skills needed. If the previous demonstrations of basic skills by the instructor were of excellent quality, the students will be encouraged to achieve good results in every skill application.

Another method of encouraging quality projects is to identify past successful projects and awards. Figure 5 shows the display of awards in a vocational agriculture classroom. The students often have relatives who have previously taken the same course. By recognizing prior successful projects, a competitive desire will be created.

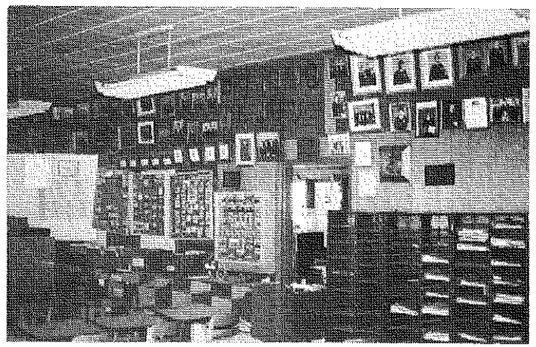

Figure 5. Display of awards and individual pictures in a vocational agriculture classroom.

Once the competitive environment has been established, the students will strive to construct quality projects.

Useful Skills

The ultimate result of the time and effort invested by students in quality shop projects will be an asset to them in the future. If students are personally recognized for their efforts, they will be encouraged to continue the quality work. The students will build confidence in their abilities which will be future attributes when seeking employment. Employers look for people with experience and who demonstrate the ability to learn. The success in constructing quality shop projects demonstrate experience and skills necessary for employment after completion of high school. For people continuing on to post secondary education, the experiences obtained in constructing quality projects will give them a competitive advantage after completion of their higher education.

Quality projects are media through which students can mature and learn. The benefits of constructing quality projects are satisfying in the short term but are assets in the future. One of the best ways to inspire students is to emphasize the success of prior students. The remainder of the inspiration rests on the instructor providing constructive remarks throughout the development of projects from planning to completion.

THEME

Agriculture Mechanics: Pride, Workmanship, and Quality

By Robert W. Pearcy
(Editor's Note: Mr. Pearcy is Vocational Agriculture Instructor at Redwood High School, Visalia, California 93291. His students have won several honors in the Lincoln Arc Welding Awards Program.)

Twelve years ago, I started teaching vocational agriculture and, after two years of dividing my time and efforts in many different areas, I began to work more with agriculture mechanics than with plant and animal sciences. By putting my interest and skills in an area that I enjoyed, I began to feel like I was accomplishing more as an agriculture teacher.

I could see progress from day-to-day on various projects in the laboratory and evaluate my progress and teaching technique as students completed their work. I suppose that over the past few years I have tried most of the teaching techniques offered by the experts but not all techniques work all the time.

If I had to choose one thing that has inspired students to construct quality projects, I would choose "examples". By this, I mean show students that something can be built and the ideas will develop on their own.

Each year as our freshmen enter school I am asked numerous questions such as, "Was that trailer built here?", or "Where did you get the kit to build that spray rig or wood splitter?" New students do not realize that top quality work on large involved projects can be done by high school students. By providing examples of projects and ideas, students can readily see that they too could build large complicated projects.

Students undergo a tremendous change in their lives from the time they enter high school until they graduate four years later. They begin as immature individuals unable to identify tools, materials, etc. Hopefully, these same youngsters will develop into skilled young people with the basic vocational skills necessary to provide them with employment.

Project Selection

It is hard to describe a project idea by simply telling someone. The old saying "A picture is worth a thousand words", is never more true than in my classes. We have at least 300 different photographs of projects that have been built over the past few years. When students ask me about a project that we have built before, I will refer them to a picture similar to what they have in mind. Usually a picture will help direct them toward a project with certain design changes.

Basic skills are gained during the first two years of vocational agriculture. During this time, students are provided practical experience with shop tools, safety, drawings, welding, cutting, woodwork, painting and finishing, small engine repair, hydraulics, electricity, plumbing, concrete work, surveying and more. I try to provide enough experience in agriculture mechanics during these first two years that the student can return the third year and be ready to start a major project with a minimum of help from me.

When I ask my juniors and seniors what kind of project they intend on building, many of them answer that they do not have anything in mind. They all want to build and construct some major project but do not have a need for, or the money for such a project.

Over the past years we have gained a reputation for building top quality projects and consequently have numerous people asking us to build various things for them. Usually through the summer and fall I will receive requests to build a dozen major items such as livestock trailers, wood splitters, cattle loading chutes, wood stoves,

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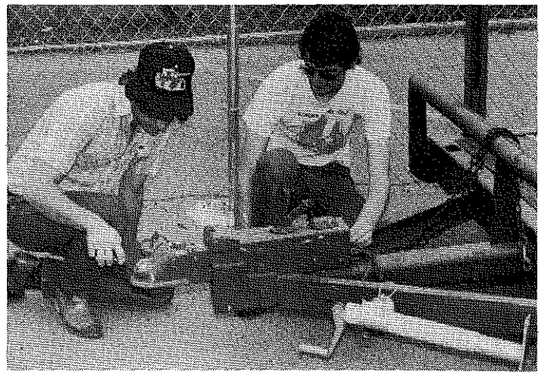
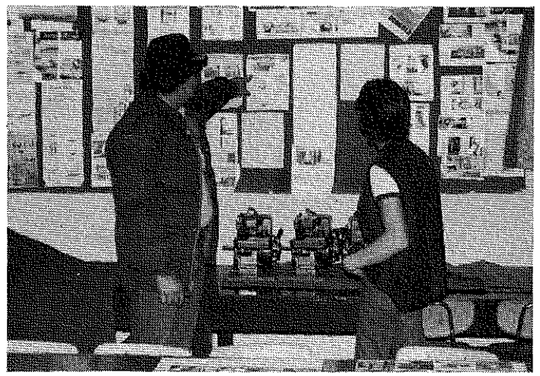


These students examine a surge brake hitch and compare it to one they expect to construct.



Information from various companies are on the wall of the classroom. Numerous ideas and projects are illustrated.

Agricultural Mechanics: Pride, Workmanship, and Quality

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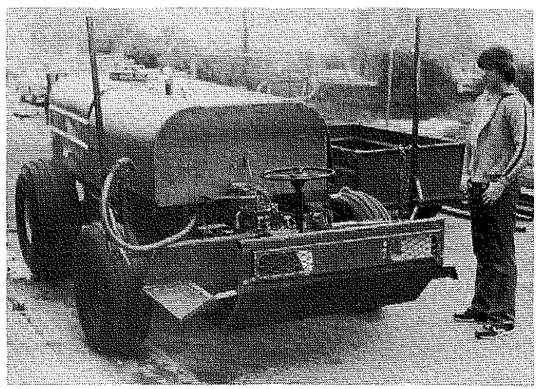
etc. These projects are then assigned to various students (sometimes two students on larger items).

I try not to accept any major job if there are too many strings attached such as length of construction time or short cuts in workmanship and materials. Occasionally a project is turned down because either the person needs the item too quickly or wants it built too cheaply.

Financing Projects

If a student chooses a project from the list of things we have been asked to do, or something he or she wants for themselves, certain requirements must be met before construction can begin. Financing seems to be the most important factor when considering a project. Financing can be handled in several different ways. First, nearly all materials are ordered and provided by the department. I do not encourage students to bring their own materials for projects because it is hard to keep materials separated and avoid students using each other's metal, wood, etc. For these reasons, I try to provide all the necessary materials for the more common projects.



This is not the typical project in the shop, but a complicated piece of machinery. Many skills were applied here such as design, welding, hydraulics, plumbing, electrical wiring, etc. All these skills lead to a quality, first class project.

Materials are put out to bid during June and July and are ordered and available by September. Also, open accounts at several stores and businesses allow me to pick up miscellaneous supplies during the year. All this leads to better control and usage of supplies and materials. Each student can plan, estimate the cost and build his or her project from one stock of materials.

When the project is completed we work out an actual cost of materials and the bill is given to either the student or the person the project was built for. I pay the school district account for all materials used.

When a project has been designed and a cost estimate has been made I would set down certain plans and agreements with the student and the person we would be building a project for. First, I require a deposit on all construction projects in excess of $100. This deposit is usually 15-20 percent of the cost estimate. Once materials have been ordered and construction started, the deposit cannot be returned. As progress is made, I request payments to be made so that by the time the project is finished it will be nearly paid for.

Shop projects may vary from a $2.00 wood stool or mail box to a $10,000.00 spray rig, and everything in between.

During a typical year our shop will turn out approximately $20,000 worth of projects by 50-60 different students.

I consider everything in the laboratory as though they were mine, even though they are not. Therefore, I look at the laboratory and equipment with a more personal interest. I consider the loss of even the most minor tool a loss from me personally. We seldom lose any tools because of strict clean up procedures after each class. However, a tool is occasionally broken due to no one's fault. Minor repairs are taken care of by our classes and major repairs are made by our district maintenance department.

Each item that leaves the laboratory is a reflection of the department, the program and myself. Therefore, everything that leaves must be completed, painted, correctly constructed, be first-class in workmanship, and make the builder proud that he or she built the item. Shortcuts or half-way jobs are not permitted. Occasionally, a student may have to rebuild a portion of a project before it is allowed to be taken home.

If poor quality work is allowed by the teacher, then students will do poor quality work. I feel it is my responsibility to expect the best at all times.

Anyone can frame a small trailer, or frame a feeder or small building but that is the easy part of the project. The hard part is the finish work, the detail painting, etc. For example, a fireplace insert wood stove can be framed together and welded in just a few hours, but the front doors, trim and finish may involve several weeks of work in order to achieve an attractive project.

An added incentive for students to do quality work is the opportunity for awards and recognition. I encourage each student in my construction classes to enter the Lincoln Arc Welding Contest. During the year pictures are taken to show the progress and steps in construction of each project. All reports are completed in May and submitted for cash awards. These reports become a very valuable aid to me and my students. The detailed plans aid future students in planning and building similar projects.

Students need to be praised for their work and at the same time need to be criticized for their mistakes. I have told numerous students that it is just as easy to build it right as to build it wrong and the end results will be more satisfying if the project looks good.

Placement in industry is an important aspect of agriculture mechanics. Numerous calls come in during the year for part-time welders, small engine repair mechanics, etc., I am proud to be able to recommend a student to a prospective employer, even more proud when that student is hired and stays on the job for several years.

In order to get your students to achieve quality work and be proud of what they are doing, instructors must be proud of what they are doing. They must be willing to give praise for good work to the student and take the criticism from other teachers and parents for poor work. Fortunately, the criticism is outweighed by praise and satisfaction if they put out a little extra effort. An agriculture teacher can earn the same salary whether he or she does that extra effort or pushes for quality work.

THEME

The A-B-C's Of Project Quality

By Wilbur G. Chancellor
(Editor's Note: Mr. Chancellor is Farm Mechanics Instructor at Choctaw County Vocational Center in Ackerman, Mississippi 39735.)

A quality projects begin on the first day students come in contact with a description of the outcomes expected of them. After student personal data forms are completed, we start working on safety tests. Each student is given tests on fire prevention and control, tornado, and shop safety. The fire prevention and control test is designed to help prevent laboratory fires, but also to help the student to know how to control it if one should occur. The tornado test is used to make sure the students know where to go and what to do in case of a disaster. The shop safety test covers the use of all equipment and the laboratory rules and regulations.

Each student must pass each of the three tests with 100 percent accuracy before going any further in the agricultural mechanics program. The students realize after taking these tests that quality work is a must, even if it has to be done a second or third time to achieve that level.

Basics Are Essential

Everything has to start somewhere and with us quality starts with the basics. What are the basics? Well, the basics for us is starting at the beginning in every area that we cover.

We have three major subject matter areas: welding, combustion engines (small engines), power and machinery. Our welding program is broken down into individual units of arc welding, MIG welding, TIG welding, oxy-acetaylene cutting, oxy-acetylene welding and oxy-acetylene brazing. We start out in the classroom and spend approximately 12 hours on each unit, depending on how fast the students develop, before going to the laboratory for demonstrations and beginning practice. Each unit is taught separately, and each student has time enough to learn the basic operations, characteristics, and skills before going to another unit.

Once the students go to the laboratory and observe demonstrations on different units, they begin practice to develop skills and techniques that will be used later on various projects. The students start out with small projects and work up to larger and more complex projects.

These welding projects start from scratch with design, bill of materials, layout, construction and finish. Each project is graded on the above mentioned criteria plus the amount of time spent to complete the project and the total quality of the completed project. The projects are checked daily, and students are advised as to how well their projects are going. Students can ask for advice or help at any time, but the student is responsible for making the final decisions. Quality workmanship is a must and if necessary the project will be reworked.

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The A-B-C's of Project Quality

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The internal combustion engines program is mainly used as an introduction to larger engines and to teach operating principles and theory. But we do a certain amount of small engine work.

The power machinery program takes up where the internal combustion engine program ends. Again class time is spent learning the basics and how to use various reference materials. Different types of equipment and tools are discussed and demonstrated and the student learns how to use these before project work begins.

The use of the trac-com system by Ford Tractor Operations is an excellent teaching aid and a good way for the student to receive individualized instruction.

Projects in the power and machinery program are graded on a performance basis from beginning to end. Some of the projects in this program are engine overhaul, hydraulic system repair, clutch and pressure plate replacement and transmission repair. Also included is machinery and equipment repair and refinishing. In this area as well as others quality is essential.

Competition

Competition is one good way of obtaining quality projects and quality performance. Student competition in the laboratory is a teaching aid when you are striving for top quality and performance. Whether it is working on tractors, machinery or welding projects, my students try to do the best job possible.

We encourage competition within our department, but we also enter other contests such as FFA contests at federation and state levels, the Lincoln Arc Welding Awards Program and the farm mechanics projects competition held at our state fair. We have entered 18 projects over a three-year period at the state fair and have won all blue ribbons.

The quality shows up in the projects but also in the students. Each year the students strive to maintain the quality achieved in former years and set a new standard themselves.

Organization and Finance

Laboratory organization and adequate financing are important aspects of achieving quality performance and quality projects. First of all, the laboratory should be organized in such a way that the total facility can be utilized. A well organized tool room or storage room with an ample inventory of needed supplies is a must. In our department, we build a lot of welded projects and use a lot of metal. We have a metal rack for larger materials and a metal storage room for the smaller materials. Both of these are located inside the laboratory to help protect the metal from rusting. The supplies used in finishing are stored in the painting and refinishing room. All other supplies are stored in the tool room.

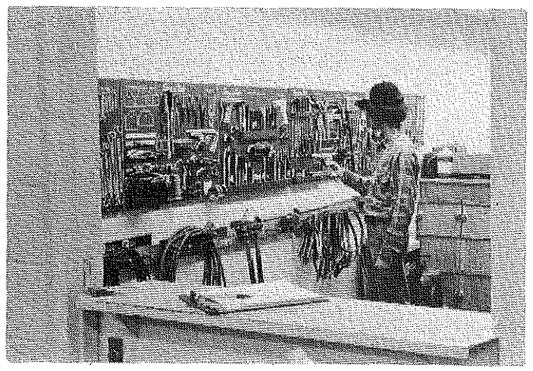
Financing laboratory projects can present a real problem. Our department gets the necessary supplies furnished, but when it comes to buying metal, paint, and tractor parts; we have to look elsewhere. We have a 15 percent cover charge, above the cost of materials, for repair projects such as tractor overhaul, equipment and machinery repair, and refinishing. We also build welded projects to sell at a small profit which gives us some operating money to buy materials.

The students are able to obtain practical experience instead of just being allowed to weld in a booth. These projects help the community by providing them with quality products at a reasonable price and my students gain valuable practical experience.

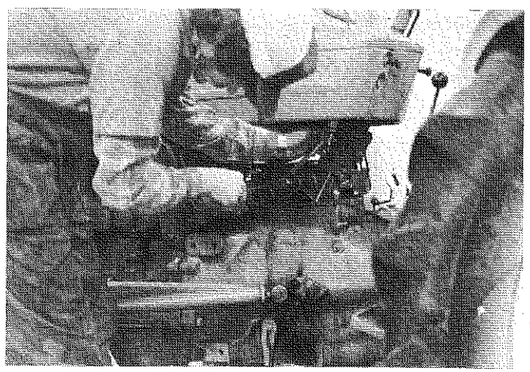
The students' interest in and concern for the program is a major factor in obtaining quality projects. If the students realize from the start that the training they receive will help them in securing a future job, they usually make the changes necessary to fit into the program.

The students learn various employability skills which will give them a better chance of securing a job. While learning and using these skills, the students are achieving the quality performance and workmanship necessary to produce quality projects.

The students' attitude toward achieving quality projects in our department is exceptionally high. It does not matter where we go, on field trips or just visiting, my students are always comparing the quality of others' work to the quality of their own.



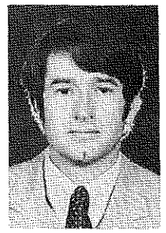
A keeper for the tool room is a must for maintaining equipment in an orderly fashion and promotes good housekeeping practices.



The steering on the FFA tractor provides a means of learning important maintenance skills.

THEME

Project Construction: The Traditional Element of Instruction



By James H. Daniels
(Editor's Note: Dr. Daniels is an Associate Professor of Agricultural Education, G01 Tillman Hall, Clemson University, Clemson, South Carolina 29631.)

A review of past issues of *The Agricultural Education Magazine* reveals that project construction by students has always been considered important to the vocational agriculture curriculum. The review also reveals a gradual evolution of project type. In the 1920's and 30's, for example, typical projects included forge work, and harness repair, which were relevant during that period. As the technology in agriculture has changed, programs became outdated and have been continually modified or replaced by up-to-date endeavors.

The primary value of training students through project construction seems to lie in the assumption that the demands of project construction in laboratory closely parallel the demands of reality. If this is true, a lag between the two appears to have always existed. Whether or not this lag has lessened in recent years is not easily discernible. Perhaps the lag varies more among programs than within programs, both currently and historically.

Pros and Cons

The advantages of project construction by students include:

1. Students are forced to plan — existing plans may be adopted or students may develop their own plans.

2. Material calculations — the students learn to produce an accurate bill of materials.

3. Project economics — the students learn to determine the cost of a project, and decide whether or not it is feasible.

4. Accountability and efficiency — hopefully, students work more conscientiously and efficiently with purchased project materials than with scrap materials commonly used in skill development exercises.

5. Responsibility — in the real world students must learn to suffer the consequences of mistakes; if materials are damaged or ruined, replacements must be obtained.

6. A parallel to the real world — ideally the conditions of building a quality project are very similar to working conditions on-the-job.

7. Amplification of training — the project provides an excellent opportunity for students to put into practice newly acquired knowledge and skills.

8. Pride, recognition and motivation — a well made project can be a tremendous source of pride and motivation for students; also, it is an excellent way to get favorable recognition for both the student and the program.

The disadvantages of project construction include:

1. Storage — Storing partially completed projects can be a problem especially when the laboratory is used by several other classes during the day.

2. Managerial time drain — There is no question that worthwhile projects may require a tremendous amount of personal supervision from the teacher, especially when several different projects are developed simultaneously.

3. Financing — Usually quality projects are expensive, and unless adequate provisions are made prior to construction, problems can arise. Some students may not be able to purchase the necessary materials. Alternative financing takes time to secure.

4. Scheduling — It is difficult to accurately estimate the time requirements for projects considering individual students work at different rates. A serious problem occurs when students run out of time prior to completion. Sending a partially completed project home will result in a negative perception of the program.

Recommended Steps in Project Adoption

1. Weigh the pros and con and make sure the advantages outweigh the disadvantages for each project.

2. Inventory the present use of student projects by type and determine whether they should be continued or discontinued; also, determine if additional projects would enhance learning.

3. Assess the limitations and abilities of the students, facilities and equipment, budget, and the teacher.

4. Identify the interest and needs of students, school, and the community.

5. Assess the goals and missions of: the school and the local program.

6. Blend projects with teaching units. The haphazard approach must be avoided. Projects should be related to recently completed instruction.

7. Determine each project's educational worth, cost, time requirement, feasibility, and relevance.

Project Worthiness Criteria

Before a particular project is cleared for construction, the following questions must be answered:

a. Does it have educational utility?

b. Does it have a practical application?

c. Does it have home, farm or community uitlity?

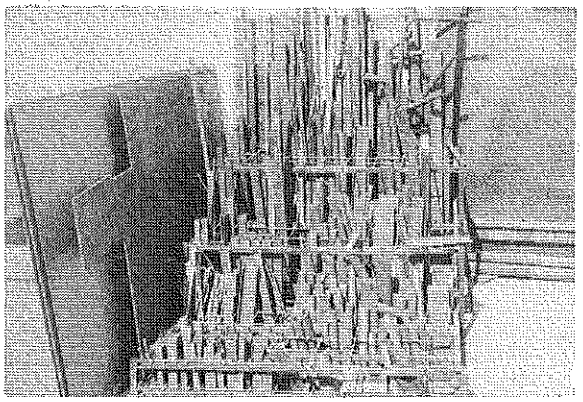
d. What is the cost/value ratio?

e. Will it result in positive relations?

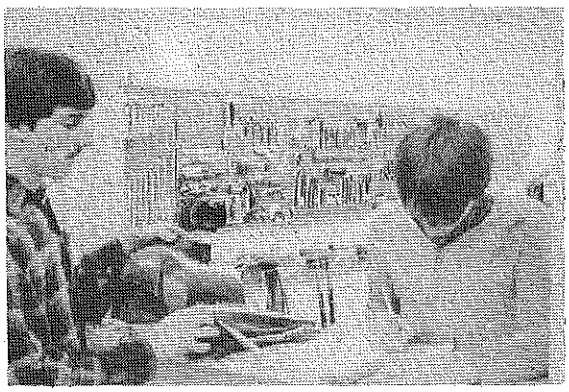
f. Is the project appropriately compatible with the program's overall purpose and mission?

Stories in Pictures

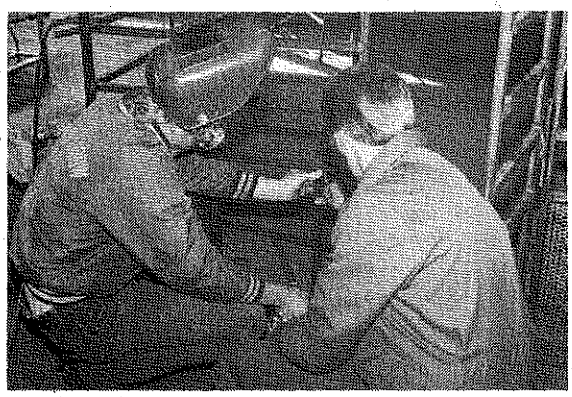
When identifying project ideas, a picture is worth a thousand words. (Photograph courtesy of Robert Pearcy, California.)



Adequate storage for salvage material saves money and time. (Photograph courtesy of John Wallace, Missouri.)

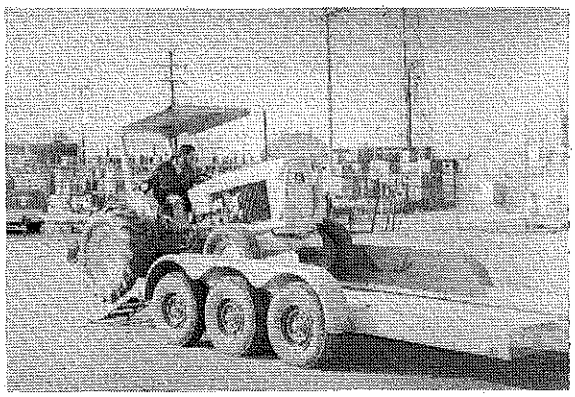


Planning and cooperation are essential life skills. (Photograph courtesy of W.G. Chancellor, Mississippi.)



The vocational agriculture instructor must carefully supervise quality projects. (Photograph courtesy of Verlin Hart, Oklahoma.)

Quality projects provide valuable experience and a source of income. (Photograph courtesy of Joe Farrell, Kansas.)



This trailer, a premium winner at an Oklahoma State Fair two years ago, was built by the Broken Arrow FFA Chapter. It now takes its place as a useful piece of equipment. (Photograph courtesy of Verlin Hart, Oklahoma.)