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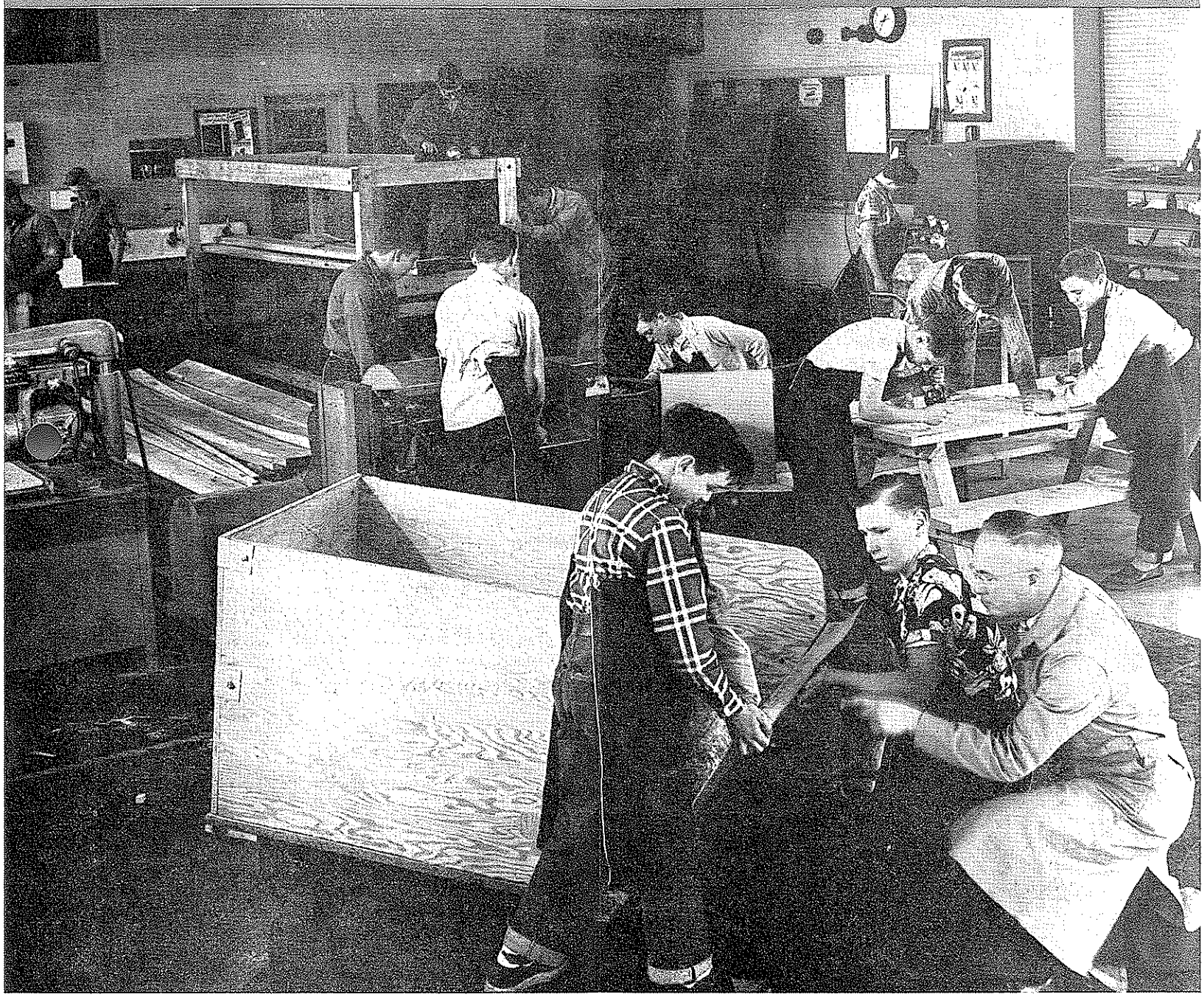

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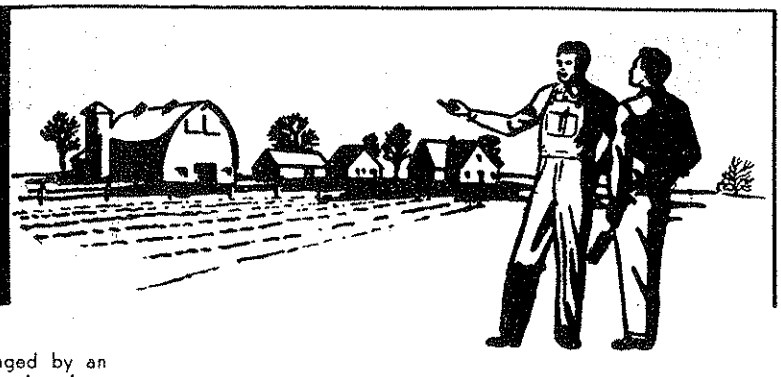
Featuring— The Increasing Emphasis On Farm Mechanics

The Agricultural Education Magazine



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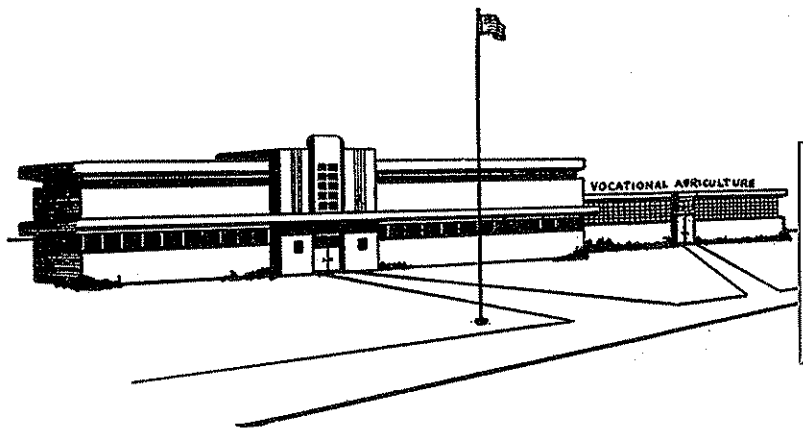
Contents



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Editorials

Guest Editorial . . .

CLARENCE POE, Editor and Board Chairman, *The Progressive Farmer,* formerly Chairman (and Member Representing American Agriculture) Federal Board for Vocational Education

Community organization is now the farmer's greatest need. He needs many other things, of course. But a community organization to push community progress is the best tool for getting nearly all these other things. It is the master key to nearly all rural forward movements.

America's rural leadership has been a long time getting around to a realization of this truth—a long, long time. But the most gratifying fact on the whole rural horizon today is the new emphasis on community organization—grassroots organization. And since this new situation offers all teachers of vocational agriculture and home economics (and their leaders) such a wonderful opportunity for service, I wish to beg them to make maximum use of it—and quickly.

As has just been said, this realization of the importance of community organization has been a long time coming. We have long had national programs for improving rural conditions and promoting rural progress . . . regional programs . . . state programs . . . county programs.

But now—at last—we find the wisest leaders of rural thought turning to the real foundation of the whole structure—community programs. "County Progress Through Community Progress" is winning general acceptance as the master motto for all our "Go Forward" programs of the next 10, 20, or 50 years.

In all these cases I believe—and certainly in most of them—progress begins by realizing that the county is too big a unit for best results—and *this is the situation which offers a truly unique opportunity to agricultural teachers.* In every county quite a number of geographically defined separate communities need to be set up . . . and then goal posts of community progress set up for each community with separate committees on 8 or 10 important subjects such as crops, livestock, farm, home, church, recreation, youth activities, etc.

Take my old home county as an example. There the county has been divided into 15 separate communities, with six men and six women as leaders in each community. Thus we have "180 Captains of Progress" we might call them . . . and it is easy to imagine how much 90 such men along with 90 such women to "keep them stirring" can accomplish in any county any year!

Not only do these programs get all the people of a community working together but all agencies are brought together. In my home state, for example, all of these 11 agencies act together in promoting these county and community program campaigns:

1. Agricultural Extension Service
2. Home Demonstration Extension Service
3. The Experiment Station
4. Vocational Agriculture and Home Economics Teachers.

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Farm shop instruction brings satisfactions

J. L. EASOM, Assistant Chief, Vocational Rehabilitation and Education Division, Veterans Administration for State of Mississippi. Jackson, Mississippi

Joseph stood up, brandishing his saw over his head, but his grin belied the violence of his appearance and gesture. "This saw," he said, "is a tool without soul or conscience. It can be used to cut open the hated skulls of Romans or it can be used to fashion a cradle for the lowly Nazarene Child. It all depends on the person who uses the saw." The above is a rather broad interpolation of the writings of the Synoptic Gospels, but even so, the truth of the statement is as fresh and modern as the latest pedagogical pronouncement. The finished products from the square and the saw, the hammer, the plane and bit, the wrench set, the stock and dies, the welding machine and the paint brushes in the hands of boys, skillfully directed by an agriculture teacher who has a love for boys, can provide esthetic values to both himself and the boys which are as soul and mind-satisfying as a product from the brush and easel or the chisel and mallet in the hands of the painter or sculptor.

As a young agriculture teacher 26 years ago, and later as a high school superintendent, and still later as a vocational agriculure supervisor, I was considerably disturbed because there was no opportunity for selection of students for vocational agriculture classes. Usually all boys in the first two high school grades were enrolled in vocational agriculture. Consequently and frequently there were "town boys" who had little opportunity for carrying on supervised farm activities. Faced with this, I made no rhetorical pronouncements such as quoted above, but I did sense that each student possessed undeveloped abilities and, further, I had a heavy responsibility for finding where his interests lay and stimulating him into action. The immediate job was to find out "what" and "how" to teach this heterogeneous group and to teach them something that would fill their present and prospective needs, whether as town or as farm boys.

The school shop offered a way to meet the challenge, in part, as no other single means did, and especially for these town boys. Fortunately, as shops went in the early days, available equipment was fairly sufficient for doing a wide variety of shop jobs. It was necessary to exercise considerable imagination and ingenuity in order to provide shop activities for this heterogeneous group The scope of the farm shop activities ranged from simple motor repair, farm machinery maintenance, farm building repairs, building farm and home conveniences to activities, in some instances, which, if measured by present day standards, would be considered impractical —other than to keep an energetic boy busy and out of the clutches of the devil.

A review of the careers of a representative number of my former agriculture students will help establish whether or not farm shop instruction was a wasted effort or whether it was contributory to successful careers. Let's take Foley. He was a rather awkward

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Some controversial issues in farm shop instruction

Where are we going with power tools?

KENNETH L. RUSSELL, Teacher Education, Sam Houston State College, Texas

Kenneth L. Russell

FOR some time I have had the feeling that we have over equipped our school farm shops in vocational agriculture. This is only a tentative conclusion, but I am finding more and more evidence that we are failing to reach our goals by having too many power tools in our farm shops.

The development of my own son, as nothing else, has strengthened this tentative conclusion. At the age of four, George began experimenting with saw, hammer, and nails. At five, he was constructing small projects with wood. He had learned to use the saw quite well for his age. In fact, we bought him his own twenty-inch, ten-point Ditson saw. No child was ever more proud of a new toy. It kept me hustling to find boards for him to saw and nail together. A dime's worth of nails became as valuable to him as a dime's worth of candy.

When he was six, we started the construction of a new home here in Huntsville, Texas. I say "we" built a house because George lived on the job that spring and summer. To save time we bought a power saw. This new toy was a marvel to behold. In a second's time I could saw a board in two; so George brought me all his sawing. At first it was fun to help him, but gradually this became a chore to me and a detriment to George. That young man lost interest in doing his own sawing, but not his interest in boring holes, driving nails, and building things. Gradually, these other activities ceased to have value because sawing is always necessary before nails can be driven and holes bored in the construction of a project. Even a tiny board no bigger than a lath became too much of a task for George to saw by hand. Since I had neither time nor patience to do all his sawing he gradually gave up building projects. But his creative interest is still strong. Quite frequently the garage is strewn with boards full of nails, holes, chisel marks, and plane shavings. Nothing, however, is actually constructed. That would require sawing, and George disdains the hand saw. Did you ever try to convince a boy that he should use the hand saw when a power saw was available to do the work?

Loss of Interest

Now the present trouble is that George is too small to handle the power saw safely. While he is growing old enough to use it he will lose the best years of his life for learning woodworking skills.

I can not help but look back on my own youth and thank Providence that no such thing as power tools existed in the farm shop at the Chilhowee High School in Missouri. There is no way to prove the point, but I am afraid a room full of power tools in the school shop would have hindered my interest in building things at home and limited my creative ability.

When I was seven a new house was built on our home farm. The old carpenter let me use his new plow plane—an essential then in building window frames. Thank goodness, he had no power saw. That would have been too dangerous for a young boy of seven, but the plow plane was not, and under his kindly direction I was allowed to use this fascinating tool.

I never lost my interest in building. There was no magic machinery to discourage me as the power saw has discouraged my own son. I am sure, quite sure, that a power saw which I could not use might have abated my interest. How I hated to rip those long boards for those early projects, but since there was no magic way to get the job done, I had to do it myself.

Another factor to my advantage was that Bob Marshall in those early days of vocational agriculture at Chilhowee had no illusions about what could be constructed in the farm shop. As a result I built bird houses and hog houses at home and such things as bookcases and walnut chests at school. One chest was for my current heart-beat, and the quality of workmanship was far superior to anything I would have attempted for a pig. The wood was planed by hand from rough-sawed, air-dried walnut. I shall never forget how to sharpen a plane and adjust it properly as a result of this project.

Here again I am glad that we had no power tools. I can picture exactly what would have happened. The job of sawing all those hog houses out by hand would have become intolerable after using the power saw at school. I would have lost interest in building those hog houses at home, where they should have been built, and constructed them at school, or not at all. This would have deprived me of much valuable experience in constructing projects at home and of the more skilled experiences at school.

Skills Not Learned

As a teacher of vocational agriculture I equipped my first shop at Sarcoxie, Missouri. We had no power tools, and I am quite confident that those boys in 1938-41 learned more of the skills they needed on the home farm than any later group I taught after I moved to Neosho where we had power tools.

Let me emphasize that there was no difference between the needs of the boys in Sarcoxie and Neosho. None of them had power tools on their home farms. In Sarcoxie I taught them to use the hand tools they had. In Neosho I attempted to teach them to use the hand tools they had at home, but the power tools at school developed in them a dependence on machinery, and the boys ended by learning to rely on mechanical equipment which was not available to them at home. The quality of the projects turned out was improved, but the training of the boys was not one mite better and not at all in keeping with their facilities at home. All I did with the power tools was to discourage the use of hand tools and implant in the boys a reliance on machinery rather than on themselves.

Relation to Vocational Needs

As a teacher trainer I see in the farm shop much that I question as being the proper kind of education for farm boys. I see boys lined up to make simple cuts on the power saw when a hand saw will do the work just as well. I see boys using jointers who can not sharpen and adjust a plane. I see fingers missing, too. I see projects under construction at school that should be done at home. I see very little quality work because there is not the incentive to do the same kind of work for pigs and chickens as one will do for his mother, dad or sweetheart.

I am a firm believer in teaching the farm boy the things he needs to know to make a success of farming in his own farming situation. Vocationally, I want him to do the best job he is capable of doing with the land and facilities he has available or can economically justify. If he operates tractors, I want him to understand tractors. If he uses mules, I want him to understand mules. I see little point in a boy's becoming proficient in the budding of peach trees if he grows corn, cotton, and hogs. In other words, I accept the philosophy of teaching vocationally on the basis of the needs of the boy and the community in which he lives.

To be specific, in the case of the farm shop I see no point in teaching the boy to use a jointer, if farms in the community have no jointers, or in his learning to use the electric welder if farms do not have electric welders. It appears to be a waste of time to practice with the wood lathe when his chance of owning and using one as a farmer is less than his owning an airplane.

Meaning of "Needs"

The fact that he has electricity and could have these tools is beside the point. He does not have them and, for many economic and sufficient reasons, will not have them as a farmer. To teach on the basis of what he might have because he has electricity available, appears to be like justifying airplane engine instruction because he has gasoline.

I personally believe we are a bit confused about this thing called "need." The need of the boy and the need of the

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Farm mechanics teaching is changing with the times

PAUL F. PULSE, Assistant Supervisor,
Farm Veterans Training Service, Ohio

MANY times we have seen or heard the statement, "Inability to change is evidence of death" or "A rut is a grave with both ends knocked out."

As a teacher of Vocational Agriculture, have you kept abreast of the times? Does your program of instruction include demonstrations of skills and abilities required by the present-day farm operator? Is there ample time for practice on the part of the students to acquire these skills and abilities? Or as a teacher are you more interested in seeing how many projects can be constructed, repaired, or turned out of your classes during the school year?

It's a fine experience for anyone to assist, or help another human being. However, it is much finer, and more self satisfying to help a fellow human being help himself permanently, by teaching him how to perform the job or acquire the skill. This, after all, is the purpose of teaching.

Working in a supervisory capacity one has a splendid opportunity to visit teachers right out on the job, and to receive many new ideas as we see the teacher in his shop carrying the class through many learning-by-doing experiences. It has been my good fortune to observe some master teachers during the past seven years. The one cardinal principle of these teachers invariably has been that they are primarily concerned with teaching skills and abilities through well chosen demonstrations properly timed to meet the needs of the students in their classes.

The Service Feature

Oh, you ask! What about service? But, the master teacher does not have to worry about service. It follows good teaching. Let's look at the welding picture. Here is a teacher demonstrating how to run a bead with an arc welder to the students. After they have mastered the ability they right away have many uses for it. There are countless plans of projects which can be made. And many a lad has an idea of his own as to what he desires to make. It is usually based on a specific need. And in most cases is entirely satisfactory.

Definite plans for shop teaching are desirable. In this picture, Ralph Needs, teacher of vocational agriculture at Summit Station, discusses his plans for teaching farm shop with his superintendent of schools and A. E. Ritchie of the Department of Agricultural Education at Ohio State University.

Consider the case of the students and teacher evaluating the various hog boxes under construction in Farm Shop. Yes, after a boy has developed the ability to use hand tools in such a way as to turn out acceptable work, which he can take home and point to with pride in his accomplishment, there is no reason in the world why he cannot use the power tools to step up production and work more efficiently.

Now you see there is no quarrel between teaching the skills and performing a service. In fact, if the students do not possess the skill or ability to turn out quality work of which they can justly be proud, no one will desire their services as craftsmen of even the most elementary farm carpentry jobs. If on the other hand they possess the skill required to turn out acceptable work, there will always be a steady production line of useful, needed shop projects emerging from the Farm Shop, with a back log of projects that time will not permit undertaking.

Needs Arise on Farms

Yes, the present-day master teacher, visiting the homes of the students this summer is keeping an eagle eye out for possible shop projects based on needs of the boys' individual farming programs and the home farm as he talks with Dad, Mother, and son regarding the coming year's program of Vocational Agriculture.

Look at the picture of the teacher demonstrating the need for cleaning the air filter on that tractor. All the facts regarding the quantities of air used daily, the amount of dust drawn in, or wear produced if this matter is not attended to will not cause many people to perform the job as needed. But this teacher uses the tractor from the field, shows the condition of the filter, then supplements the discussion with the pertinent facts and factors having a bearing on the matter. Is there any question in anyone's mind as to whether the students are interested? I'll bet every one of them wonders if the air

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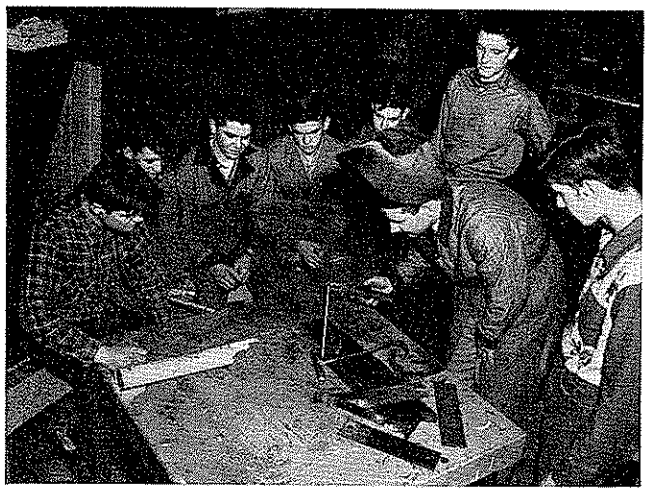
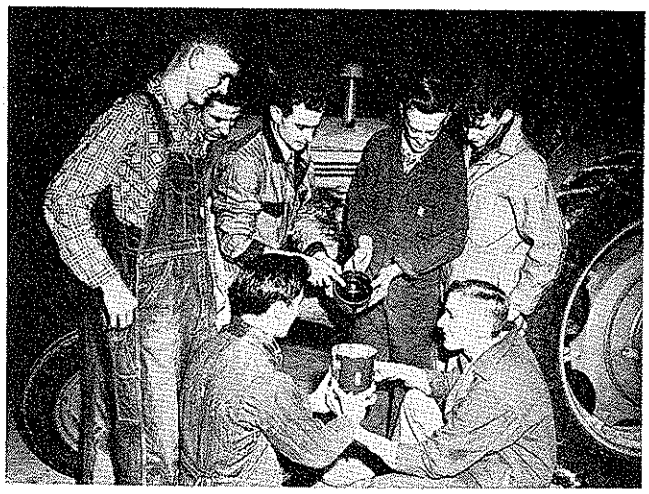


Mr. Ralph Needs, teacher of vocational agriculture at Summit Station, Ohio, demonstrates the use of the electric arc welder to members of his class. Such teaching is necessary in order that boys may develop needed skills and abilities in farm mechanics.



Joy Warner, teacher of vocational agriculture in Champaign County, Ohio, demonstrates the renewal of tractor air cleaner to members of his farm mechanics class. Such teaching emphasizes both the educational and the service needs of the students.

Difficulties in securing farm machinery projects in vocational agriculture shops

DONALD L. FREEBURY, Vo-Ag Instructor, Valier, Montana

MACHINERY maintenance and repair projects are considered desirable learning experiences in vocational agriculture. Many vocational agriculture instructors and supervisors believe that an insufficient amount of machinery maintenance work is being done in the high school vocational agriculture shops.

Many factors may be involved such as:

1. Instructors may lack confidence in teaching machinery repair.
2. Parent-student cooperation may be involved.
3. Schools may lack space and equipment.
4. Cost of maintenance and repair may deter interest on the part of parents.
5. Transportation to and from the farm may be difficult.

The writer made a survey of Montana vocational agriculture teachers on this problem to determine:

1. Teachers' reactions with their present machinery maintenance program.
2. Extent of the present program on machinery maintenance.
3. Teachers' opinions on lack of shop projects.

A major question raised was, "Are you satisfied with the amount and kind of Farm Mechanics Projects your students bring to your shop and shop program?" This question is important to determine what percentage of the instructors are satisfied with the present supply of machinery for maintenance teaching purposes. Of the 54 instructors, nine, or 16.67 per cent replied, "Yes," and 45 or 83.33 per cent stated they were not satisfied.

Extent of Present Machinery Maintenance Program

The major construction, repair and maintenance projects were approximately as follows:

25% Tool-sharpening and maintenance
20% Minor wood construction
20% Welding repair
7% Department and school construction
5% Equipment painting
4% Truck, car, other repair
4% Other machinery maintenance
3% Major wood construction
2% Misc. construction and repair
10% All other jobs

The above tabulation lists approximately 75 per cent of the projects in a small area of work, namely tool maintenance and sharpening, minor wood construction, and welding repair. The 25 per cent of jobs remaining includes all other work completed, which is a small figure when there are still approximtely 20 jobs not considered, such as machinery repair and maintenance.

The survey points to a shortage of certain jobs to complete a well rounded program of instruction in vocational agriculture.

A significant shortage of instruction is in combine repair, water and sewage, concrete construction, and electrical maintenance.

The average in the state for tractor overhaul, trailer repair, and engine maintenance was approximately one-half job per department. The average in the state per department for engine overhaul, machinery repair, and tractor maintenance was approximately one job.

With the assumption that almost every farm having a tractor will have at least one and usually several pieces of non-powered equipment, such as a disc, there will be a ratio of 1 to 1-plus between powered and non-powered, or between powered and other types of machinery. The survey showed powered machinery maintenance amounting to 10.90 per cent and a non-powered maintenance figure of 7.32 per cent. Instruction jobs of non-powered equipment maintenance in the state is falling short of instruction jobs on powered pieces of equipment.

The percentage of all woodworking jobs is approximately 34.27 per cent, while the total machinery maintenance and repair is about 18.22 per cent. This indicates a ratio of approximately 2 to 1 for the woodworking.

Reasons Given

The major reasons given by vocational agriculture teachers for lack of machinery and equipment for maintenance and repair projects are approximately as follows:

25% Insufficient parent, teacher, and student cooperation
20% Inadequate department facilities and space
13% Distances too great for moving machinery
10% Parents lack confidence in students' ability
7% Students not sold on value of maintenance
5% Too many non-farm boys enrolled in vocational agriculture
20% All other reasons

The principal reason given by teachers themselves for the lack of machinery was due to lack of teacher, pupil and parent cooperation. Approximately 25 per cent of the reasons given listed a lack of cooperation with teacher, parent, student, or a combination of any two. Approximately 7 per cent listed that the students were not sold on the value of machinery maintenance. Cooperation of teachers, students and parents as a total factor accounts for about one-third of the difficulty in securing machinery projects.

The study revealed that adequate shop space is a major item in securing a good farm mechanics program. An interesting fact was that 12 per cent of the reasons given listed distance to be a factor, and less and 1 per cent said lack of a machinery trailer was a cause. It is quite possible most of the distance problems may be corrected with the addition of a trailer for transporting equipment. □

Farm Shop Instruction—

(Continued from Page 147)

and single-track minded young fellow of about 15, with farm experience limited to that of a home garden. Among his first questions after school opened in September, 1928, was, "When do we work in the shop?" In the course of the months that followed, Foley demonstrated unusual skills in the use of hand tools and in planning and laying out shop jobs. Shortly after his graduation from high school he associated himself with a large contracting firm and soon became the key figure in all phases of the firm's statewide operations.

Daniel, from a family on the bottom rung of the ladder of farm tenancy, had difficulty in securing a one phase or one farm enterprise supervised practice program. He loved farm shop work and farm machinery repair was "his line." The economic depression of the early thirties forced him from high school. In a few years he was taking the place of his father who had died, heading up the family on a rented Delta farm. He directed the labor of his family in its farming efforts. He maintained and repaired their farm machinery and also some on neighboring farms which brought in some cash for family living. The economic level of Daniel's family was raised to a point never before enjoyed.

Sam was a regular farm boy, son of a large land owner, and interested in farming. He showed no specialized interest in farm shop in school, but leaned toward farm machinery maintenance and repair. After graduation from high school he began farming and in a few years was well established. The influence of farm shop training in Sam's farm operations is very much in evidence today by just a casual observation of his home and farm.

It is my conviction that these boys, as evidenced by their successful careers, established a positive relationship between what they were taught and the careers which they followed. To take the position that their chosen careers were followed solely upon the basis of what was taught in farm shop and in agriculture classes would be fallacious, but certainly it is reasonable to believe that some definite contribution was made to them in their chosen occupations. The skills acquired, elemetary though they may have been, certainly played an important role in their life's work. In retrospect, the "town boys" and farm boys not interested in farming who were enrolled in my agriculture classes were not as serious a problem as I imagined. In the final analysis, "it all depends on the person who uses the saw." □

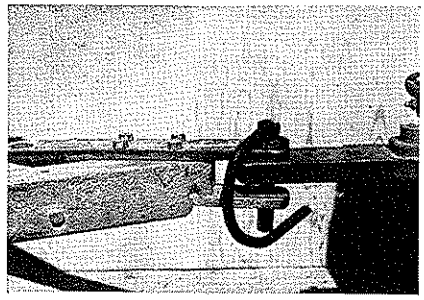
Vocational agriculture instructors swap ideas

HAROLD L. KUGLER, Dept. of Agr. Eng., Kansas State College

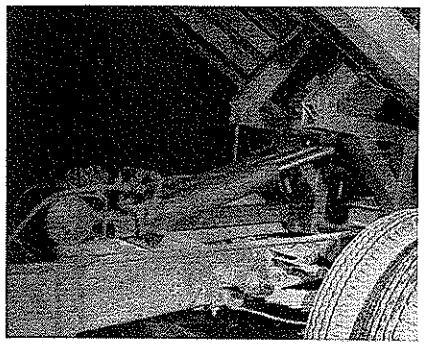
IF you have an idea and another man has one and you both exchange these ideas, the two of you each have two ideas. A farm shop idea exchange was one of the features of the Kansas Annual Vocational Agriculture Instructors' Conference Program, June, 1954.

The vocational agriculture instructors were encouraged to place on display projects, blueprints, and photographs of worthwhile projects which had been developed by students in their vocational agriculture department. These were placed on display in the Agricultural Engineering Department's farm shop. Staff members of the Agricultural Engineering Department also added to the display projects which had been completed by Agricultural Education trainees enrolled in college courses.

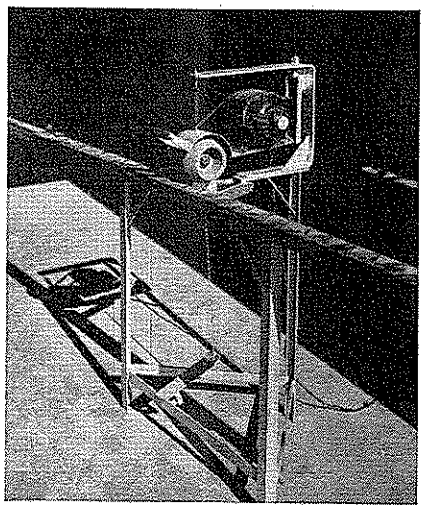
The projects and ideas placed on display ranged from large to small. A hydraulic controlled grain dump bed designed and constructed by a high school student was available for operation and attracted considerable attention as it was raised and lowered. Other equipment included such items as a battery operated branding iron heating forge, implement trailer, squeeze chute, power mowers, mower sickle grinder, post hole digger, safety pin for implement hitch, welding table, model bale elevator, multiple extension cord outlet, heavy duty grinder, etc.



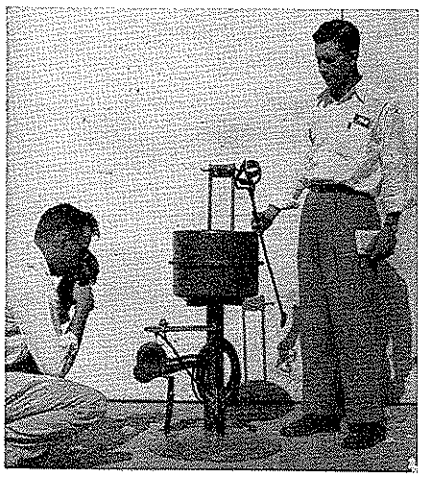
Farm implement safety pin—The handle on this pin is hinged to the top of the pin and will drop down under the tongue, making it impossible for the pin to work out while the machine is being pulled.



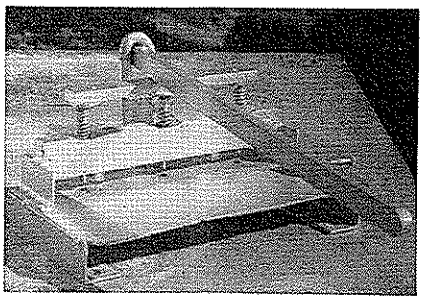
Hydraulic control dump for truck bed—Twin hydraulic cylinders, starter motor battery operated, were used to provide the power to lift this truck grain bed. Dual switches enable the operator to raise the truck bed while in the cab or when standing at the rear of the truck.



Mowing machine knife sickle sharpener—The motor is mounted on a spring suspension and the unit is pulled down on the knife while sharpening.



Vocational agriculture farm mechanics instructors photograph and examine battery operated branding iron forge. This shop project was one of several which attracted considerable attention of the instructors attending the "Swap an Idea" display arranged by the Agricultural Engineering Department of Kansas State College at the time of the Annual State Vocational Agriculture Instructors Conference.



Three-hole paper punch—Three valve stems and springs were used to construct a hand lever operated paper punch.

The instructors photographed many of these items, discussed problems of securing materials and design. Many additional shop problems were discussed as the instructors viewed the exhibit. Worthwhileness of this display feature of the conference program was evidenced by the number who participated. Many of these same shop projects will be constructed by students in Kansas next year. Those who brought ideas had an opportunity to secure others. Thus, enabling them to add additional interest to their instructional program. □

Farm Mechanics Teaching Is Changing - - -

(Continued from Page 149)

filter is clogged with dirt on his own tractor. Is there any doubt about understanding on the part of the students as to the need for servicing this unit? Or what will happen regarding wear to the vital parts which it protects if it is not properly serviced? And lastly, is there any doubt but what every student in the class will not immediately service the air cleaners on each piece of his equipment if he is not already doing so?

Yes, the master teacher of Farm Mechanics as I have observed him is vitally concerned with teaching simple skills throughout the entire vocational agriculture program. This presents another problem: namely, accurate records of the skills and abilities taught.

Value of Demonstration

In order for the teacher to teach those skills and abilities which are important to boys, as well as to help boys build the projects that are needed to develop their farming programs, it is desirable for the teacher to have a list of "demonstrations" or subjects for group discussion which should be given during the four-year period.

Economical use of class time becomes especially important. It is obviously more economical use of time for the teacher to call the class together for 15 minutes to discuss and demonstrate the use of an electric soldering iron than to spend 10 minutes with 15 different students, teaching them individually to use the electric soldering iron.

Here is a sample list of demonstrations used by some teachers I have observed. It is suggested that each teacher should develop a list according to the needs of his particular students. This list can be used throughout the four-year period for a particular class. Each demonstration can be checked off as given and the list can be helpful in reviewing what has been taught, as well as in planning for future instruction.

Group Discussion or Demonstrations Appropriate to Farm Mechanics Instruction in Vocational Agriculture

	Date Given
PLANNING SHOP PROJECTS	
1. Reading drawings	
2. Sketching shop projects	
3. Preparing a bill of material and calculating lumber costs	
4. (add others)	
USING HAND TOOLS	
5. Using the square	
6. Using the cut-off hand saw	
7. Using the rip saw	
8. Using the plane	
9. (add others)	

(Continued on Page 164)

Power tools in use in Kansas vocational agriculture farm mechanics shops

PHILIP B. FINLEY, Vo-Ag Instructor, Bird City, Kansas

MECHANIZED farming as practiced today requires the use of power tools in repair and maintenance. If a job is worth doing, it is worth doing well. The use of power tools speeds up the operation and increases the efficiency of the work.

The interest in the purchase of power tools in the farm shop came with the extension of rural service lines to the farms. Such tools as the power saw, electric arc welder, and portable electric drills are now standard equipment in many home farm shops. A progressive vocational agriculture farm mechanics program, organized to keep pace with the farm need, provides instruction for the farmer of the future in the use of power tools.

A graduate study to determine the major power tools now in use in Kansas vocational agriculture shops and those additional tools not in use, but recommended for purchase by Kansas vocational agriculture instructors, was conducted during the spring semester of 1953-54 with Harold L. Kugler, teacher trainer in farm mechanics at Kansas State College as the critic professor.

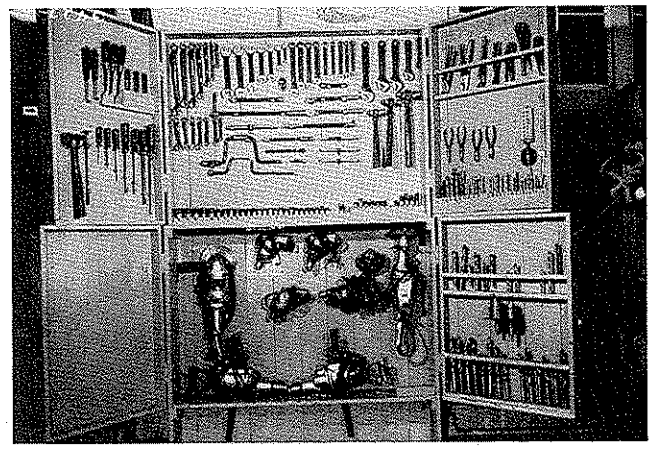
Response of Teachers

Questionnaires listing 35 major power tools and the various sizes of each of these tools were sent to one hundred (50 per cent) of the vocational agriculture instructors in the state of Kansas. Eighty-six replies were received and provided the information reported in this survey. The questionnaires included a comparative scale which enabled each instructor to indicate whether each power tool listed was available, and if so, was the tool, "used frequently," "used occasionally," or "never used." An additional column was provided in which the instructor could indicate those tools recommended for purchase. "Frequently used," indicated that the tools were used at least once per week and "occasionally used" indicated that the tools were used only once or twice per month when the shop was in use.

Of the eighty-six schools reporting in this survey, 95 per cent indicated ninth year vocational agriculture classes, 94 per cent reported 10th year classes, 88.5 per cent reported 11th year classes and 64 per cent indicated 12th year vocational agriculture classes. Kansas instructors divide their time, offering instruction in both farm mechanics and agriculture. Two-fifths of the time, or two days per week, is devoted to the use of the farm mechanics facilities.

Thirty-seven (43 per cent) of the schools reported veterans-on-farm classes now in operation, ranging in enrollment from 13 to 20 students in size. Adult and young farmer classes were also reported using the vocational agriculture farm shop equipment and tools.

Tools listed on the questionnaire in this survey were divided into seven areas; namely, welding, cold metal, woodworking, forging, painting, grinding and automotive tools. A summary of the reports of these eighty-six vocational agriculture instructors is contained in the tables and explanatory columns of Table I.



Metal drills were the most frequently reported power tool reported on hand. Eighty-six departments reported a total of 167 portable drills. A well equipped farm mechanics shop has use for ¼" and ½" electric portable drills as well as portable grinding equipment.

The Tools and Their Use

The number of tools of each of the various sizes available was obtained. The information carried in the table included with this report has been reduced to conform to the space available. Metal drills were most numerous of all tools reported. The 86 schools reported 193 electric drills. Of these, 167 were portable electric drills of which 86 were ½" size and 66 were ¼" in size. There were 191 arc welders reported by the 86 instructors. The 180 ampere farm type welder was the most predominant. Bench grinders were third in number of tools reported. Of the 148 reported, 146 were reported as frequently used. The three motor sizes reported on grinders in order of frequency of report were 1/2 h.p., 1/4 h.p., and 1/3 h.p. The metal lathe is considered by many to be a questionable piece of equipment; however, there were 42 reported, 18 of which were reported as frequently used. Ninety-

(Continued on Page 153)

TABLE I

The Number of Power Tools Reported and the Extent of Their Usage as Reported by 86 Kansas Vocational Agriculture Instructors.

	Name of Power Tool	*Total No. Reported*	*No. Reported Frequently Used*	*No. Reporting Tools Used Occasionally*	*No. Reporting Tools Never Used*
I.	Metal Drills	193	171	16	6
	1. Portable electric drills	(167)			
	2. Post drills	(17)			
	3. Blacksmith drills	(9)			
II.	Welders	191	189	2	0
	1. Farm type A.C.	(142)			
	2. Indust. type A.C.	(39)			
	3. D.C. Electrical motor driven	(9)			
	4. Gasoline Engine driven	(1)			
III.	Bench Grinders	148	146	2	0
IV.	Oxyacetylene Equipment	91	87	4	0
V.	Circular Bench Saw	79	70	8	1
	1. Tilting arbor	(69)			
	2. Fixed arbor	(10)			
VI.	Forge	78			
	1. Coal	(64)			
	2. Gas	(14)			
VII.	Bench or Floor Drill Press	75	75	0	0
VIII.	Hoist	72	44	27	1
IX.	Air Compressor	62	47	15	0
X.	Portable Hydraulic Floor Jack	55	37	18	0
XI.	Sanders	53	27	16	0
	1. Disc sander	(27)			
	2. Belt sander	(26)			
XII.	Stationary Floor Grinder	50	50	0	0
XIII.	Metal Lathe	42	18	18	6
XIV.	Portable Hand Grinder	29	18	11	0
XV.	Automotive Valve Grinder	29	6	18	5
XVI.	Wood Lathe	28	12	14	2

(Table I Continued on Page 153)

one acetylene regulator tank type oxy-acetylene regulators and eleven carbide acetylene generators were reported by the 86 vocational agriculture instructors. The carbide acetylene generators were introduced when the rural war production training programs were in operation and have not increased in number in recent years. Additional information concerning the 35 different tools surveyed is included in table I.

Additional Tools Desired

The 86 instructors checking the survey were asked to check the tools which they did not have but would recommend for purchase if the budget permitted. Twenty-eight different power tools were recommended for purchase. The twenty most frequently reported are shown in Table II. Each instructor checked the size and type of equipment desired. This has been eliminated in order to simplify this report. It is interesting to note that power hack saws are at the top of the list. Of the forty-three requests for hack saws, twenty-nine preferred a blade type while fourteen listed a continuous band hack saw as their choice. The demand for tools to do metal work is evidenced by the frequency in which tools such as the hack saw, welders, grinders, and forge are requested.

The Place of Welding Equipment

The use of arc welding equipment since World War II has gained significance in Kansas vocational agriculture farm shops to such an extent that in this study it was given special consideration. A table was organized to indicate the number of students per welder in each of the 86 schools reporting. This survey indicated 4.33 students per welder in the average size class and further data are presented in Table III.

Mr. Walter Gehlbach, a graduate student at Kansas State College, surveyed in a study conducted during 1953-54, the extent to which arc welding was being taught. Mr. Gehlbach surveyed the other half of the vocational agriculture departments in Kansas which were not included in this survey conducted in the area of power tools. He found that there were 4.30 students per welder in the average sized class and that if the instructors could acquire the equipment

(Continued from Page 154)

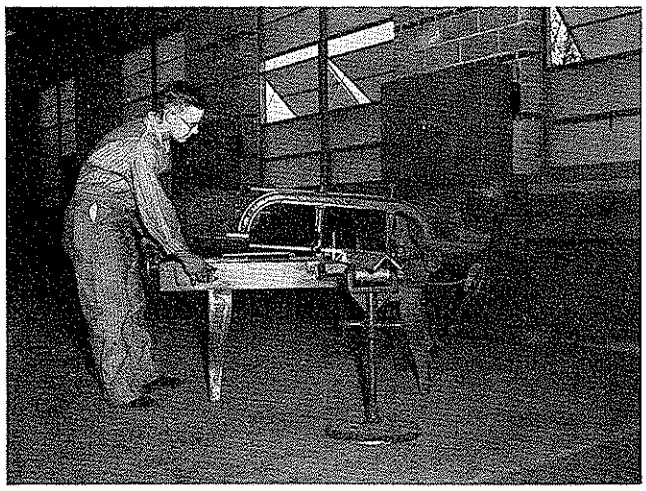
TABLE I (Continued)

XVII.	Power Hack Saw	27	25	2	0
	1. Draw cut	(23)			
	2. Continuous band	(4)			
XVIII.	Jointer Planer	23	12	10	1
XIX.	Portable Electric Hand Saw	17	10	7	0
XX.	Band Saw	15	7	8	0
XXI.	Carbide Acetylene Generator	11	7	3	1
XXII.	Jig Saw	11	5	4	2
XXIII.	Thickness Planer	9	6	3	0
XXIV.	Battery Charger	7	6	1	0
XXV.	Engine Analyzer	7	4	3	0
XXVI.	Radial Saw	6	6	0	0
XXVII.	Wood Shaper	4	3	1	0
XXVIII.	Swing Saw	3	1	2	0
XXIX.	Scroll Saw	2	1	1	0
XXX.	Other Tools				
	1. Milling machine	1	0	0	1
	2. Valve seat grinder and refacer	2	0	2	0
	3. Mower sickle grinder	2	1	1	0
	4. Power sander (vibrator type)	1	1	0	0
	5. 6" bend break	1	1	0	0
	6. Arbor press	1	1	0	0
	7. Trip hammer	2	1	1	0
	8. Air transfer paint spray unit	1	1	0	0
	9. Hydraulic press	1	1	0	0
	10. Flexible shaft grinding wheel	3	3	0	0
	11. Power sandstone	1	1	0	0
	12. Saw filing jig	1	1	0	0
	13. Cement mixer	2	2	0	0

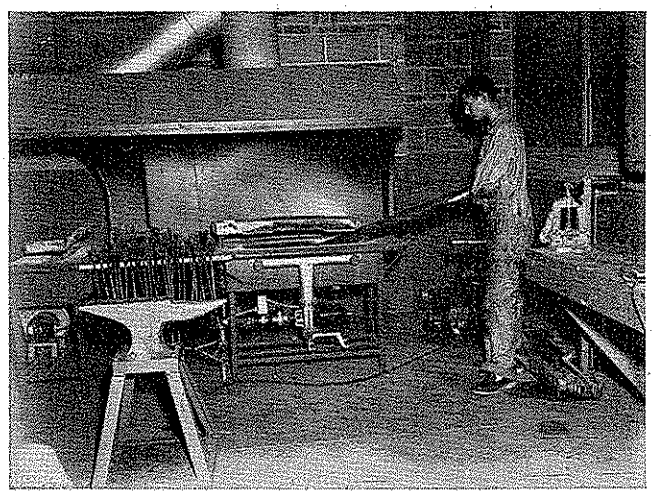
TABLE II

Power Tools Recommended for Purchase

	Name of Tool	*Frequency of Request*
I.	Power Hack Saws	43
II.	Sanders	30
III.	Welders	21
IV.	Portable Electric Hand Saw	21
V.	Hydraulic Floor Jack	21
VI.	Portable Hand Grinder	19
VII.	Metal Lathe	18
VIII.	Forge	16
	1. Home Built (Gas)	(8)
	2. Commercial (Gas)	(8)
IX.	Metal Drills	16
X.	Battery Charger	15
XI.	Jointer Planer	15
XII.	Portable Paint Spray Unit	14
XIII.	Air Compressor	13
XIV.	Hoist	13
XV.	Stationary Floor Grinder	13
XVI.	Band Saw (Woodworking)	11
XVII.	Automotive Valve Grinder	10
XVIII.	Wood Lathe	9
XIX.	Drill Presses	8
XX.	Circular Bench Saws	8



The power hack saw was at the top of the list of power tools recommended for purchase. Fifty per cent of the departments surveyed indicated a need for a metal cutting power hack saw. All pictures shown were supplied by Harold L. Kugler of Kansas State College.



As many as twenty-five Kansas Vo-Ag departments replaced the coal forge with a natural gas forge during the 1953-54 school year! The gas forge provides a clean, even heat that is ideal for shaping either large or small pieces of metal.

they desire, they would have 2.76 students per welder in the average sized class. A distribution of welders according to number of students in class can be secured by studying the table which follows.

Suggested Equipment

What power tools should a shop have? How much will it cost to equip a shop? These are questions which are frequently asked. A suggested list of power tools for a Kansas vocational agriculture shop has been prepared using as a basis, data secured from this survey. This has been supplemented by the suggestions and the experience of those who have taught farm mechanics. Perhaps this list will be of value to those who are interested in equipping their vocational agriculture farm shops with additional power tools. Some departments plan a budget to include a new power tool each year until the shop is completely equipped. This list is intended to serve as a guide only. □

TABLE III

Number and Use of Arc Welders in 86 Kansas Vocational Agriculture Farm Shops

Number of Welders Reported Per School	*No. of Schools Reporting*	*No. of Students Per Average Sized Class*	*No. of Students Per Welder in the Average Class*
1	13	8.68	8.68
2	53	10.28	5.14
3	12	7.81	2.60
4	5	10.16	2.54
5	2	11.45	2.29
6	1	28.66	4.77
TOTAL	86	MEAN AVERAGE 12.84	4.33

TABLE IV

A Suggested List of Power Tools for a Vocational Agriculture Shop

Tool	*Size*	*Number to be Purchased*	*Price*
1. Portable electric drill	½"	1	$ 65.00
	¼"	1	38.00
2. Bench Grinder	½ H.P.	2 @ $80.00	160.00
3. Stationary Floor Grinder (wheel 14" × 2½")	3 H.P.	1	246.00
4. Arc Welders	180 amps A.C. Farm Type	2 @ $172.00	344.00
	250 amps A.C. Indust. Type	1	264.00
5. Oxyacetylene Regular Tank Type Unit (Includes one set of cutting attachments and one set of welding tips)		1	135.00
6. Pedestal Drill Press (Heavy Duty)	20"	1	312.00
7. Continuous Band Power Hack Saw	6" × 10"	1	450.00
8. Radial Arm Saw	12"	1	395.00
9. Chain Hoist	2,000 lbs.	1	56.00
10. Portable Paint Spray Unit	1/3 H.P.	1	80.00
11. Air Compressor	1½ H.P.	1	445.00
12. Portable Hydraulic Floor Jack	2 ton	1	69.95
13. Portable Electric Hand Sander and Buffer with Grinding Attachment	7"	1	55.00
14. Portable Electric Hand Saw	8"	1	130.00
15. Jointer Planer	6"	1	177.00
16. Commercial Gas Forge		1	192.00
17. Band Saw (wood cutting)	12"	1	308.00
18. Metal Lathe	44"	1	789.00
		TOTAL	$4,331.60

Where Are We Going?

(Continued from Page 148)

pig are different. We are educating boys, not pigs. For example, a boy on a farm needs to know how to use a hand saw skillfully. There is nothing available which will substitute for the handsaw on the farm. A skill saw, a table saw, or a radial saw will not meet this need. The need is not for a hog house, an end table, or a hay rack, or any of a thousand things where the use of the handsaw on the farm may be involved. The hogs may have need for a hog house, his mother for an end table, and the cows for a hay rack. The need of the boy is to learn how to use the handsaw in the construction of any project that he may wish to construct. He can learn to use the handsaw only by using the handsaw, not by using the skill saw, table saw, and radial saw. It makes not one iota of difference whether he learns to use the handsaw on the hog house, the end table, or the hay rack. In fact, he may learn to use the handsaw more efficiently on the end table than on the hog house and hay rack though he may not obtain quite as much practice. A boy can not learn to use the handsaw proficiently by sawing one board in two by hand for the examination of the instructor and then sawing all the rest of the boards on the power saw. The power saw saves time but that places the premium upon finishing the project, not upon developing the skill of the boy in using the tool.

What Is the Goal?

The misconceived idea that the project is the need rather than the development of the boy has led to much that is not educational in the school farm shop. That the birds on our farm needed a house was of no importance. That I loved birds, that I built them houses, that my father taught me how to use simple tools and to read simple plans for bird houses is the important thing. I built large bird houses, small bird houses, round bird houses, square bird houses, red bird houses, green bird houses, rustic bird houses, one-room bird houses, and five-story, thirty-room bird houses.

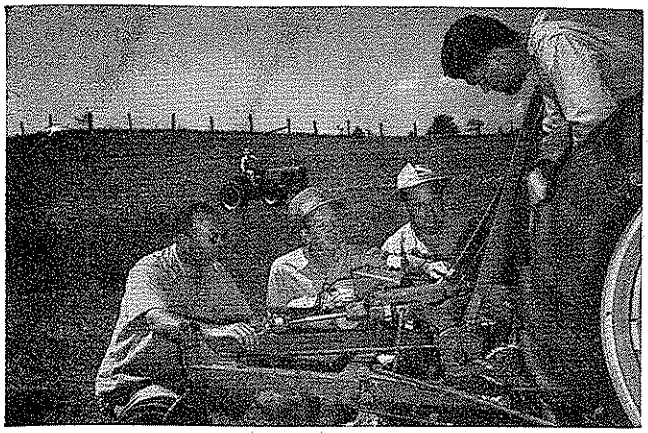
My need was to learn to use tools in the construction of wood projects. Had I been interested in geraniums and built flower boxes of every shape, size, color, and description, the experience in learning how to use tools would have been just as valuable. The bird houses have long since disappeared, but the educational value I derived through their construction remains.

The birds in Texas do not "need" houses, but I needed a house three years ago and my experience with hand tools as a youth in the construction of bird houses played no small part in my ability to plan, supervise, and finish my own home. Had my father and Professor Marshall at this stage said, "No, Kenneth, you cannot build bird houses;—you must devote all your time to hog houses and chicken feeders," they might have killed the interest which developed my ability to use simple wood-working tools. Had they given me a power saw, they could not have interested me in the use of a handsaw.

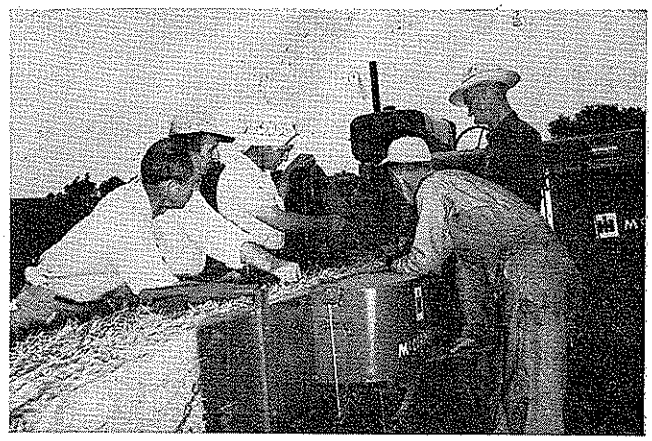
Power tools in the school farm shop can not be justified in terms of the home farm need, the need of the student, or in what we "say" should be constructed by farm boys.

We affirm that bread boards, magazine racks, end tables, and cedar chests have no place in the farm shop. We then proceed to elaborately equip our shops with power tools which are not found on the farms of the community and which are best adapted for the construction of the very projects we "say" have no place in the school shop. □

May 1955 Be a Year of Accomplishment in Your Work and Satisfaction to Yourself



Teachers were divided into small groups for instruction. Following the instruction in adjustment and operation of a particular machine the groups were rotated.



Machinery company servicemen assisted in the instruction. This group is shown the proper adjustment of the knotter on an automatic pick-up baler under field conditions.

Teachers need assistance in keeping up-to-date

In-service training in farm mechanics in Virginia

EVANS G. THOMPSON, Graduate Assistant, Cornell University

FARMING is not a static occupation. Constant research has produced new and improved methods of growing crops and animals. New and improved machines are constantly being made available to the farmer. These and other new developments combine to make present day farming a highly competitive business. Not only must the farmer be able to make a multitude of wise managerial decisions, but he must also be able to perform new manipulative abilities as a result of increased farm mechanization. Teachers of Vocational Agriculture must also keep up with the new developments in agriculture if they are to accomplish the primary objective of Vocational Agriculture.

Teacher-training departments are faced with the problem of offering in-service training that will give the teacher the training necessary to develop a sound teaching program for his community. The in-service training program should include instruction in farm mechanics which is based on the actual needs of farmers. A study of the trends in farm mechanization, farm surveys, and farm business analyses will aid in identifying some of the present day farm mechanics problems of farmers.

Changes Bring New Needs

According to the U. S. Census, about 15 per cent of the total population in the United States was classified as rural farm in 1950. (It is estimated that only 2/3 of the rural farm population are actually farmers.) The percentage has been decreasing at a rapid rate for a number of years. While the actual percentage of people engaged in farming in Virginia may be higher than for the nation as a whole, the decreasing trend is similar. The U. S. Census report indicates that farmers have secured more and more labor-saving devices to offset the decrease in available farm labor. Based on the 1950 U. S. Census Report, the number of tractors on farms in Virginia has increased from about 11,950 in 1940 to 48,133 in 1950. This is an increase of about 36,000 or approximately 300 per cent in one decade. It is estimated that about 75 per cent of these tractors are of the wheeled type and are actually being used on farms. It is reasonable to assume that the use of other production implements has increased proportionately to the increase in the number of tractors.

In 1940 there were 86,800 automobiles on Virginia farms as compared to 94,000 in 1950, and 23,000 trucks as compared to 49,100 in 1950. About 95 per cent of the farms had electricity in 1953, an increase of 2½ times since 1945. In 1953, about 40 per cent of the farms had running water, an increase of 13 per cent over 1950.

Similar trends in the other areas of farm mechanics could be cited, but the above figures indicate the rapid changes that are taking place in farm mechanization.

These changes have confronted the farmer with an untold number of new problems in conducting his farming business. Such problems as the following have become important to the successful operation of any farming business and, with few exceptions, they have received little attention in the instructional programs in Vocational Agriculture: selecting machinery and equipment for the farm; the care, operation, and maintenance of farm machinery; planning and maintaining farm buildings, fences, and other structures; planning and maintaining the farm and home wiring system; selecting and maintaining motors and other electrical equipment; and establishing a home farm shop. Selecting and using farm shop tools are also important problems.

Instruction Has Not Kept Pace

Several surveys by different states indicate that farmers began to identify these needs as early as the late 1930's and early 1940's. In several instances, they indicated that the farmers recognized this changing pattern of farming before the teachers did, as evidenced by what the teachers were actually teaching. Immediately after World War II the teachers in Virginia began to demand in-service training to equip themselves to meet some of the above needs of the farmers in their communities. The writer made a survey of the Vocational Agriculture teachers in Virginia in 1948,[1] in which the teachers indicated that one of their greatest needs in the area of farm power and machinery was more technical knowledge. As a result of the demands of the teachers, members of the Agricultural Education and Agricultural Engineering Departments at V. P. I. cooperated with the State Supervisory staff in planning an in-service training program in the areas of farm power and machinery, farm electrification, and farm shop work.

Since space does not permit a description of all the above programs, the remainder of this discussion will be devoted to a brief description of the organization and procedures used in the course in the farm power and machinery area.

Planning the Course

A committee consisting of members of the Agricultural Education and Agricultural Engineering Departments and representatives of farm machinery companies met to make preliminary plans for the instruction. After reviewing the requests of the teachers they developed a tentative schedule to offer two weeks short courses during the summer months. Their plan provided for instruction to be given in the operation, adjustment and maintenance of: (1) tractors, (2) moldboard plows, (3) cultivators, (4) mowers, (5) rakes, (6) field harvesters, and (7) automatic pick-up balers. Similar instruction was to be given on other farm machines after the majority of the teachers in the state had received the above instruction.

This tentative program was presented

(Continued on Page 156)

[1]Thompson, Evans G. *A Study to Determine the Desirable Content of A Farm Power and Machinery Course for Vocational Agricultural High Schools in Virginia.* Unpublished thesis, M.S., 1952. Virginia Polytechnic Institute, Library, V. P. I., Blacksburg, Virginia.

In-Service Training - -

(Continued from Page 155)

and explained to farm machinery companies having sales organizations in Virginia. The companies contacted agreed to cooperate in the program to the extent of furnishing machines to be used for class work in the field, and to furnish a service man for at least one day of the course to explain the adjustments of their particular machines. Two companies have furnished a service man for the entire two weeks of the courses.

For the most part the land of the Agricultural Engineering Farm was used. It was necessary to secure some neighboring fields of corn and hay.

Conducting the Course

The procedure of instruction for each machine was as follows:

1. The principles of operation of each type of machine were discussed in class before the actual work in the field by a member of the Agricultural Engineering faculty.
2. A staff member from the technical agriculture departments discussed the correct cultural practices to follow for each type of crop for which the machine was to be used before the field operations. Example: A member of the Agronomy staff discussed the correct cultural practices to follow in cultivating corn before the class actually cultivated corn.
3. The next step was to divide the class into groups of about four students. Each of these groups was assigned a tractor and machine to adjust and operate.
4. Each group adjusted its assigned machine as far as possible in the laboratory. The instructions as outlined in the Operator's Manual for each machine were followed by each group in making the adjustments.
5. The machines were operated in the field by each student under the supervision of an instructor. Field adjustments were made as needed for the particular soil or crop being worked. Tractor operation was also stressed in all of the field instruction.
6. After each student in the group had operated the assigned machine, the group was assigned to another make of machine of the same type. In this way, the students received instruction on all makes of machines used in the course.
7. The instructors used in this course consisted of: the teacher-training staff in farm mechanics, one member of the Agricultural Engineering staff, and service men from the machinery companies that cooperated in the program.

General Observations

A. A complete schedule was drawn up for the course, showing the daily as well as hourly assignments of each group.
   1. This schedule must be flexible—instructors must be ready to make changes in case of rainy weather or other reasons that cannot be predicted in advance.
      (a) If rain prevents field work with haying machinery, the principles and laboratory adjustments of plows may be studied in the classroom and laboratory. This same procedure can be followed for other machines.
      (b) All repairs and replacement of parts to machines should be made when they are needed by the group of students using the machine.

B. A group leader should be selected for each group of students. The instructor must be sure that each member of the group operates and assists in making the necessary adjustments of each machine.

C. The machinery companies manifested an intense interest in the course, to the extent of furnishing machinery and personnel.

D. Judging from the reaction of the teachers, the course met a definite need of the teachers. They requested the continuation of the course. Two 2-week short courses were conducted first in 1951, and at least one 2-week course has been conducted every summer since that time. About 75 per cent of the teachers of Vocational Agriculture in Virginia have participated in the course. □

Guest Editorial

(Continued from Page 147)

5. Agricultural Conservation and Stabilization
6. The State Farm Bureau
7. The State Grange
8. The State Department of Agriculture
9. Soil Conservation Service
10. Farmers Home Administration
11. Department of Conservation and Development
12. Rural Electrification Administration

Participation in a program of community progress makes living more zestful, challenging, inspiring. The sense of "belonging," the sense of being expected to do a part in a program for the common good—this not only gives a new sense of dignity and worth to every man and woman, every boy and girl, but new satisfaction. It makes life a game, a sport, an inspiring challenge. I have always been greatly interested in a fine football story told by Dr. J. W. Holland in a sermon entitled "Set Up Some Goal Posts!" Speaking of Alabama's famous "Crimson Tide," Dr. Holland says that one fall when the coach took the squad out for its first practice, everybody on it seemed listless, sluggish, half-hearted. Utterly lacking were the usual drive, enthusiasm, fighting spirit. And then as Dr. Holland says—

"The coach gathered the boys in the center of the gridiron and gave them a hair-raising lecture. 'What's the matter?' he shouted. 'You can hardly catch the punts, and when you do catch one, you trot along instead of running. What's the matter?' One of the players answered, "How do you expect us to do our best when the goal posts are not in place?'

"The goal posts were put in next morning and when the team went out for scrimmage, it fairly tore up the sod in the field. The team was thrilled with a new spirit and went on to a victorious season. It went to the Rose Bowl and brought home one of the goal posts, in honor of its victory over Southern California."

The boys of the Crimson Tide were no different from nearly all the rest of us. We all need goal posts if we are to do our best. And while this is true of individuals, it is equally true of states, counties, communities.

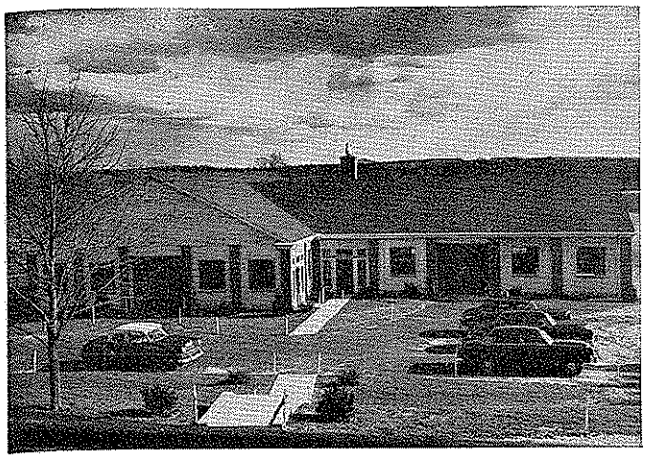
Furthermore, it should be inspiring indeed to realize that in promoting community progress through community organization we are at last fulfilling the greatest unfinished hope and talk of the founder of American democracy, Thomas Jefferson himself. More than a hundred years ago Jefferson saw just exactly the disastrous situation which we are at last remedying now—that county, state and nation were organized and that all urban places were organized, but that there was no organization in the rural communities. Hence time after time he declared that "as long as I have breath in my body" he would fight for two things—(1) education and (2) provision for organized, incorporated rural communities—"the subdivision of the counties into wards," as he put it. His idea was to organize all over America rural communities of say about six miles square into forceful, capable, rural democracy-republics — corresponding in size somewhat to our consolidated school districts.

Now at last it is now our duty, our challenge and our opportunity to work out in some fashion the realization of Jefferson's ancient dream. The task will not be easy and there will be many lions in the path. But ultimate victory is certain. And in all the intervening months and years all of us who labor in the cause—no matter whether in township, district, county or state—may have the fine consciousness, the satisfaction and the great inner pride of feeling in our hearts the truth of what old Thomas Carlyle said long ago, "Oh, it is great and there is no other greatness—to make some nook of God's creation a little better, fairer, more fruitful and more worthy of God." □

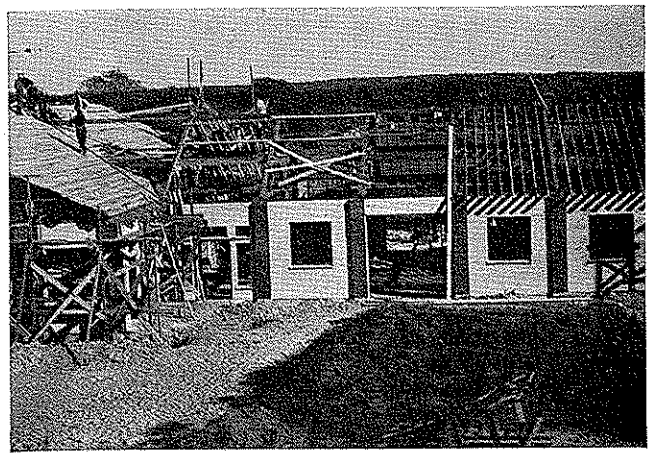
The Cover Picture

Shown on the cover is a Vo-Ag class at work in the Farm Shop at Owosso, Michigan. It is quite evident that several shop jobs are going on simultaneously; everyone seems to be busy, and the teacher, D. W. Dalgleish, shown in the foreground, is taking advantage of instructional opportunities. No doubt many teachers would envy the Owosso department the facilities which it has available.

Picture furnished by the Dept. of Photography of the Owosso High School.



The completed building. It provided two years of instruction in heavy construction methods. The grounds were landscaped by students under the direction of the ornamental horticulture faculty.



The same building one year earlier. Varied problems entered into this project all the way from foundation to final interior facilities.

(All photos courtesy "The Standard Times," New Bedford, Mass.)

Instruction via construction

A county school in Massachusetts adds to its facilities while the boys learn construction skills

KARL H. ERICKSON, Director, Bristol County (Mass.) Agricultural School

THE County of Bristol in the State of Massachusetts has $70,000 worth of new building at a net cost of less than $20,000. The building is a cinder block structure, some 110 feet long and 80 feet wide, housing the farm maintenance vocational shops of the Bristol County Agricultural School. In addition to the savings in dollars, the instructional value to the pupils themselves is the greatest gain, because the building was put up by the pupils under the direction of farm shop instructors.

Construction of the shop building has been a two-year project. Started early in 1952, it was ready for occupancy in the Fall of 1953. Plans for, as well as the work of the building, were the result of cooperative effort of the shop personnel and the director.

Shop students have plenty of room to work—and some to spare—without interferring with others engaged in other projects. There is plenty of room to handle even big stock at either of the power saw tables without conflicting with workers at the planer, jointer, band saw, drill press or wood lathe. There's even room enough to back a truck into the wood working shop from the adjoining mechanics shop and leave it there while a student builds a new body for it.

The mechanical shop—50′ × 80′—is the larger portion of the T-shaped building, and even with a corner given over to an office, its floor space will accommodate a number of vehicles at the same time. It is equipped with a large drill press, machine lathe, power hacksaw, electric and gas welding apparatus, air compressor, two hoists, power grinders and a valve surfacing lathe, in addition to hand tools. The equipment that would be found in the ideal farm shop is found here.

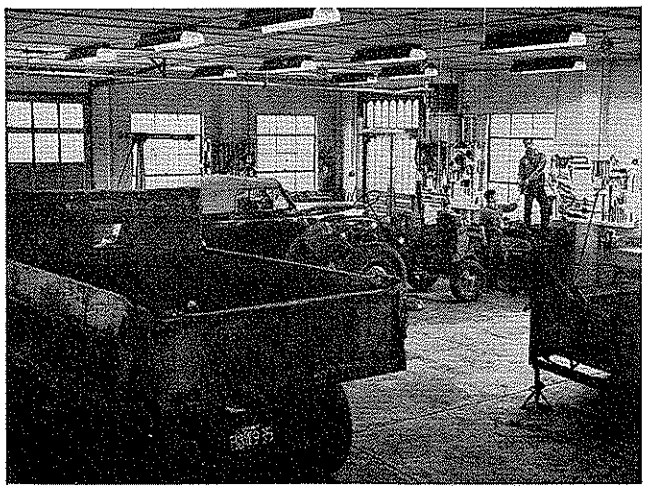
To Meet Farm Needs

The Agricultural School is training farmers and is not trying to turn out carpenters, machinists or mechanics. All-around training is given to prepare the students to meet all the problems they are likely to face as farmers. The problems include maintenance and repair of farm buildings and machines. The modern farmer is confronted with a difference in the value of the dollar as represented in farm products—his income—and the one that pays for new machinery or skilled labor in woodworking and machine trades for repairs. It is very necessary that he be competent to do as much of the varied work on the farm as possible. That is why students are given as varied experiences as possible at school. Much of the repair and maintenance of school property is done by the boys.

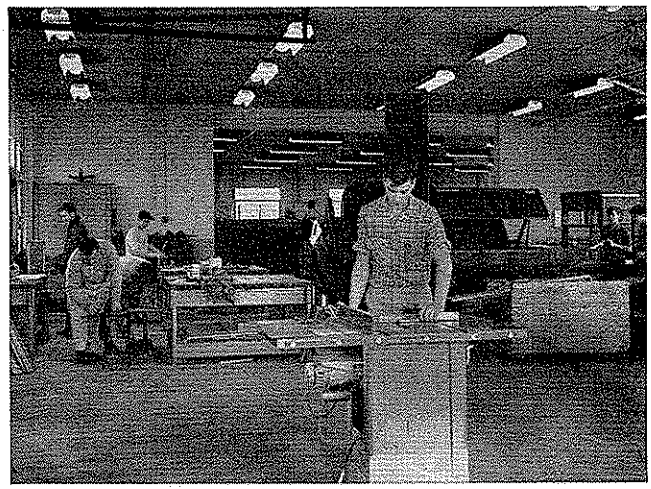
The shop building project, however, was unique. It gave the students first-hand knowledge of masonry and truss construction for big roofs. They also installed the heating system, gaining experience in steamfitting. Through the use of the George Barden Funds, the services of a special instructor in masonry and one in steamfitting were procured.

The building is designed with poured concrete pilasters at approximately 10-foot intervals, providing a number of panels that are all alike. These were divided among students for building up cinder block walls and fitting steel window frames, each group performing

(Continued on Page 158)



A corner of mechanical shop showing kinds of equipment being worked on by students. Readily accessible tool boards are used instead of a tool room.



Roominess in the woodworking portion of the shop. Note space around saw tables for handling such awkward stock as large pieces of plywood.

Improved instruction is likely to result from attention to—

The farm shop space and its use

M. K. LUTHER, Regional Supervisor, California

M. K. Luther

"YOU might consider moving all your commonly-used tools to a central location on that wall," was the advice given a new teacher by an experienced farm mechanics specialist. "That, and shifting that table saw over nearer that sidewall would make this a well-arranged shop."

I listened with interest to the many suggestions given teachers by this man and wondered if some of this information shouldn't be passed on for the profit of others.

We agreed that adequate floor space, large available wall areas, and easy access make efficient organization of the farm shop simpler, but did *not insure it;* and that a small shop with very evident construction and planning faults sometimes was organized for maximum efficiency and took advantage of every possibility in spite of the problems involved.

Those who are interested in the suggestions which follow will understand that each shop or program has its particular situations or conditions that prevent 100% efficient use of space; that what may be a valuable suggestion, indicating rearrangement or shifting for one, may not be possible, or desirable, for another. Good judgement in the application of these "rules of thumb" is essential.

It might be well, first, to list some desirable features of a farm shop. As the present instructor using this shop, you may have had little or nothing to say about its construction and, whether good or bad, it probably cannot be changed now. You are fortunate if:

1. The floor is concrete, unbroken, and has been kept painted or oil-free.
2. The machinery access door is at least 12' x12', and easily opened and shut by students.
3. The windows are at least 5' from the floor.
4. The roof is at least 14' above the floor.
5. The space is adequate for 20 students per section. (An enrollment of 45 to 50 boys, with three farm mechanics classes could well use a 40' x 60' working area.)
6. At least one storage room for extra (new) tools, machinery parts, and miscellaneous hardware and supplies.
7. Adequate toilet and wash-room facilities.
8. A separate classroom available for Farm Mechanics if in a multiple-teacher department.
9. An outside, fence-enclosed area, hard surfaced. (Especially desirable as an extra work area in states with mild and short winters.)

Yes, I know. Not many have these ideal conditions. So what? It still doesn't keep you from organizing the physical aspects of your farm shop to make the most of your situation.

Possible Improvements

Have you considered the following possibilities?

1. Putting in the fencing and concrete (Gravel or black-top also usable) for your outside "holding" or work area.

2. Building in a "mezzanine" floor. Not always possible, and precautions must be observed. Stairways must be safe; the area is not for junk; and fire regulations must be observed. It might give you extra storage or even work space if practical for your shop.

3. Centralizing the commonly-used tools—both woodworking and machinery. The use of one large cabinet—which can be closed and locked—adjacent to the main work areas is becoming accepted practice. The tool room and its check-out system *are not* for farm shops—administrators being willing and other shop use being compatible.

4. The elimination of some of the following:

   a. Those extra work benches. Does your shop need to be completely surrounded by under-window benches? I doubt it. Your benches are not for storage. Neither is yours an industrial arts shop.

   One good bench away from the walls has much use, especially for demonstration work. Wall benches are good—but not so many that they cut down on wall or floor use. Do you make proper use of saw horses? Could you not make more effective use of that space if you cut out some bench area? I believe some of you could.

   b. Review the objective of farm mechanics, and then ask yourself this, "Have I limited my power or other large tools to those needed for agriculture training, or those needed to expedite my work?" Consider the jointer, router, planer, wood and iron lathes, band saw, sander, and breaker. If you can honestly justify them for the farm training in your community then by all means keep them.

   c. How about that war surplus? Are you keeping useless tools, supplies, or junk around? Remember that 100# box of electronic supplies, the old airplane motor, the four dozen star drills and the large box of 4" cast iron couplings someone once thought your shop might use? Is someone insisting you clutter up your shop with them?

   d. Is it possible to eliminate unnecessary partitions? Do you still have that finishing room, a left-over from the days of manual training? Why not lumber stored vertically, or on iron and lumber racks under benches? Honestly now, what is the advantage of those iron and lumber storage rooms?

5. Have you seen the modern, student-constructed wall benches supported by slanting angle iron front legs? (Pamphlet 170, Planning and Equipping the Farm Shop, Iowa Extension Service, Ames, Iowa.) These benches accommodate a castered roll-away iron or lumber storage rack, and eliminate the pre-disposition to dirt and junk found when wall benches are enclosed by cabinet doors. It is possible to sweep under these sturdy, sightly benches.

6. Are your power tools, such as the heavy duty grinder, drill press and table saw, placed to accommodate long or large stock without danger of interference? Are they placed near the area of greatest use, and preferably away from the center of the shop?

7. Have you blocked off or filled up those recessed spaces, or at least made effective use of them?

8. Are your walls and ceiling a light color?

9. Are your shop working area and doors visible from your office or classroom? This is a desirable feature, but is not always possible of accomplishment if you have moved into an old or improvised shop.

Justify Changes

You may not be able to use many of the suggestions given above in your particular situation, but you do know that good lighting, *effective use of floor space,* safety, and efficiency for use (work simplification) are what you are after. If you are so used to your shop that it is hard to "see the forest for the trees," why not draw out the outline of your shop to scale on some butcher paper? Cut out the pieces of equipment, storage rooms and so on—also to scale—and set up an arrangement that you feel is based on effective and safe use of a farm shop. Arrive at a plan that you feel is sensible and can be accomplished. Then, by all means, talk it over carefully with the Principal. It is possible you may move on within a year or two and he will understandably resent another teacher wanting to rearrange all you have changed.

Be conservative in your requests, make changes gradually, and you will eventually get the satisfaction that comes from teaching in a farm shop properly organized. □

Instruction via - - -

(Continued from Page 157)

the same operations. The roof consists of a 50-foot span 80 feet long over the mechanical shop and a 40-foot span 60 feet long over the woodworking shop.

A plaque designates the building as the Kenneth N. Tufts Memorial Shop in honor of the shop instructor who died suddenly on January 28, 1953. □

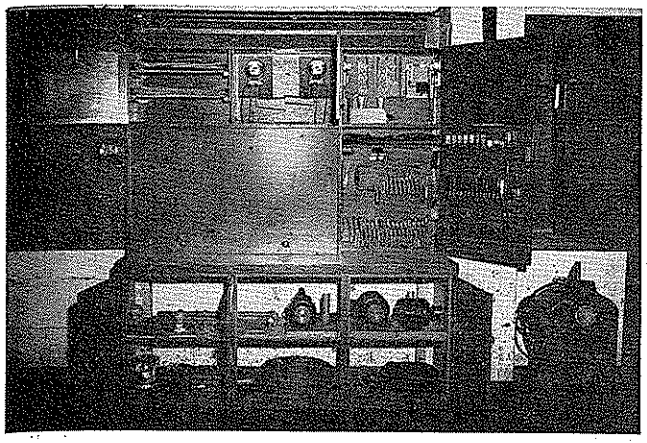


Fig. 1. The electrical work center with the adequate wiring demonstration panel closed and doors open to show desirable arrangement of tools, supplies and demonstration equipment for electrical work in a Vo-Ag shop.

Fig. 2. A group of electrification advisers studying a demonstration in 1951, at Allison, Iowa, on the adeqate wiring panel which was the forerunner to the demonstration panel of the electric work center in Fig. 1.

The farm wiring menace

Are adequate precautions being taken?

E. F. OLVER, Assoc. Prof. of Agricultural Engineering, The Pennsylvania State University

OUR nation's wealth is a production wealth. Our aim has always been to let one man produce what it originally took two men to produce. The machine age has made this possible and rural electrification has played a leading role.

The use of electricity on the farm means less hard labor and a much better standard of living. The efficient use of electricity depends on a well-planned, well-installed wiring system that will take care of all present and future needs. The basic requirements of a well-planned farm wiring system are that it be: *Safe! Adequate! Easily expanded! Economical!*

The first requirement can be met by compliance with the National Electric Code which constitutes a minimum standard; however, the code standard does not mean the installation is necessarily efficient or convenient. The last three requirements mentioned depend on careful planning. Adequacy depends on present and future needs. Expansion of the electrical system depends on whether good design is used such as placing the meter at a central point, etc. Economy is derived from using properly-sized wiring so that the electric losses will not be excessive when equipment is operating.

Farm Electrification Education

Rural Electrification is relatively a new field that has grown by leaps-and-bounds since 1935. There are very few farmers in the United States who cannot have electricity at a reasonable cost if they want it.

To meet the challenge that rural electrification has presented most power suppliers have hired agricultural engineers, home economists, and others to work with farmers on their farm and home electric needs. This development has come in answer to a need. Farmers have many electrical problems since they depend so much on electricity and many try to do electrical wiring jobs around their farms.

Almost every state university has written one or more publications on the farm electric program. Penn State University has three such publications. A general circular (#474) entitled "Adequate Farm Wiring" was written primarily to interest the farmers, in general, in adequate wiring.

Since many people feel that electricity is "beyond them," it was felt that a training program for vocational agriculture students would be a sound approach. Progress Report No. 107 entitled "An Electric Work Center for the Vocational Agriculture Shop" was developed to encourage Vo-Ag teachers to have all farm electric equipment in one area as is done with welding, metal working, etc. The electric work center was reported several months ago in this Magazine. This Electric Work Center, figure 1, incorporates a demonstration board ready for instant use, a manual wiring section, and all electric tools, supplies, motors, etc.

Then miscellaneous Publication Number Two, entitled "Lessons in Farm Electrification," was developed around the Electric Work Center. This manual includes a summarization of electrical demonstrations developed in Pennsylvania and Iowa, and is used with the demonstration board of the Electric Work Center. Figure 2 shows the Demonstration Panel which was the forerunnner of the panel used as part of the Electric Work Center in figure 1.

(Continued on Page 166)

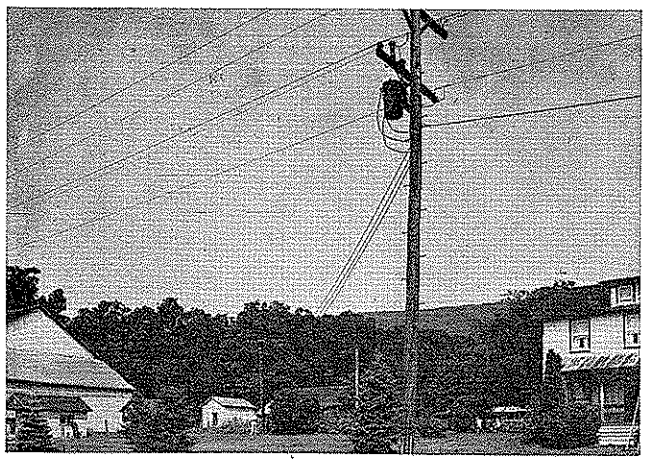


Fig. 3. Here is a modern farmstead with a modern electrical system. Notice the wires from the transformer in the foreground running to a meter pole in the center of the electrical load. From there it is distributed to all the farm buildings.

Fig. 4. In contrast to Fig. 3, this shows some actual wiring on a farmstead. These wires were run by inexperienced persons. The crime of such a situation is that on a wet day children can be killed playing around such a set-up.

Technical skills needed in farm mechanics[1]

ARTHUR M. AHALT, Teacher Education, University of Maryland

HARRY T. MILLER, Vo-Ag Instructor, Frederick, Maryland

THIS report is another in the series dealing with technical skills needed by teachers of vocational agriculture. It deals with 205 farm mechanics skills listed in 17 groups as folows: Cold metal, 12 skills; soldering and sheet metal, 10; woodworking, 21; glazing, painting and refinishing, 11; tool-fitting, 17; ropework, 9; farm machinery, 16; tractors and gas engines, 14; blacksmithing, 8; sketching and drawing, 6; home workshop, 6; farm electricity and motors, 20; electric arc welding, 11; oxyacetylene welding, 10; concrete, 11; plumbing and water supply, 13; and farm fencing, 10. Minor skills were not included in the study. The purpose, procedures used in this study, and its applications were discussed in the October issue.

The lists of skills were sent to a random sample of approximately one-fourth of the teachers in the North Atlantic Region. Of 292 lists mailed to teachers 132, or 45.2 per cent, were returned. Replies were fairly well distributed over the North Atlantic Region, with all states except one being represented.

The Farm Mechanics teaching experience of the teachers surveyed ranged from less than one year to 34 years. About three-fifths (62.1 per cent) of the teachers checking had ten years or less of experience, and a large majority (90.1 per cent) had twenty years or less.

Size of Farm Shops

All teachers were asked to indicate in their returns the size of their farm shops. These were arbitrarily grouped as large shops (over 1500 square feet), medium shops (1001 to 1500 square feet) and small shops (1000 square feet or less). About two-fifths (40.9 per cent) of the teachers reported large shops, one-fourth (25.7 per cent) reported medium shops, slightly over one-sixth (17.4 per cent) reported small shops, and slightly under one-sixth (16.0 per cent) reported no shops.

General Nature of Returns

Practically all teachers used one or more of the skills listed in each of the seventeen groups. Tables 1 through 17 show the number of teachers who used each skill, the value they placed upon them, and the place where they had reached a point in their training to demonstrate each skill completely. The skills are listed in the Tables in the order of the number of teachers that used each skill, except when two or more skills were used by the same number of teachers, in which case the skill receiving the greatest number of high value ratings was placed ahead of the other skill(s).

In the original analysis of the data tabulations were made by years of experience being tabulated together, as were those having ten years of experience or less. There were 50 of the older teachers and 82 of the younger men. Tables comparable to those in this summary were included in the original study for both the older and the younger teachers, but only notable differences between the two are included in this discussion for the sake of brevity.

Two main averages are used in this summary because they offer the most descriptive and meaningful measures for comparing the groups of skills. The first is the average number of teachers using all skills within each group. It was used to rank the groups and was obtained by dividing the number of skills in a group into the total number of "used" checks for all skills in the same group. The second is the average number of "high value" ratings given by the teachers to the skills within a group. It was obtained in a similar manner as for the average number of teachers using skills, that is by dividing the number of skills in a group into the total number of "high value" checks for all skills in the same group. For greater clarity to the reader the number of teachers has been transposed into percentages in numerous instances, especially in the discussions of the places where teachers were trained.

Comparison of the Groups of Skills

Each group of skills represents an area of farm mechanics subject-matter. The groups are presented in the order that the average number of skills within each group were used by all teachers.

Close examination of the Tables reveal many differences among the individual skills. The reasons for some of these differences are apparent, some have several possible explanations, and others are not easily understood. Comments are made on only a few of the more outstanding differences in the discussion accompanying each table, but those who use this summary are encouraged to analyze the results critically to discover additional variations for themselves.

(Continued on Page 161)

TABLE 1. Summary of Cold Metal Skills

Skills	Number of Teachers Checking: Used	Value*: High	Value*: Med.	Value*: Low	Where Trained %: On Farm	Where Trained %: In Vo-Ag	Where Trained %: In Col.	Where Trained %: On Job
1. Drill a piece of metal	125	103	28	1	24	23	43	35
2. Cut with a hack saw	124	91	38	3	38	20	34	32
3. Operate a grinder	122	108	22	2	21	23	40	38
4. Use a file	122	92	39	1	34	26	31	31
5. Operate a drill press	119	95	36	1	13	22	41	43
6. Cut and tap threads	118	93	38	1	13	17	48	40
7. Ream and countersink holes	110	77	52	3	10	17	44	39
8. Bend cold metal	109	70	55	7	22	18	40	29
9. Square a piece of metal	101	76	47	9	15	18	37	31
10. Rivet metal	98	67	60	5	16	16	39	27
11. Layout metal with a scribe	93	49	74	9	9	7	45	32
12. Make an elongated slot	53	28	72	32	3	7	18	25

*Teachers were asked to rate the "Value" of a skill whether they used it or not, hence the "Value" totals are usually more than the "Used" totals. However, all teachers did not check all skills.

TABLE 2. Summary of Woodworking Skills

Skills	Number of Teachers Checking: Used	Value*: High	Value*: Med.	Value*: Low	Where Trained %: On Farm	Where Trained %: In Vo-Ag	Where Trained %: In Col.	Where Trained %: On Job
1. Identify common hand tools and equipment	124	99	30	3	49	23	27	25
2. Figure a bill of material	121	95	36	1	15	35	43	28
3. Square a piece of lumber	120	93	34	5	31	34	37	18
4. Rip a board	120	90	36	6	44	30	25	21
5. Counter-sink and set screws	119	79	52	1	25	32	31	31
6. Use brace and bits	118	86	45	1	49	27	21	21
7. Use wood chisels	117	84	47	1	35	26	29	27
8. Select nails, screws, bolts and nuts	117	83	46	3	36	17	29	35
9. Drive, set and draw nails	116	82	48	2	46	29	21	20
10. Smooth wood	115	70	55	7	28	30	40	17
11. Use jack, smooth and block planes	113	84	45	3	29	30	34	20
12. Operate a circular saw	112	91	39	2	15	18	34	45
13. Bevel a board	109	57	66	9	26	31	30	22
14. Layout stock	101	83	45	4	15	28	40	18
15. Make and glue common wood joints	99	57	64	11	6	24	29	40
16. Identify and store lumber	96	59	68	5	28	14	20	34
17. Operate a jointer	89	63	60	9	6	14	19	50
18. Operate a band saw	85	61	63	8	5	11	20	49
19. Layout and cut rafters	84	60	62	10	11	6	30	37
20. Operate a planer	81	58	64	9	8	11	16	46
21. Bevel and plumb a building site	75	54	70	7	12	5	17	41

*Refer to footnote for Table 1.

[1]Summarized from "Technical Skills in Farm Mechanics Requiring a Planned Demonstration for Effective Teaching, Needed by Teachers of Vocational Agriculture in the North Atlantic Region," by Harry T. Miller. Thesis, M.S., The University of Maryland, 1952. 144 pp.

COLD METAL skills ranked first in use by teachers. All skills in the group were used by more than 70 per cent of the teachers except "make an elongated slot," which was used by only 40 per cent, indicating it is not important.

The older teachers got most of their training for these skills on the job (44 per cent) and in college (36 per cent). In contrast the younger teachers got most of their training in college (35 per cent), with training obtained on the farm, on the job and in Vo-Ag being about equal (23, 22 and 20 per cent respectively). The younger teachers got considerably more training in Vo-Ag classes and on the farm than did the older teachers.

WOODWORKING skills ranked a close second to cold metal skills in use by teachers. The teachers received their training for these skills about equally in all places, with little difference between the older and younger teachers in this respect.

SOLDERING AND SHEET METAL ranked third in use by teachers. The average of the high value ratings given the skills by the teachers, however, was below the median for all groups.

GLAZING, PAINTING AND REFINISHING skills ranked fourth in use by teachers, but they too were low in high value ratings. Only one skill, "Clean and store paint brushes," was given a high value rating by a large portion of the teachers; as a whole only four groups rated below this one in the average number of high value ratings given to the skills by the teachers.

A large portion of the training (47 per cent) the teachers received for these skills was on the job, with the older teachers getting even more of their training there (56 per cent) than the younger teachers (41 per cent). The colleges gave the teachers only a nominal amount of their training (20 per cent) for this group of skills.

TOOL-FITTING skills ranked fifth in use by teachers, only slightly under the previous group. The value ratings teachers gave the skills dropped off considerably for the last seven skills listed, with the last skill, "lay-off and gum circular saw," being rated very low.

The place teachers received their training for these skills varied considerably. The training received in college for some—sharpening chisels and plane-irons, and cleaning, jointing, setting and filing hand saws—was among the highest received in college for any skills in the study. A surprisingly small proportion of the training for this group of skills was received in Vo-Ag classes (9 per cent, which is below the average for all groups).

ROPEWORK skills ranked sixth in use by teachers, being very close to the previous two groups. Over half of the teachers used all of the skills in the group, but none of the skills received a large proportion of high value ratings, and the two last skills, "relay strands at end of rope" and "select and coil rope," were rated very low in value. The training received by the teachers as a

(Continued on Page 162)

TABLE 3. Summary of Soldering and Sheet Metal Skills

Skills	Used	Value* High	Value* Med.	Value* Low	Where Trained % On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Solder small holes	121	79	53	0	14	26	47	34
2. Clean and tin a soldering copper	119	83	44	5	12	24	51	32
3. Solder a seam	117	77	52	3	10	21	51	35
4. Operate a blow torch	116	72	55	5	21	24	37	34
5. Sweat on a patch	115	65	62	5	10	18	52	35
6. Operate an electric soldering iron	110	68	58	6	13	14	27	56
7. Rivet sheet metal	92	54	69	9	11	12	35	34
8. Layout and cut a pattern in sheet metal	92	53	69	10	8	9	41	34
9. Bend and form sheet metal	90	51	75	6	6	12	37	35
10. Select sheet metal	79	50	70	12	4	8	29	38

*Refer to footnote for Table 1.

TABLE 4. Summary of Glazing, Painting and Refinishing Skills

Skills	Used	Value* High	Value* Med.	Value* Low	Where Trained % On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Clean and store paint brushes	120	85	47	0	22	13	29	56
2. Replace a window pane	110	68	63	1	42	14	15	39
3. Select paint	109	70	59	3	19	13	27	50
4. Putty a window pane	109	67	65	0	41	13	16	39
5. Measure and cut glass	107	62	67	3	34	12	20	41
6. Prime surfaces for painting	104	67	60	5	25	9	21	49
7. Apply paint after priming	102	52	73	7	21	15	21	45
8. Use varnish and paint remover	99	64	63	5	15	11	21	52
9. Mix paint (color and thinning)	91	42	71	19	13	6	20	52
10. Calculate quantity of paint needed	87	51	66	15	9	8	19	51
11. Operate a paint sprayer	75	43	74	15	8	2	13	52

*Refer to footnote for Table 1.

TABLE 5. Summary of Tool-Fitting Skills

Skills	Used	Value* High	Value* Med.	Value* Low	Where Trained % On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Sharpen a cold chisel	120	99	33	0	12	13	56	39
2. Sharpen axes and hatchets	116	97	35	0	44	12	25	35
3. Sharpen knives, sickles and scythes	113	98	32	2	30	9	34	40
4. Sharpen plane irons and wood chisels	112	97	36	0	11	7	57	37
5. Clean and care for tools	111	104	28	0	32	16	31	32
6. Sharpen a twist drill	111	94	35	3	3	8	52	48
7. Fit handles in hand tools	110	92	39	1	29	19	32	30
8. True an emery wheel	109	87	43	2	10	10	42	47
9. File an auger bit	106	79	48	5	19	6	44	37
10. Sharpen mower knives	105	86	46	0	43	8	19	35
11. Clean, joint, set and file hand saws	103	65	52	15	7	15	60	21
12. Select grinding wheels	92	67	59	6	7	6	25	54
13. Sharpen scissors and pruning shears	89	69	55	8	12	8	34	35
14. Clean, joint, set and file two-man saw	79	48	64	20	11	5	41	22
15. Sharpen ensilage cutter knives	78	77	50	5	27	3	17	31
16. Clean, joint, set and file circular saw	76	46	63	23	9	5	26	36
17. Lay-off and gum circular saw	62	38	63	31	3	1	32	26

*Refer to footnote for Table 1.

TABLE 6. Summary of Ropework Skills

Skills	Used	Value* High	Value* Med.	Value* Low	Where Trained % On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Tie common knots	113	75	54	3	32	21	28	32
2. Make a long splice	104	76	50	6	13	19	39	33
3. Make a short splice	104	67	54	11	14	20	42	28
4. Whip and crown splice rope	103	60	65	7	9	21	44	29
5. Make a rope halter	102	63	58	11	16	18	38	30
6. Make common hitches	99	71	54	7	27	17	24	31
7. Make an eye splice	98	57	65	10	10	18	36	34
8. Relay strands at end of rope	91	44	77	11	12	17	34	28
9. Select and coil rope	76	37	78	17	20	8	20	28

*Refer to footnote for Table 1.

whole was distributed rather evenly among all sources, but the older teachers had to learn most of the skills on the job (44 per cent).

FARM MACHINERY ranked seventh in use by teachers in spite of the part that it plays in modern farming. This is probably due to the difficulty teachers experienced in getting machinery into their shops, and lack of time available for students to perform farm machinery skills, which are rather time-consuming. However, the average of high value ratings that teachers gave farm machinery skills (85.2) was higher than for any other group.

More training was received by the teachers on the farm (35 per cent) for farm machinery skills than for any other group except farm fencing. Only a small amount of training was received in Vo-Ag classes (6 per cent). The remainder of the training received was divided almost evenly between college (28 per cent) and on the job (31 per cent). As might be expected because of the rapid advances in farm machinery, the younger teachers received a greater portion of their training in college (32 per cent) than did the older teachers (23 per cent). Training received in college would no doubt be greater, but as in high schools, college instructors no doubt experienced difficulty in getting the machinery into their shops and in having time for students to perform the skills.

TRACTORS AND GAS ENGINE skills ranked eighth in use by teachers, but considerably below farm machinery. However, the average of high value ratings given this group of skills by the teachers was only slightly below the ratings for farm machinery (84.5), and was second among all groups. As in the case of farm machinery, teachers probably experienced difficulty in getting tractors and gas engines into their classes to work on, and in having enough time for students to perform the skills.

The teachers had to get even more of their training on the job (44 per cent) for tractors and gas engine skills than they did for farm machinery, with twice as much having been obtained on the job by the older teachers (62 per cent) than by the younger teachers (31 per cent). The fact that the younger teachers got an unusually large amount of their training in college (35 per cent) should be noted.

BLACKSMITHING skills ranked ninth in use by teachers, slightly below tractors and gas engines. However, the average of the high value ratings (53.1) given blacksmithing skills was the lowest for any group. One skill, "anneal metal," was used by only about 40 per cent of the teachers and received a very low value rating.

The amount of training received by the teachers in college (62 per cent) for this group of skills was easily the highest received for all groups. This was true for both the older and the younger teachers (61 and 64 per cent) respectively.

SKETCHING AND DRAWING skills ranked tenth in use by teachers and the average number of high value rat-

(Continued on Page 163)

TABLE 7. Summary of Farm Machinery Skills

Skills	Used	Value*			Where Trained %			
		High	Med.	Low	On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Repair mower knife	113	98	33	1	56	6	18	33
2. Paint farm machinery	113	84	46	2	41	11	20	41
3. Lubricate farm machinery	111	98	33	1	55	4	14	38
4. Repair and replace broken parts	108	99	32	1	44	6	22	36
5. Make adjustments on farm machinery	108	98	33	1	46	5	21	36
6. Align cutter bar on mower	106	95	37	0	28	9	42	27
7. Assembly machinery	104	76	53	3	36	7	28	33
8. Register mower knife	100	92	40	0	25	8	41	26
9. Prepare machinery for storage	100	84	47	1	48	5	17	30
10. Systematically check farm machinery	97	93	38	1	40	6	27	24
11. Hitch plows vertically and horizontally	88	81	48	3	21	3	38	26
12. Figure pulley sizes and speeds	87	78	52	2	7	10	44	26
13. Calibrate a grain drill and corn planter	84	79	47	6	21	5	35	23
14. Select and use belts	78	75	54	3	17	4	30	27
15. Identify parts with machine model for ordering repairs	74	68	59	5	21	6	27	20
16. Fit bearings on farm machinery	70	65	59	8	27	3	13	27

*Refer to footnote for Table 1.

TABLE 8. Summary of Tractor and Gas Engine Skills

Skills	Used	Value*			Where Trained %			
		High	Med.	Low	On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Service the oil filters and change the oil	100	94	37	1	28	5	24	43
2. Completely lubricate a tractor	98	98	34	0	28	4	25	41
3. Service the air cleaner	98	90	41	1	25	5	28	40
4. Demonstrate safe tractor operation	95	99	31	2	15	5	31	44
5. Service the tires	95	89	42	1	29	3	17	46
6. Winterize a tractor or gas engine	94	91	41	0	22	4	26	42
7. Service ignition and spark plugs	94	90	41	1	19	5	34	36
8. Service the cooling system	93	90	41	1	25	5	28	35
9. Service the carburetor and fuel system	92	85	46	1	20	5	32	35
10. Adjust the brakes	81	70	59	3	19	2	20	40
11. Demonstrate the principles of gas engines	77	91	38	3	7	4	38	28
12. Service the transmission and final drive	75	68	56	8	17	2	21	35
13. Adjust the clutch	74	66	58	8	15	1	19	39
14. Service the valves	70	64	60	8	7	4	26	33

*Refer to footnote for Table 1.

TABLE 9. Summary of Blacksmithing Skills

Skills	Used	Value*			Where Trained %			
		High	Med.	Low	On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Build and maintain fire in forge	98	58	53	21	11	15	55	17
2. Shape and bend hot metal	96	63	54	15	11	8	59	18
3. Temper chisels, picks and similar tools	95	63	50	19	8	11	61	15
4. Heat and hold metal at proper temperature	94	54	58	20	11	12	60	11
5. Cut hot metal	92	57	50	25	9	7	59	17
6. Draw out chisels, picks and similar tools	89	56	57	19	7	10	60	12
7. Punch hot metal	73	41	67	24	7	7	42	17
8. Anneal metal	57	33	67	32	4	4	37	12

*Refer to footnote for Table 1.

TABLE 10. Summary of Sketching and Drawing Skills

Skills	Used	Value*			Where Trained %			
		High	Med.	Low	On Farm	In Vo-Ag	In Col.	On Job
	Number of Teachers Checking							
1. Make a sketch of projects to build	110	94	34	4	3	24	54	29
2. Make a working drawing to scale	92	62	62	8	2	21	53	16
3. Read a blueprint and working drawing	87	63	62	7	3	17	47	20
4. Practice making free-hand three-view sketches	82	51	69	12	1	12	49	20
5. Make a list of materials from a blueprint	78	70	53	9	3	16	41	18
6. Make a set of upper and lower case letters	68	26	81	25	1	6	49	12

*Refer to footnote for Table 1.

TABLE 11. Summary of Home Workshop Skills

Skills	Number of Teachers Checking: Used	Value*: High	Med.	Low	Where Trained %: On Farm	In Vo-Ag	In Col.	On Job
1. Select essential tools needed on the farm	98	78	50	4	23	11	30	34
2. Inventory tools on the farm	95	70	57	5	17	16	25	37
3. Plan tool arrangements	88	67	61	4	6	13	37	32
4. Draw plans for home workshop	79	63	64	5	6	12	38	23
5. Plan and organize supplies arrangement	77	62	66	4	5	10	27	35
6. Make a list of power equipment needed in shop	76	59	68	5	4	8	30	34

*Refer to footnote for Table 1.

TABLE 12. Summary of Farm Electricity and Motor Skills

Skills	Number of Teachers Checking: Used	Value*: High	Med.	Low	Where Trained %: On Farm	In Vo-Ag	In Col.	On Job
1. Make common splices	113	81	46	5	12	12	52	37
2. Make a simple circuit (a single light)	105	77	50	5	13	12	41	39
3. Repair a damaged cord	100	85	43	4	24	9	22	45
4. Read a meter	100	66	60	6	19	11	35	35
5. Make a connection to a fixture	95	83	42	7	16	7	21	51
6. Make a circuit of lights in a series	94	70	53	9	12	11	38	33
7. Select motors, controls and switches	90	69	59	4	10	1	42	37
8. Make a circuit of lights in parallel	88	70	56	6	9	10	37	32
9. Connect a motor	87	71	56	5	12	4	26	45
10. Make a trouble light	85	64	63	5	20	7	18	40
11. Wire an outlet	84	72	53	7	10	6	26	42
12. Use overload protection devices	82	71	57	4	9	1	27	45
13. Ground electrical installations	81	71	57	4	13	4	22	42
14. Replace the brushes in a motor	79	60	65	7	12	3	19	45
15. Wire a 2 switch circuit	76	65	61	6	8	3	31	34
16. Clean and service a used motor	68	61	62	9	7	1	23	37
17. Plan the home wiring system	64	46	76	10	8	1	28	27
18. Replace the element in an electrical appliance	63	52	69	11	13	3	12	35
19. Reverse a motor	59	48	70	13	9	1	15	34
20. Change a motor from 110 to 220 volts	53	49	65	18	6	1	14	32

*Refer to footnote for Table 1.

TABLE 13. Summary of Electric Arc Welding Skills

Skills	Number of Teachers Checking: Used	Value*: High	Med.	Low	Where Trained %: On Farm	In Vo-Ag	In Col.	On Job
1. Prepare materials for welding	92	82	46	4	0	2	34	56
2. Run a bead	91	85	43	4	0	2	38	51
3. Strike an arc	91	83	45	4	0	2	38	51
4. Select proper electrodes	91	80	48	4	0	3	32	56
5. Make proper settings on welder	91	78	49	5	0	2	35	54
6. Make a simple weld (flat)	89	82	46	4	0	2	36	51
7. Chip and clean a weld	88	79	47	6	0	2	38	48
8. Make butt, lap and fillet welds	77	67	59	6	0	1	30	46
9. Select a welder for the farm	73	64	60	8	0	2	25	46
10. Weld vertically	67	57	66	9	0	1	19	47
11. Use the carbon arc torch	51	47	61	24	0	0	13	38

*Refer to footnote for Table 1.

TABLE 14. Summary of Concrete Skills

Skills	Number of Teachers Checking: Used	Value*: High	Med.	Low	Where Trained %: On Farm	In Vo-Ag	In Col.	On Job
1. Mix concrete	99	79	51	2	34	4	21	40
2. Estimate quantity for job	95	75	54	3	21	6	21	47
3. Calculate proportions for mixture	92	73	54	5	18	4	25	45
4. Finish or trowel concrete	89	62	67	3	21	3	13	52
5. Lay a section of concrete	81	56	71	5	22	4	10	45
6. Drill a hole in concrete	79	45	77	10	12	8	10	49
7. Build forms for concrete construction	77	65	64	3	19	4	6	48
8. Lay concrete or cement blocks	72	50	79	3	12	2	12	46
9. Reinforce concrete	70	51	76	5	15	2	8	45
10. Water-proof concrete or block walls	53	43	82	7	13	2	5	33
11. Test ingredients	47	28	86	18	5	4	14	24

*Refer to footnote for Table 1.

ings given the skills by teachers was low. Only one skill, "make a sketch of projects to build," had a large proportion of high value ratings. The skill, "make a set of upper and lower case letters," was used by only about half of the teachers and a very small portion of them gave it a high value rating.

Teachers received their training for these skills mostly in college (57 per cent), with training obtained on the job (22 per cent) being next. More training was received for this group of skills in Vo-Ag classes (19 per cent) than for any other group of skills.

HOME WORKSHOP skills ranked eleventh as a group in use by teachers. None of the skills had an extremely large or small number of high value ratings. Most of the training was received by the teachers on the job (38 per cent) and in college (36 per cent), but more training had been received in Vo-Ag (14 per cent) than for most other groups.

FARM ELECTRICITY AND MOTOR skills ranked twelfth in use by teachers. The 20 skills in this group had a wide range in the per cent of teachers using them (from 86 to 40). The group ranked about in the middle of all groups in high value ratings.

The place where teachers received their training varied considerably between individual skills within this group. However, considering all skills, teachers received more training on the job (46 per cent) than anywhere else. The older teachers had to get a large majority of their training on the job (62 per cent), while the training the younger teachers got on the job (33 per cent) was slightly below the training they received in college (35 per cent).

ELECTRIC ARC WELDING is relatively new to teachers. That, coupled with competition from oxyacetylene welding, probably accounts for its low rank of thirteenth in use by teachers. There are advantages to both types of welding, but many teachers do not have both at their disposal. The average of high value ratings given electric arc welding skills was above that for most other groups, indicating that many teachers felt that these skills were important.

Electric arc welding ranked second only to oxyacetylene welding in the amount of training teachers had to obtain on the job (electric arc, 60 per cent—oxyacetylene, 63 per cent). Its newness in farm mechanics in high school is emphasized by the fact that the younger teachers received most of their training in college (52 per cent), whereas the older teachers got their training almost entirely on the job (79 per cent). None of the training was received for electric arc welding skills on the farm or in Vo-Ag classes.

CONCRETE skills ranked fourteenth in use by teachers. Two skills, "water-proof concrete and block walls" and "test ingredients," were used by less than 40 per cent of the teachers. This group of skills was bracketed almost evenly with the last two groups of skills discussed for the lowest average of high value ratings (concrete 57.0, plumbing and water supply 56.0, and farm fencing 57.4).

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Most of the training for concrete skills (56 per cent) was obtained on the job, and more training was received on the farm (22 per cent) than in college (17 per cent).

OXYACETYLENE WELDING skills ranked fifteenth among the groups in use by teachers. This was not as popular among teachers as electric arc welding (the average number of teachers who used all oxyacetylene skills was 65.7, as compared to 73.1 for all electric arc welding skills).

Training was received mostly on the job for oxyacetylene welding skills (63 per cent). This group ranked highest of all groups in this respect for both the older (81 per cent) and the younger teachers (47 per cent), but as in electric arc welding the younger teachers got considerable training in college (48 per cent).

PLUMBING AND WATER SUPPLY skills ranked sixteenth in use by teachers. Only a few of the skills were used by a large number of teachers and four were used by less than 40 per cent of them. Most of the training was received by the teachers on the job (42 per cent) and, as in concrete, more skills were learned on the farm (29 per cent) than in college (22 per cent).

FARM FENCING skills ranked seventeenth and last in use by teachers. The major item of note for this group is that the teachers received most of their training on the farm (62 per cent), the amount being more than twice that received on the farm for any other group.

Summary

This study shows that the most important groups of skills in farm mechanics, when judged by the number of teachers who used the skills are cold metal, woodworking, soldering and sheet metal, glazing, painting and refinishing, tool-fitting and farm machinery, in that order. When judged by the average number of high value ratings teachers gave the skills, the order of importance is farm machinery, tractors and gas engines, cold metal, tool-fitting, woodworking, and electric arc welding. Teachers included in this survey tended to use, and gave a high value rating, to the more common and less technical skills in all groups.

Most training for skills was obtained by the teachers as a whole on the job, followed closely by that received in college. Training received on the farm as a boy was third, and that received in Vo-Ag classes was lowest. About half of all training of teachers with more than 10 years of experience was gotten on the job, while the younger teachers received most of their training in college, with "on the job" being next. No doubt older teachers have had to get much training on the job because many new skills have been developed in farm mechanics since they attended college, which emphasizes the need for in-service training for teachers. The low amount of training teachers received in Vo-Ag classes is at least partially due to the fact that many teachers included in the survey did not take Vo-Ag in high school.

The rapid changes taking place in farm mechanics means new skills will be added rapidly to those included in this study, and some skills now in use may gain or lose importance in a short period of time. However, the basic findings in this study are of such a nature that they should be of considerable value for some time in the future. □

TABLE 15. Summary of Oxyacetylene Welding Skills

Skills	Number of Teachers Checking: Used	Value*: High	Value*: Med.	Value*: Low	Where Trained %: On Farm	Where Trained %: In Vo-Ag	Where Trained %: In Col.	Where Trained %: On Job
1. Operate the cutting torch	82	72	53	7	1	2	33	46
2. Light and adjust torch	81	71	55	6	1	2	31	47
3. Adjust regulating gauges for cutting and welding	80	69	56	7	1	1	30	48
4. Run a simple bead with rod	78	69	58	5	1	2	24	51
5. Select proper rods	78	67	59	6	0	2	22	54
6. Select proper tips	78	66	60	6	0	1	24	53
7. Attach hose and gauges to cylinders	78	61	65	6	1	1	27	49
8. Braze cast iron	73	65	63	4	0	2	25	46
9. Run a simple bead without rod	69	61	65	6	1	1	24	43
10. Make welds vertically	63	56	65	11	0	1	21	41

*Refer to footnote for Table 1.

TABLE 16. Summary of Plumbing and Water Supply Skills

Skills	Number of Teachers Checking: Used	Value*: High	Value*: Med.	Value*: Low	Where Trained %: On Farm	Where Trained %: In Vo-Ag	Where Trained %: In Col.	Where Trained %: On Job
1. Thread pipe	105	78	51	3	23	11	30	41
2. Measure and cut pipe	103	76	53	3	26	9	30	38
3. Ream pipe	95	63	66	3	19	11	28	37
4. Run and connect simple lines	92	69	60	3	27	8	18	39
5. Replace faucet washer	90	76	53	3	34	5	15	36
6. Repair leaky valve	84	72	58	2	30	6	14	34
7. Straighten and bend pipe	75	44	76	12	18	8	19	30
8. Replace valve and plunger leathers in pump	69	53	69	10	31	3	9	26
9. Flare and solder copper tubing joints	60	46	71	15	7	2	15	36
10. Plan and locate water system	52	41	75	16	15	1	10	26
11. Lay a sewage drain of tile	51	41	80	11	17	2	11	21
12. Plan and locate kitchen sink and drain	47	36	79	17	17	1	4	25
13. Plan and locate bath and septic tank	42	33	79	20	13	1	9	19

*Refer to footnote for Table 1.

TABLE 17. Summary of Farm Fencing Skills

Skills	Number of Teachers Checking: Used	Value*: High	Value*: Med.	Value*: Low	Where Trained %: On Farm	Where Trained %: In Vo-Ag	Where Trained %: In Col.	Where Trained %: On Job
1. Select fence materials	81	63	57	12	45	5	12	19
2. Stretch fence	80	59	55	18	61	2	4	13
3. Brace corner posts	78	63	52	17	54	3	4	17
4. Hook up and electric fence	76	71	47	14	43	3	5	25
5. Construct and hang farm gates	73	57	56	19	43	4	4	22
6. Run a fence line	71	54	63	15	51	3	5	12
7. Plant posts	70	55	59	18	48	3	3	16
8. Select and treat fence posts	69	59	60	13	28	6	10	25
9. Splice wire fence	54	52	61	19	36	3	3	12
10. Construct a cattle guard	29	41	63	28	12	1	4	12

*Refer to footnote for Table 1.

Farm Mechanics Teaching

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PAINTING
10. Preparing surfaces for painting _____
11. Calculating amount of paint needed _____
12. Mixing paint _____
13. Applying paint _____

TOOL FITTING
15. Removing rust from home farm tools _____
16. Preventing rust and storage of farm tools _____
17. Fitting handles in hammers _____
18. Sharpening and care of hand cut-off saws _____
19. (add others) _____

USE OF POWER TOOLS
20. Tilting arbor saws—adjustment, use, and safety practices _____
21. Radial arm saws—adjustment, use, and safety practices _____
22. Portable electric saws—adjustment, use, and safety practices _____
23. (add others) _____

SOLDERING
24. Use of direct flame in soldering _____
25. Use of electric soldering iron _____
26. Soldering with arc welder _____
27. (add others) _____

PLUMBING
28. Use of pipe and pipe fittings on the farm, both galvanized and copper _____
29. Laying out, forming and riveting sheet metal _____
30. (add others) _____

BRAZING AND WELDING
31. Using the arc torch for brazing _____

□

Preparation in agricultural Engineering for Vo-Ag teachers

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D. R. McClay

THE Committee on Agricultural Teacher Training, of the American Society of Agricultural Engineers, has developed a list of suggested objectives for courses in agricultural engineering for the pre-service level of teacher preparation. The list is presented below for its value in helping teachers to identify those areas of agricultural engineering which are considered to be important in their programs. While the list is made up of objectives to be attained in the training of teachers, there is back of it the basic assumption that the training which teachers receive should be determined by the needs which they will have in conducting effective programs in vocational agriculture.

Farm Power and Machinery

Objectives—To develop understandings of basic principles involved, some judgment, and reasonable ability to:

1. Select power units and machines best suited to a given farm or given conditions: Size and type, simplicity of design, safety and convenience of operation, availability of repair service, coordination with other machines, justifiable investment.

2. Determine cost of use of power units and machines: Initial cost, probable life, repairs, housing, interest, insurance. (Some or all of this phase may be included in courses in farm management.)

3. Service, operate and adjust common power units and machines: Lubricate; recondition cutting edges; replace dull or worn parts; make common operating adjustments; hitch tractors and implements; calibrate planting and fertilizing equipment.

4. Locate and remedy common operating troubles: Due to wear of sprockets, chains, gears, bearings, and similar parts; due to breakage; due to misalignment of frame or supporting members; due to improper functioning of ignition, carburetion, cooling systems, valves, and other parts of power units.

5. Plan and execute a program of preventive maintenance: Protection-shelter, rust preventives, paint, grease; storage of parts to prevent deterioration; periodic inspection to determine repair needs; major adjustments due to wear or breakage; repairing in anticipation of breakage.

6. Do repair work such as can be done economically by the farmer: Use of common tools, *replacing* easily *replaceable* worn or broken parts, sharpening dulled edges. (May be included in courses in Farm Shop.)

7. Recognize need for major repairs involving the use of specialized skill, tools and equipment, and determine appropriate methods of getting such work done: Cost of service, reliability, effect on life and usefulness of machine.

8. Determine and use safe operating practices: Speed, protection of moving parts, stopping machine to adjust and remove obstructions.

Farm Buildings and Conveniences

Objectives — Develop understandings of basic principles involved, some judgment, and reasonable ability to:

1. Organize a farmstead and plan long-time farmstead improvement programs: Building location, efficiency, fire protection, appearance, plantings, sanitation, services (cream collection, custom shelling and grinding, etc.), utilities, land slope, wind direction, sunlight.

2. Evaluate existing buildings on a farm. Select and modify plans for new construction and remodeling to meet requirements for production, storage, processing, living: Space, arrangement, labor efficiency, management, economy, simplicity, soundness of construction, shape and appearance. This requires ability to read, interpret, and change plans and make sketches.

3. Plan and execute building maintenance and improvement programs: Systematic repairs, upkeep, modification to meet changing needs.

4. Recognize the need for, evaluate, and select utilities, equipment, and devices for effective operation: Elevators, conveyors, water distribution, light and power, and feeding and feed-handling devices.

5. Recognize and meet requirements for environmental and sanitation control: Temperature, air movement, light, moisture.

6. Select suitable building materials for specific uses: Durability, functional performance, strength, ease of application, availability, economy, appearance. Know commercial units, calculate quantities, and determine local costs.

7. Recognize accepted construction standards: Foundations, frames, coverings, finishes.

8. Do such construction as can be done economically by the farmer: Work with concrete, masonry, wood, steel and other material.

9. Recognize basic requirements of dwellings: Space, arrangement, convenience, comfort, utilities.

10. Recognize and protect against or eliminate common hazards to life and property: Fire, accident, lightning, wind.

Soil and Water Management

Objectives—Develop understandings of basic principles involved, some judgment, and reasonable ability to:

1. Make land surveys, run levels, and contours by using the farm level, locating and placing grade stakes, and making contour maps.

2. Plan terracing and simple farm drainage systems including the running of contours, locating waterways, ditches and spillways, locating tile lines, outlets, establishing grades, adapting type of drainage to systems of crops and soil conditions, determining the amount and character of run-off for a given area, learning to use equipment needed to lay out drainage systems and estimating costs of construction and maintenance of terraces, spillways, etc.

3. Plan and lay out typical irrigation systems considering the advantages and limitations of the various types of irrigation systems; determine distance between borders, type of borders, length of flow, size of head of water; establish checks and estimate width of strip for various types of irrigation; establish basins and run surface pipe and estimate flow; select and use overhead systems; lay out ditches and laterals to grade and estimate flow for furrow and corrugation systems; figure the costs involved in the various types of irrigation systems and sources of water, lay out and construct irrigation ditches and gates, and compute the amount of water needed for a selected field.

4. Maintain irrigation and drainage systems including the upkeep of terraces, spillways and ditches; service overhead irrigation layouts and correct defects in both drainage and irrigation systems; fertilizers in irrigation water.

5. Perform recommended types of surface treatments using the equipment necessary to providing the recommended cropping systems and providing satisfactory mulches and cover crops.

6. Plan and lay out farm reservoirs including the choosing of the appropriate site, calculating the expected flow and capacity, determining the procedure in constructing the pond; construct adequate spillways, providing outlets and using practices that preserve earthen reservoirs or embankments.

7. Relate erosion control to farming practices including the understanding of the basic causes, their methods of control, or control of gully erosion, and control of surface erosion.

Objectives—Develop understandings of basic principles involved, some judgment, and reasonable ability to:

1. Solve the common problems of wiring the farmstead and buildings: Present and future electrical loads, load center, distribution, pole location, wire sizes, service entrances, types of wiring, service outlets, switches, circuits, safety.

2. Select lighting equipment for yards, lots and buildings, and other work areas: Kind, size, number, and location.

3. Select common electrical appliances and equipment for the farm and home: Safety, quality, energy consumption, durability and provision for adjusting, cleaning, lubricating, and servicing.

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Preparation in - -

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4. Evaluate the use of electricity in farm enterprises and in the improvement of farm living conditions: Comparative costs; quality of product; savings in labor; health; sanitation; recreation.

5. Make suitable application of electric motors to various jobs: Types, sizes, and characteristics of motors and drives; motor circuits, protective devices and switches, voltage.

6. Read meters, interpret rate schedules, and compute monthly bills.

7. Repair and maintain electrical equipment: Locating and correcting troubles and hazards, fuses, switches, fixtures, cords and wiring, motors, heating appliances, lamps.

Farm Shop Work

Objectives—Develop understandings of basic principles involved, some judgment, and reasonable ability to:

1. Select the tools and equipment common to the farm shop, including names, sizes, grades.

2. Sharpen, repair, and maintain the common farm shop tools and equipment.

3. Use the common farm shop wood and metal tools and equipment properly, including sawing, nailing, fastening with screws, etc.

4. Properly use, service, and maintain such power tools as are commonly found in the farm mechanics shops, such as the grinder, saws, drills, surfacers, welders, etc.

5. Solder and work sheet metal.

6. Make the more important rope knots, hitches, and splices.

7. Do elementary forge work: bending, shaping, and tempering.

8. Do electric arc and oxyacetylene welding.

9. Do pipe and tubing work and make simple plumbing repairs.

10. Do painting and glazing and apply other finishes.

11. Sew leather and repair harness (where needed).

12. Select lumber, hardware, and building material, and calculate bills of materials.

13. Supervise and assist in arranging and equipping a home farm shop.

14. Supervise and assist with construction and maintenance of smaller farm buildings, projects, appliances, and equipment.

15. Construct and maintain adequate farm fences.

16. Do cold metal work including cutting, drilling, filing, tapping, riveting, bending, etc.

17. Do drawing and sketching including blueprint reading.

18. Do concrete work including building forms, preparing mixes, and laying concrete blocks.

19. Recognize them and protect against dangers and hazards connected with the use of tools and equipment. □

The Farm Wiring - -

(Continued from Page 159)

All teachers in Pennsylvania have the last two publications in their possession, and these publications have been or will be distributed to the Ag. Teachers in Iowa through the Electric Suppliers of that state.

Why Is a Concentrated Program on Adequate Wiring Needed?

The words, "In God We Trust," were put on pennies for those who place pennies behind fuses! People have no conception of the danger in which they are placing themselves or their loved ones when they do this, but there are very few who seem to realize this danger.

Why is a penny needed behind a fuse? Because the present wiring is too small to handle the load that is placed on it. Business Week Magazine (Oct. 3, 1953) states that all homes wired before World War II are not only inadequate but they are obsolete. The wiring inadequacy due to the expanded use of electric equipment has encouraged people to "slug" fuses to keep the equipment going. This is a most dangerous practice. Figure 4 shows the type of wiring that can result from poor practices, inexperienced help, and a complete disregard for safety.

In 1935, 1 out of 10 farms had electric service but today only 1 out of 10 do not have it. About half of the farms are served by Rural Electric Cooperatives and half by Power Companies. Pennsylvania farms are over 95% electrified. Rhode Island, Connecticut, New Jersey, Ohio and Oregon are over 99.1% electrified.

The potential for the use of electricity on our farms is very great. On the average only about 30% of the electricity delivered to the farm is actually used for the farming operation. The 70% is used in the home. In 1935, the average electrical consumption per farm was about 50 to 100 kwh. per month. Today, it is not at all unusual for power suppliers in good farming areas to report their average farm consumer using 500 kwh. per month. However, it is necessary for such farms to have modern wiring systems as shown in figure 3.

Misplaced Values

"Wiring is something you pay for whether you get it or not" is a common statement heard. If the wire size in a home is too small, then the operating cost of electrical equipment is too high with the added possibility that the equipment may burn out. The electrical system must be adequate for present and future needs or the electrical equipment will not be satisfactory.

Many times people do not realize the importance of the value of automatic electrical equipment. I know of one power supplier that has about 10,000 farm consumers. Well over 40% of these consumers have television. However, it is almost a sure bet that less than this number have bathrooms.

In Conclusion

The problem has been stated. Is there a better place than our Vo-Ag Classes to teach a more timely and important subject than "Adequate Wiring?" □

Who Wrote What You Read?

The twelve issues of the *Agricultural Education Magazine* during the period from January to December, 1954, contained a total of 205 articles, editorials and miscellaneous items. All but fifteen of these contributions came from persons identified with a particular state program or agency. Vocational agriculture instructors furnished 38.4 per cent of the 190 articles identified as coming from particular states. Another 38.9 per cent of the contributions came from members of Teacher Education staffs. Supervisors furnished 7.4 per cent of the articles and the remaining 15.3 per cent came from persons outside our own professional ranks.

By Regions, the North Central led in the number of articles contributed during the year with a total of 65. All but two states in the Region were represented. The second most frequently represented Region was the North Atlantic with 51 articles. All but one state in the Region had one or more contributors.

The Southern Region was third in the total number of contributors with 44 articles. Four States in the Region were not represented during the year. The Pacific Region furnished 30 articles and also lacked representation from four states. However, it should be noted that both the Southern and Pacific Regions increased their proportions of articles appearing during the year over their representation for the previous year.

Comparisons of states and Regions on the basis of frequency of contributions must take into account the number of potential contributors in each. It is obvious that states and Regions vary in this regard.

In frequency of representation by states, Pennsylvania leads the list with 17 articles. Others which were represented frequently included Michigan (14); California and Ohio (13 each); Alabama (10); Missouri, New York, and Texas (9 each); Virginia (8); Arkansas (7); and Nebraska and Wisconsin (6 each).

From the Editor's annual report to the Editing-Managing Board.

Do you ever disagree with the ideas expressed by those whose articles appear in the Magazine from month to month? Why not express your disagreement in a rebuttal article?

Pictures can tell a story of interest to the readers of the Magazine when accompanied by an explanatory legend. The back page is devoted to this opportunity. Pictures must be clear and on a glossy print. If requested, prints will be returned.

Theme for the February Issue

"Administering the Program of Vocational Agriculture"

MATHEMATICS IN AGRICULTURE, second edition, by R. V. McGee, pp. 208, published by Prentice-Hall, Inc., Price, $5.35.

This second edition of *Mathematics in Agriculture* includes additional problems in the area of the use of machine power and electricity on the farm, a revision of problem data to bring them into line with current prices and practices, and expanded treatment of algebra.

As does the previous edition, this edition includes the following: the fundamental mathematical operations; percentages; equations; lengths, areas and volumes; ratios and proportions; averages; graphs; the right triangle and trigonometry; exponents; logarithms, and the slide rule; and special applications of practical measurements to agriculture.

This book represents the subject of mathematics in agriculture in a condensed, yet understandable manner. All operations are first explained, then illustrated through step by step solutions to illustrative problems. Diagrams and charts are used effectively to clarify difficult or obscure concepts. Tables of weights, measures, and various mathematical functions are included at the end of the book. This should be a very useful reference for departments of vocational agriculture.

The author, R. V. McGee, is in the Department of Mathematics, The Agricultural and Mechanical College of Texas.

—A.H.K.

THE RESPONSE OF CROPS AND SOILS TO FERTILIZERS AND MANURES, second edition, by W. B. Andrews, pp. 463, illustrated, published by W. B. Andrews, State College, Mississippi.

This book represents a comprehensive treatment of the response of crops and soils to fertilizers and manures. Several chapters are devoted to nitrogen, its sources, uses, and effects. Lime, phosphorus and potash also receive broad and varied treatment. Other chapters include discussions of soil organic matter, mixed fertilizers, placement of fertilizers, the use of manures, fertilizing ponds for fish production, and the effect of fertilizers on the yield and feeding value of hay and pasture crops.

The sources of the data presented in this book have been cited at the end of each chapter. The book contains a great many tables and charts, and some photographs, to illustrate and clarify various points. Teachers of vocational agriculture should find this a valuable reference book.

W. B. Andrews is an Agronomist with the Mississippi State College and Experiment Stations.

—A.H.K.

News and Views of the Profession

Weaver Assigned to Israel

W. Jack Weaver of the Agricultural Education Bureau of the New York Education Department has accepted an assignment to the Israel Project of the Research Foundation of the State University of New York. This is a two-year appointment as Specialist in Agricultural Education, the duties of which embrace in cooperation with Israel Government personnel and the U. S. Foreign Operations Administration, the developing of a program of agricultural education in elementary and junior high school grades and on the vocational high school level, in the schools of the Country of Israel.

Weaver has been in the service of the New York Education Department for the past thirty-five years following five years in teaching vocational agriculture and one year as graduate assistant at Cornell.

He started teaching vocational agriculture in 1912 upon graduation from the Massachusetts Agricultural College and has thus been closely associated with the development of the vocational agricultural program since its earliest beginning in New York. Mr. and Mrs. Weaver departed from New York by T.W.A. airline in early December.

Thompson to California

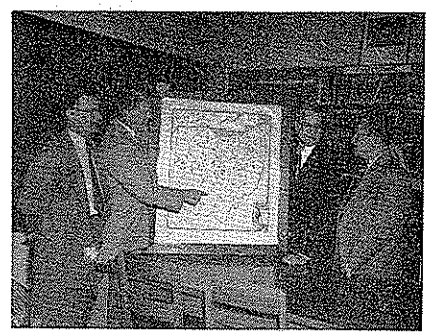
Dr. Orville E. Thompson is now a member of the teacher training staff in the University of California at Davis, having joined that staff in September of this year. Dr. Thompson completed work for his doctorate at Cornell University during the past summer. He served as a graduate assistant in Agricultural Education during the two year period of his doctoral study. Dr. Thompson obtained his early preparation and teaching experience in Montana before completing work for the Master's degree at the University of California.

Enters Teacher Education

Dr. Robert F. Coffin accepted employment with the Rural Education Department of the New York State College of Agriculture in September as Instructor in Agricultural Education. Dr. Coffin's earlier experience was gained in the program of vocational agriculture in Vermont.

Becomes Supervisor

Dr. Harold Noakes has joined the Supervisory Staff in New York. Formerly he was a member of the Teacher Training staff in the same state and a member of the faculty of the New York State College of Agriculture. He has served as director of the Future Farmer Leadership Training Camp in New York continuously since it was started in 1947. In his new capacity he will continue as advisor in the operation of the camp. His present address is Agricultural Education Bureau, State Education Department, Albany, N. Y.



A Teacher Educator studies Teacher Education. Prof. Weiss of Illinois takes a look at the Ohio program as explained by, left to right, W. H. Wolf, Austin E. Ritchie, (Weiss) and Ralph Bender. (Photo by Ralph Woodin.)

John N. Weiss, Associated Professor Agricultural Education, University of Illinois, was granted a sabbatical leave of absence from February 1, 1954, to August 1, 1954, to study undergraduate programs of student teaching in Agriculture and Adult Education in selected southern and central states. Fourteen teacher-training institutions were visited on this ten-thousand mile junket. The study of different teaching procedures was most enlightening. Another gratifying phase of the tour was the opportunity of getting acquainted with so many of the profession of Agricultural Education.

EDITOR'S NOTE: Inaugurated here is a new feature of the Magazine. Items of interest to the profession about persons and events are desired.

FARM MANAGEMENT ECONOMICS, by Heady and Jensen, pp. 645, illustrated, published by Prentice Hall, Inc., New York. Price, $9.00.

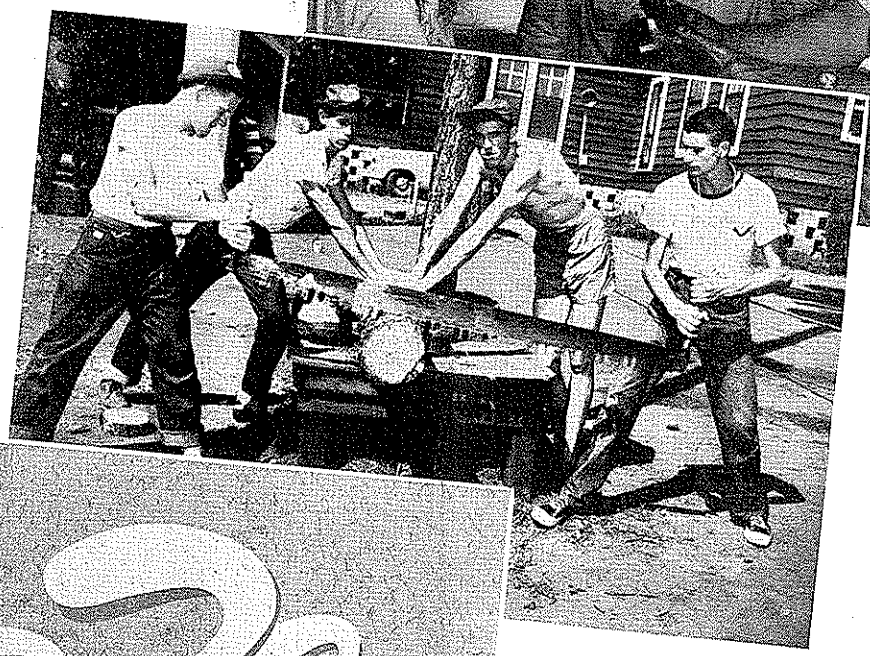
Farm Management Economics is a very comprehensive text written primarily for use in college courses in farm management and farm economics. It includes, in addition to a chapter on basic principles, chapters on purchasing a farm, crop and livestock systems, rotations, fertilization and irrigation, labor, machinery, buildings, prices and outlook, leases and rental arrangements, credit, insurance and risk adjustment, and management of the many enterprises. Principles are emphasized and clarified by specific examples from farming operations.

Although this is obviously not a good reference for the high school boy, it should have merit as a technical reference for the teacher of vocational agriculture.

Earl O. Heady is in charge of production economics and farm management teaching and research at Iowa State College. Harold R. Jensen is Associate Professor of Agricultural Economics at the University of Kentucky.

—A.H.K.

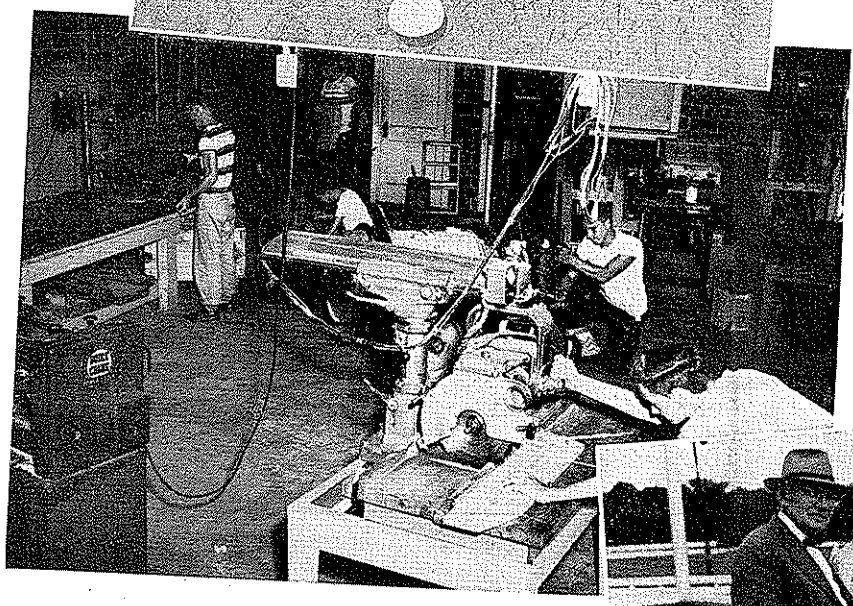
Stories in pictures



No forestry camp for Vo-Ag students would be complete without contests involving the skills of forestry. The FFA members above are competing in the wood-sawing contest held on the last day of a week-long forestry camp in Alabama.

In-service Training Welding School—Left to right: Kyle Leftwich, Carthage; W. B. Owen, Oklaunion; J. C. Fox, Waco; E. H. Barron, Clyde; Clint House, Bluegrove; and Professor R. N. Craig, College Station, Texas. This represents one of several welding short courses of one week each in which 121 teachers participated. Picture furnished by W. W. McIlroy.

This is the space where you might have told a story with a picture. Send that picture today with a legend which will emphasize the idea pictured. Don't permit this space to remain blank.



During farm mechanics shop period the farm shop is a "beehive" of activity. Here we see the vocational agriculture students of the Clinton, Mississippi, school busily engaged with their individual projects.

A QUEEN IS CROWNED. Left to rght: Dr. E. L. Nixon, Agricultural Consultant, Pennsylvania Chain Store Council; Lois Halsey, Pennsylvania's Livestock Queen of 1953; H. R. Keim, District Manager, G. C. Murphy Company, McKeesport, Pa.; Fay Weiss, of Erie, Pa., Pennsylvania's Livestock Queen of 1954; Secretary of Agriculture W. S. Hagar of Pennsylvania, and Mayor Thomas W. Flatley, of Erie, Pa. The Queen was selected from among twenty-one Future Homemaker of America students in Pennsylvania—each the Sweetheart of an FFA Chapter in Northwestern Pennsylvania counties.