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Featuring—Teaching Farm Mechanics

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IN THIS ISSUE

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The Cover

The World Plowing Contest held in Caledon, Ontario last year attracted over 160,000 people. This and similar events held all over the United States demonstrate the spectacular strides of agriculture due to mechanization. Agricultural Education continues to play an important part in assisting farmers in the trial and adoption of more efficient mechanized farming.

Editorials

Guest Editorial

Agricultural Mechanics—What Now

CARL F. ALBRECHT, Department of Agricultural Engineering, Michigan State University

Some agricultural specialists have, from time to time, questioned the necessity of agricultural mechanics instruction and the need for home farm shops. This concept probably stems from the narrow viewpoint that agricultural mechanics is farm shop work.

Vocational agriculture teachers, teacher educators and farmers do not subscribe to this limited philosophy, but we do need to re-evaluate the situation, and some major adjustments may be in order.

There will always remain the fundamental agricultural mechanics skills which every farmer must possess. If he cannot do these things, he had best get out of the business of farming and find some other means of livelihood. These skills are: (1) to perform the day to day service and maintenance tasks; (2) to adjust his power units and machines for efficient operation; and (3) to make urgent emergency repairs.

The manipulative skills kind of agricultural mechanics activities in which the farmer will engage beyond the above will depend on his attitude toward this kind of work, his aptitude in it and the time he has available for it. Other factors would include how well his shop is equipped, how available custom work is and the amount of capital he has with which to operate.

The increasing complexity of our farm power units, machines, materials handling systems, processing equipment, and the like, calls for more expert work by specially trained personnel in the areas of major repair, systems planning and installation. This means that more agricultural mechanics work will be contracted for, but it also means that the farmer must be conversant with the new problems arising.

Therefore, in our teacher education programs we must increase our emphasis on principles involved in Agricultural Mechanics and on the managerial aspects of it.

In the future we should be more concerned with the health and safety of the operator, the efficient use of the large machines and power units, and the automatically controlled tractors and machines.

More planning of structures for efficiency, low cost and multiple use is also in demand.

Quality control and on-farm processing is on the increase. Thus we need more and better instruction in the selection, installation, operation and maintenance of quality control equipment such as lighting, refrig-

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From the Editor's Desk

Farm Mechanics Teaching Starts In the Shop but—

Much of the emphasis on farm mechanics in vocational agriculture has been on activities within the school farm shop. Much has been written of the facilities needed, of the demonstration method of teaching, of the skills and abilities which should be taught, of suitable student projects. Changing needs of our students brought about by mechanization of farming suggest, however, that we need to give consideration to supplementing that instruction which is given in the shop if we are to be in touch with the times.

The first supplement should be given in the classroom. As students are taught more complex aspects of farm mechanics including electrification, welding, and tractor maintenance, for example, the shop demonstration while still important does not provide sufficient depth of understanding. Classroom discussion and supervised study of underlying principles becomes more and more important.

A second supplement to the shop in teaching farm mechanics lies in the farms in the community. It is here that combine and picker losses can be measured, corn stands counted and on the spot adjustments made. Such field trips should often be preceded by study in the classroom and shop but the learning is incomplete until students learn to cope with problems as they occur in the field.

A third supplement to teaching in the above situations is afforded through the occupational experience programs of high school students. In too many cases farming programs are limited to production projects involving crops and livestock. For many students much additional learning in farm mechanics can be developed through carefully supervised farm mechanics activities. The establishment of a home farm shop is a good example of this type of supervised practice but we need a greater variety of these on farm experiences which permit the students to put into practice what has been learned at school.

A fourth supplement to farm mechanics in the shop needs to be made through young and adult farmer programs. As larger numbers of vocational agriculture graduates are enrolled in out of school courses we need to build upon the farm mechanics understandings which have been previously developed and add those needed by today's farm operators. Materials handling, quality control and drainage systems are examples of farm mechanics problems which are of

(Continued on next page)

What Now . . .

eration, atmosphere control, drying, handling, sorting and packaging. Also the rapid adaptation of the principles of automation to the farm demands more widespread understanding of the use of automatic controls.

While the Soil Conservation Service provides a sound program of planning soil and water management in many areas, we must still give instruction in the basic principles involved in the planning, construction, and especially in the maintenance of the structures and equipment needed in this important work.

Equally important is the adjustment of our program to meet the mechanics education needs in agricultural pursuits other than farming. This field is now just beginning to be seriously probed. To be sure, many of our basic concepts in agricultural mechanics will apply, but in what new needed skills and principles should we prepare ourselves to teach in these areas. Some are the same as referred to above, particularly in the areas of quality control and automation, others will suggest themselves as we gain experience in this field.

In summary then, there are five major concepts on which we should keep our sights in the future.

First, we must remember that agricultural mechanics is not only shop work but that it involves all of the practical applications of engineering to agriculture.

Second, we must be prepared to teach our farmers to be proficient, at least, in the skills necessary to service and maintain their equipment, to adjust their machines and to make emergency repairs.

Third, we must make more use of problem solving techniques in order to develop the judgement and managerial abilities of our students.

Fourth, we must be on the alert to apply our present knowledge of agricultural mechanics to agricultural occupations other than farming and also to meet the new demands.

Finally, we must emphasize the value of the optimum home farm shop facility for a given farm operation.

There is work to be done in the years ahead and it will demand all of the ingenuity and skill that agricultural mechanics specialists and agricultural teachers can muster, and the wholehearted support of everyone interested in agricultural education. □

The fool wonders but the wise man asks. —Disraeli

In the Shop . . .

vital importance to today's farmers but may be inappropriate for high school students.

The school farm shop is still the place to start teaching farm mechanics but we believe that these supplements will enhance its contributions to learning. □

Ralph J. Woodin

More than 700 young farmers and their wives from Texas met in Austin on January 3 and 4 for the 10th Annual Convention of capitalized young farmers of Texas. The Association includes 200 local chapters with a total membership of approximately 5,000.

Stagnant minds are the greatest obstacles to progress.

—William D. Danforth

LETTERS

Sir:

In response to Professor Wilson's recent article entitled, "Is Problem-Solving Instruction Worth Saving?" I would say yes, if we will strive to make more effective use of it. Although the author associated "The Golden Age of Vocational Agriculture" with the problem method, he gives due recognition to some of the major limitations of this approach to learning.

In searching for a more effective plan of instruction for vocational agriculture, I suggest the following observations for consideration: 1) The range and significance of occupational problems faced by present day students of agriculture do not alone provide adequate content for a functional course of study. 2) There are a number of devices and procedures in addition to problem solving that can be used effectively as part of a student-centered approach to the teaching-learning process. 3) In recognition of the ever increasing scope and depth of subject matter needed in the field of agriculture, it is important to explore new ways and means of making more effective use of student and teacher time. 4) With the present emphasis on the teaching of principles, generalizations and understanding, rather than practices in agriculture, the presentation of content as logical subject matter becomes more significant. 5) There are a number of competencies needed by students of agriculture that are not well suited to the problem solving method of teaching. I have reference especially to manipulative skills and other activities involving few or no judgment situations.

With adequate imagination, initiative, research, and leadership, we should be able to develop a new and even greater "Golden Age of Vocational Agriculture," in the years ahead.

R. W. CLINE
University of Arizona
Tucson

Sir:

This letter is a commentary on the article entitled "Teaching Basic Principles in Science in the Vocational Agriculture Curriculum" by Dr. C. E. Richard of the Virginia Polytechnic Institute.

In my judgment this is an excellent article. It is well written and to the point and of still greater importance, it concerns a subject of great significance to the future success of vocational agriculture in this country. I have been interested, for many years, in the teaching of applicable and applied science and other background material which influences practices and decisions in the broad field of agriculture.

Importance of the whys and wherefores in teaching vocational agriculture cannot be overemphasized. If a student learns something and does not learn why this is true, these facts will be forgotten because he has learned by memorization, rather than by understanding. According to Lancelot and many others, permanent learning consists of understanding.

The vocation division of the State Department of Education in Arkansas, with active participation of the two teacher-training institutions is planning a Core Curriculum (Basic) for the first two years of high school agriculture. This whole venture is based upon many of the points which are expounded in this article. We are assuming that science and background materials are necessary for everyone who takes any courses in agriculture and that this instruction should precede (in most cases) specialization in a particular field of agriculture. Therefore, the emphasis placed on science and background materials in our thinking is clearly discernible. I think this article of Doctor Richards should have a substantial impact on thinking in our field.

O. P. NAIL
State College Arkansas

Sir:

I would like to express my approval of the guest editorial by Gerald B. James and Harry G. Beard, titled "Wanted—Educational Inventors."

Many teachers in the field have recognized the need for change or invention to better prepare our students for the "world of work as it applies to farming and the other agricultural occupations." Many of us have invented and adopted new methods and procedures to fit the needs of our students. Most of us, however, find ourselves bound by the present "status quo" of the educational system, namely, a school system bounded by the area of the local school service area and the limitations of its budget.

No teacher can be a specialist in all phases of farming and its allied occupations any more than all students have the same needs, aptitudes, interests and abilities. However, we find ourselves

(Continued on page 214)

When Teaching Farm Power—

Start with Small Engines

JAMES P. CLOUSE and J. MARVIN EBBERT
Teacher Education, Purdue University

One logical way of introducing the area of farm power and machinery to the vocational agriculture student is through instruction in small gas engine maintenance and repair. The value of this approach is readily apparent. Small gasoline engines are important to farm boys because of their almost universal use. They are used on power mowers, conveyors, garden tractors, water pumps, chain saws, weed cutters, generators, air compressors and for other equipment. Boys who understand the fundamentals of operation and maintenance of one cylinder engines have a good foundation for the study of larger, more complicated engines. The small gasoline engine is an excellent teaching aid because of its size, simplicity and availability. All boys recognize the importance of the operation and maintenance of small engines, and they are highly motivated to learn something about engines. Most boys have a kind of fascination for anything mechanical and engines in particular.

How can this interest be transformed and developed into real learning? Here are some suggestions that you should find helpful.

To start with, it is necessary to obtain some small engines, which are now available at a reasonable cost when obtained from selected manufacturers for instructional use. Small engines may also be obtained from the farms of the students or from other farms in the community. It is best to have enough engines to provide one for every two or three students.

Small gasoline engine instruction for most students should be limited to teaching an understanding of the fundamentals of operation along with the maintenance and overhaul that can be done on the farm.

In order to get the maximum transfer of training from the instruction in small gasoline engines to an understanding of the operation and maintenance of larger power units, the small engine work might be taught under the following headings.

I. Principles of Operation
   - A. Elements of combustion—air, fuel, ignition
   - B. Four stroke cycle principle
   - C. Compression
   - D. Lubrication
   - E. Ignition, magneto
   - F. Fuel
   - G. Cooling
   - H. Governor

II. Engine Overhaul
   - A. Use of manual
   - B. Disassembly
   - C. Reassembly and inspection of parts
     1. Compression
     2. Ignition
     3. Fuel
     4. Lubrication
     5. Cooling
     6. Governor

III. Diagnostic Trouble Shooting

IV. Engine Tune-up
   - A. Compression system
   - B. Fuel system
   - C. Ignition system

Getting Ready to Teach the Unit

Clean the engines before the instruction begins. A safe solvent, some old paint brushes, wire brushes and plenty of rags are needed. After applying the solvent, air under pressure will help remove the dirt and grease that has been lossened. As a teacher you may insist that some clean-up work be done before the engine is brought to the shop.

Assign Some Homework

This unit's importance can be given emphasis and the learning situation can be made more effective by a reasonable amount of homework. Class time may be used more efficiently, teacher work will be better organized and student interest will be better maintained by the use of outside study or work sheets that are well integrated with the class and shop work.

Demonstrate

Several situations call for a well-prepared and well-presented demonstration before the students do any work. The teacher or a well-qualified student may perform the demonstration. The demonstration should be short—not more than 15-20 minutes in length. After demonstrating, allow time for questions and student discussion.

Practice

Following the demonstration the students practice and apply what they have seen and learned. Keep the class together—avoid the problem of some students getting ahead of others. Each job should be taught in an organized manner, for example, all students should work on checking the valve seating at the same time. The teacher must check the work of each boy. Check sheets and grading sheets may be useful at this point.

Discuss

The practice session should always be followed by an opportunity for discussion. The demonstration, practice session and student work sheets will

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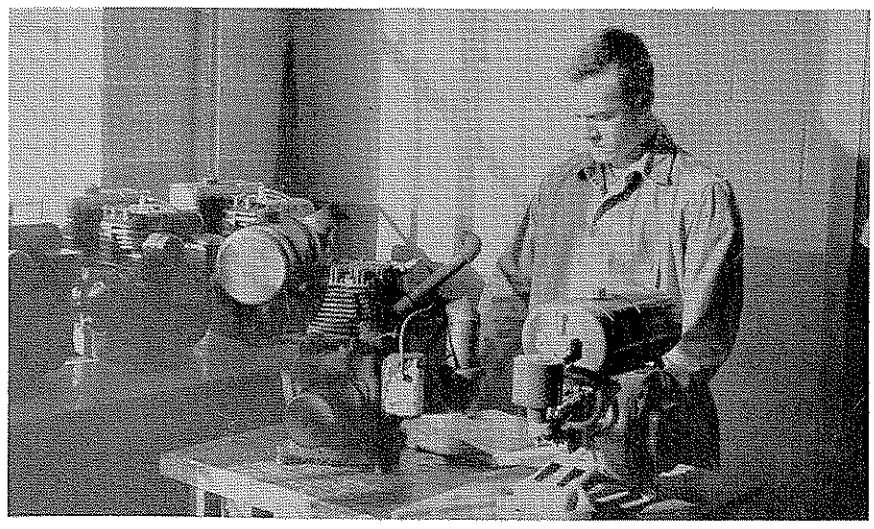
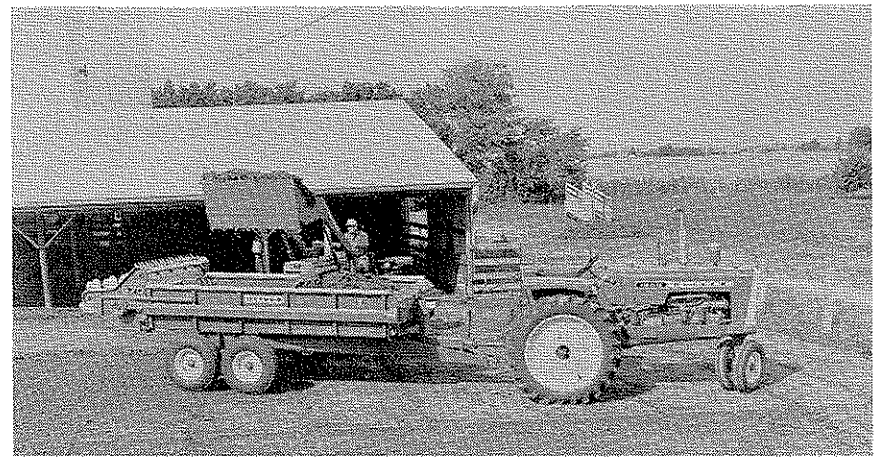


An Indiana vocational agriculture teacher prepares for a demonstration.



Data processing techniques can be used to analyze the economics of investments in machinery and equipment and provide multiple solutions.

Science and Farm Mechanics . . . for Future Teachers

CARLTON E. JOHNSON, Agricultural Engineering, The Ohio State University

Current emphasis on science in the high school and college curricula provides excellent opportunities for teachers of vocational agriculture to glamorize their teaching. The basic degree which teachers obtain is the Bachelor of Science followed by the Master of Science. However, teachers sometimes fail to make use to the fullest extent of the science they have learned, or have been exposed to, in their preparation for day by day teaching.

Some authorities claim that the amount of knowledge now doubles every eight years. We have not begun to visualize the impact of this statement, and the implications affecting the curriculum or curricula for undergraduate teacher education. There seems to be a conflict in the direction we should take. On the one hand there appears such a vast increase in knowledge that every teacher must be a specialist in some relatively narrow aspect of agriculture so that the student would study with a specialist for each area of content. On the other hand if a student is educated to a narrow range of information and specialized knowledge he may become obsolete by the development of a new machine, process or product and a huge retraining program is required to replace those technologically incompetent by obsolescence.

The President's Committee on Vocational Education has given impetus to emerging concepts, especially educational opportunities in agriculture other than farming. In viewing vocational agriculture on a national basis, state by state, there are many established programs in some states which are hailed as pilot studies and innovations in other states. Our new primary aim appears to be "to train for proficiency in agriculture" in addition to farming. Thus in communities where farming has been engulfed by urbanization a shift in emphasis is necessary if vocational agriculture is to survive. It seems desirable in many ways for thirteenth and fourteenth grade level courses to be a part of a continuation of our system of secondary free public education.

Changes in College Curricula

There has also been a push to consider thirteenth and fourteenth year courses to supplement the current concept of education by providing agricultural technician education. Area vocational schools, technical high schools, and junior colleges have been inadequate in numbers and in providing the necessary supply of adequately prepared technicians. Industry has developed many of their own education and training programs to fill their needs for technically educated personnel adapted to their specific needs. Some representatives of industry maintain they can educate for their needs better than our current public and private educational institutions.

The academic axe has been sharp in many institutions of higher learning requiring more humanities and social sciences. Any course which appears to be practical may be eliminated. What must give when such pressures are on? Take a look at the curriculum of your alma mater and you will likely discover that course requirements in production agriculture have been victims of the academic axe. New knowledge in agricultural technology has increased at a pace equal to other fields of knowledge. If you have any doubts about this, consider developments in spray materials such as fungicides, insecticides, and weedicides.

Emphasize Basic Principles

We need to review our objectives for the undergraduate curriculum and rewrite the objectives to fit the emerging concepts of vocational education in agriculture. We have a heritage unique in education involving science with practice, whereas in the past we perhaps have overemphasized the practice and taught our students too much of the "know what" and not enough of the "know why." The inherent potential of the basic concept of vocational education in agriculture provides us with a unique opportunity to use science to elucidate the "know why." The "know what" often changes, but the basic principles of the "know why," if they be basic principles, are unchanging.

We must constantly search for new applications of the "know why" while using the "know what" and must always strive for the proper balance of the two. If we attain the ideal combination our students will not become obsolete and be constantly in need of extensive retraining and re-education. The proper combination of the "what" and "why" will help develop an inquisitive mind to keep our students enthusiastic about vocational agriculture.

In the farm mechanics phase of the curriculum we have more opportunities to apply science to tangible realities than in most other phases of the curriculum. We can open up new avenues of learning and provide the opening wedge for our students to think for themselves and explore new opportunities in agriculture which are

a part of the emerging image of the unshackled future.

Adjusting the Undergraduate Curriculum

We may find it necessary to require a minimum of five years of preparation before beginning to teach but let us be sure that this additional year will provide field experience in teaching not later than the third year in college. When the prospective teacher returns to his college classroom from student teaching he will for the first time understand why he is studying. The content will now have deeper meaning and the knowledge gained in all courses will be structured in the student's mind in terms of how it can be used in teaching.

Traditionally we have required chemistry and have neglected to include an equal amount of physics which is probably more basic to effective teaching of many phases of farm mechanics. It is obvious to students that mathematics is essential to chemistry and even more so to physics. We also need the special applications of mathematics to statistics as a new tool in more effective teaching of vocational agriculture. Data processing analyses of farm accounts is a good example of applied statistics.

What better way is there to learn mathematics and physics than to apply them to problems of farming? The proper use of materials such as lumber, steel, aluminum, insulation, and the application of ventilation, irrigation, power in its many forms, and heat, light, and sound are based upon an adequate knowledge of science with enough mathematics to use the science available. However, there appears to have been a trend for instructors in each discipline to teach their courses as though every student planned to major in that department and thus the application of basic physics, chemistry, mathematics, etc., are left for the more advanced courses which unfortunately most students in colleges of agriculture, and those preparing to teach vocational agriculture will not have time to take, even in a five year curriculum. We must use the master teachers as instructors in the basic college courses because they understand the applications of the knowledge they teach, and will impart some of the applications so that students can relate what may to them be abstract knowledge, to some tangible uses. This makes the "know why" have some "know what" value, and thereby become truly vocational.

State Staff Coordination

State staffs of supervisors and teacher educators need to closely coordinate their activities, especially those related to curriculum by joint meetings at least once a month to structure a united push to implement the accelerating changes in agriculture.

Since the farm mechanics portion of the high school curriculum is using 40 to 60 percent of the time it seems logical that about this proportion of the teacher education curriculum should be devoted to preparation for teaching this agricultural engineering related content. It is difficult, if not impossible to do quality teaching with an inadequate knowledge of the subject matter content. In the June, 1960, issue of the magazine *Agricultural Engineering*, the article "Agricultural Engineering Phases of Teacher Education on Agriculture" (on page 256 of the May, 1962, issue of *Agricultural Education Magazine* this report is reviewed) lists in detail some aims and objectives with suggested procedures for preservice training in agricultural engineering aspects for prospective teachers of vocational agriculture. There are many applications of science in the farm buildings and structures phase, such as planning ventilation of farm buildings to remove moisture in the winter and to cool in the summer. Feed handling offers many more opportunities and involves power applications.

Examples of Science in Farm Mechanics

Applications of power make extensive use of applied physics to show the nature of forces and energy in such a commonplace farming operation as plowing, where hitching of the plow can easily be used to demonstrate a proper balance of forces to keep the plow floating. The related weight shift and wheel slippage problems are closely allied to the cost of operations.

The calibration of sprayers, corn planters, grain drills, etc., offer challenging applications of mathematics if the manufacturers' recommendations for speed and gear setting are analyzed by following the gear train or plow flow. Actual problems can be used to determine the effects of each step on the rate of seeding, fertilizing, or spray application.

The soil and water needs for water supply, drainage, and irrigation can be used to teach many principles of science. Most of the engineering aspects are applied science and mathematics. Mapping and surveying offer challenging uses for mathematics.

The use of electricity for power to produce heat, light, and sound offers unlimited opportunities to use the science of physics. What should high school students know about the use of electricity for power, heat, light, and the evolving applications of sound other than for communications. Obviously the teacher needs to know more than his students to make effective use of physics and other science to teach applied electricity.

The construction and maintenance or shop phase which may seem isolated from science is very closely allied. The metallurgy involved in welding which involves heating and cooling and thus physical and chemical changes in materials offers tremendous challenge to the alert teacher to simplify the complexity of theoretical metallurgy. Even the lowly art of soldering involves the selection of the correct chemicals to evoke the proper chemical changes on metals to secure an adequate bond.

Looking Ahead

It is obvious that the instructors who teach the agricultural engineering aspects must teach much applied physics, chemistry, and mathematics to the prospective teacher of vocational agriculture, and must point out the opportunities to relate basic principles

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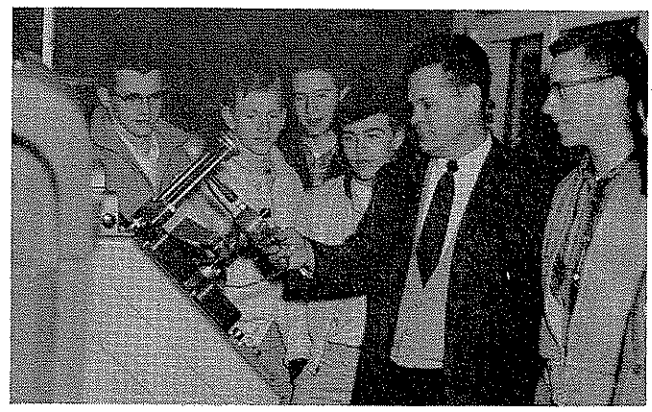
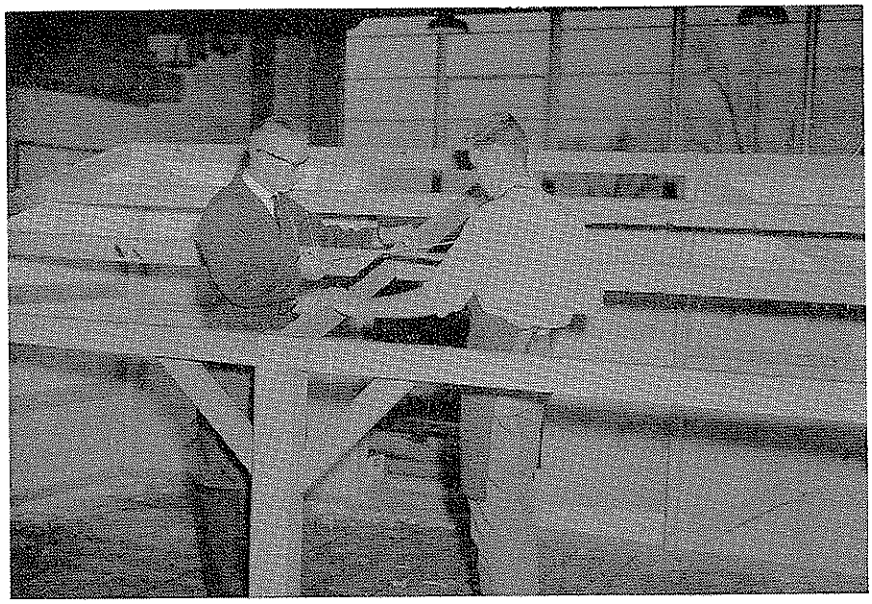


The basic principles taught this class will probably leave more lasting values than the adjustment of this particular machine.



Donald Schwarz, vocational agriculture instructor, at Platteville, Wisconsin High School, is showing a student how to check a building with the square and tape.

Teaching Farm Building Construction

HARRY D. HENDERSON, Agricultural Engineering and
CHARLES SALOUTOS, Teacher Education,
Wisconsin State College and Institute
of Technology, Platteville

We are living in a world of changes, and as a vocational agriculture instructor you have noted many changes in farm buildings in the past ten years. Chances are very good that the next decade will bring about even further developments.

Whenever you start to organize your unit on farm building you might well ask yourself a few questions. What are the needs of the students and the community? What shop facilities are available—tools, equipment, and space? How many periods or weeks will be devoted to building planning and construction? What resource personnel is available? What teaching aids can I use and where can I get more information?

Despite the great variation in the instructional unit in farm structures, it is recognized that certain basic skills should serve as prerequistes. Even those who teach classes of young farmers or adults have found that one must start with teaching the fundamental tool skills and require their mastery before the construction of larger projects or buildings. Maybe this is a good time to ask ourselves just how much preparation do we have in farm building? We teach best that material in which we have had the best background.

Here is a suggested topic outline for your farm structures unit:

(1) Economic and social relationships
(2) Building materials
(3) Functional requirements
(4) Structural requirements
(5) Construction methods

The "business of buildings" should be the number one consideration. The student must be given criteria which can be used to determine whether or not a proposed building can pay for itself. Industrial planners suggest goals of five years to pay for building expansion or remodeling; perhaps, ten years is a reasonable period for the farmer to calculate whether such an investment is equitable.

The study of types, costs, and physical characteristics of materials is of prime importance—particularly when it comes to their adaptation and subsequent selection. Today the farmer can choose from a wide variety of materials in order to procure the features such as fireproofness, convenience of application, or even beauty that he desires when he builds.

Functional requirements are the basis of all construction. A knowledge of space and arrangement, sanitation, environmental, and convenience needs are essential in order to obtain efficient building design. Modern building units must be planned with the operator in mind. We might call it the 3Cs of planning: Control of materials, Care of the livestock, Convenience of the operator.

The structural side of buildings is usually the job of a professional agricultural engineer or architect, but the farmer should recognize what constitutes good design. As an instructor you will need to devote some time to teaching the principles of triangular bracing, glued gussets, reinforced concrete, and other structural elements that will provide strength, durability and economy in the building program.

Construction practices will be discussed later.

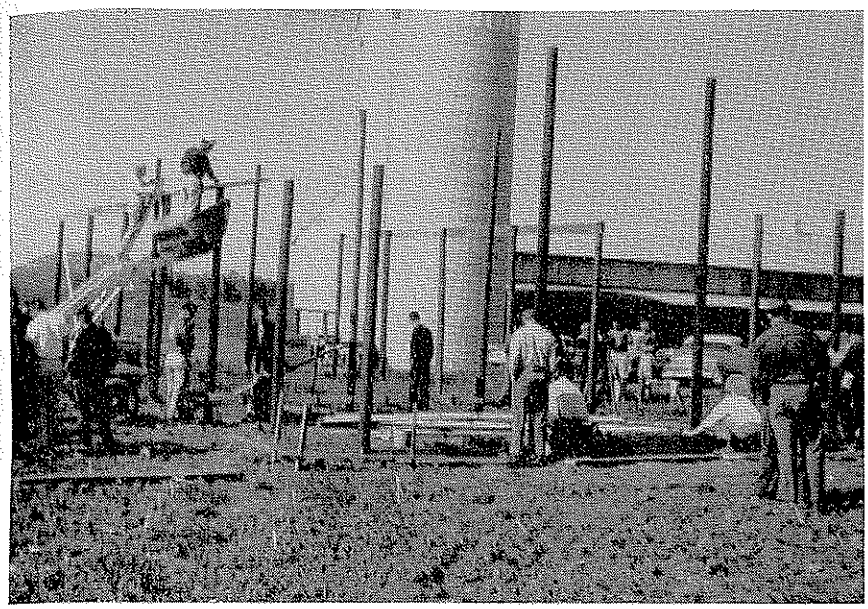
Starting with Small Buildings

Vocational agriculture instructors often utilize small buildings as a method of teaching applied carpentry. Most of the tool skills can be taught in structures of this type, but there are other possibilities, too: the building of jigs, forming laminated rafters, gluing gussets, using treated lumber. For the boys who have small projects in their farming programs these buildings will meet the needs, but what about the larger buildings?

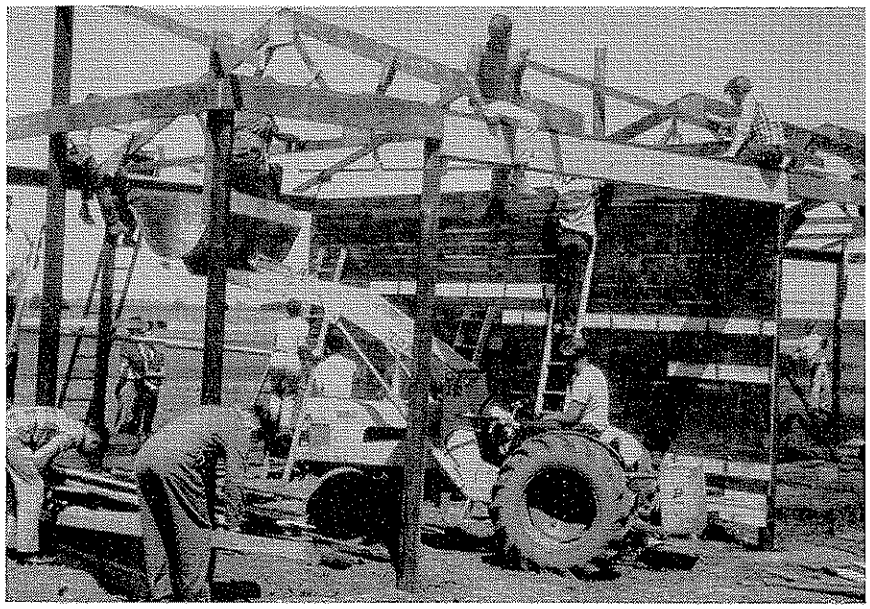
Planning obviously begins with plans—and there are many good sources of them available. Suppliers of plans are not basically in the management end of farming and this is where you can assist the high school students, young farmers, or adult farmers in making some basic decisions. If you are interested in securing plans, you should contact your Extension Service or the Agricultural Engineering Department of the nearest Agricultural College. Listed below are other headquarters where plans can be obtained:

I. Southern Association of Agricultural Engineering and Vocational Agriculture
Barrow Hall
University of Georgia
Athens, Georgia
II. Midwest Plan Service
Department of Agricultural Engineering
Iowa State University
Ames, Iowa
III. United States Department of Agriculture

The various trade associations are also excellent sources of plans and other building information.



Poles are aligned; nailing girts are being attached. (Note the utilization of manure scoop as a hoist.)



Trusses are erected; door headers are being put in place. (Note use of glued gusset plates on trusses.)

Type of Construction

The next question is how to build. There are almost as many methods as there are kinds of materials: conventional, pole, rigid frame, all-steel, laminated arch to name a few. Mr. Dan Burnham, Agricultural Building Engineer, says, "Today's buildings need specialized people for the major structures. A farmer's time is more important in his own work on the farm than to attempt to build a building without understanding the plans." Each of you should encourage the farmer to examine several possibilities to see how each would work for him before he makes his final decision.

The increasing cost of labor in relation to materials has revolutionized the entire construction industry. Single story construction, built close to the ground represents modern building efficiency; the two-story barn—emblematic of the picturesque farmstead of grandfather's day is the building of the past for the following reasons:

1. Costs too much to build
2. Costs too much to maintain
3. Not the most efficient use of labor.

We have found, that, by and large, it is cheaper and easier to move materials horizontally rather than vertically. Regardless of the type of building, it must be planned for efficiency and arranged so as to utilize time and laborsaving equipment in the interest of conserving energy and creating a favorable place to work at all times. *Flexibility* and *expansibility* are the prime goals in a farm building program.

Suggested Objectives

The committee on Agricultural Teacher Education, American Society of Agricultural Engineers propose the following objectives in Farm Building and conveniences.[1]

Develop understanding of basic principles, judgment and ability to:

1. Lay out a farmstead and plan an integrated farm improvement program, evaluate existing buildings, analyze the needs for new or remodeled construction, plan new buildings, develop a maintenance and improvement program recognizing basic requirements for farm dwellings.
2. Plan buildings for utilities and production equipment to meet the operating needs of the farmer: elevators, conveyors, water distribution and disposal systems, light and power, feed-storage, handling and processing devices.
3. Recognize and meet requirements of farm animals and poultry for environmental and sanitation control, such as temperature, ventilation, light and moisture.
4. Select suitable building materials for specific uses, including durability, functional performance, strength, ease of application, availability, economy and appearance. Recognize standard commercial units, grade, estimate quantities and determine construction costs.
5. Recognize good construction methods and standard building materials.
6. Recognize and be prepared to correct common occupational hazards to life and property: fire, accident, wind, lightning.

Other topics that we might need information on are:

1. Ventilation
2. Insulation
3. Light requirements
4. Drainage and grading
5. Automation
6. Sanitation
7. Cost

Location of Building Sites

Now that many of the objectives have been covered in your Farm Building unit, let's check the list on locating your site:

[1]Taken from the Journal of the American Society of Agricultural Engineers, Volume 41, No. 6, June 1960.

1. The building should open to the south or southeast in most areas, and be protected from prevailing winter winds.
2. Enclosed buildings should run north and south to obtain advantage of morning and afternoon sun for even heat distribution.
3. Make certain of your land level and provide for drainage.
4. Fire hazard—If building is 15 feet or higher, it is best to leave 75 feet between building to fight fire.
5. Allow adequate space for expansion—think of the future, too.
6. Make sure building is convenient to others. Accessibility to service area and fields or highway. Step saving chore routine.
7. Convenient access to electricity.
8. Convenient access to water.
9. Make new building conform to others.

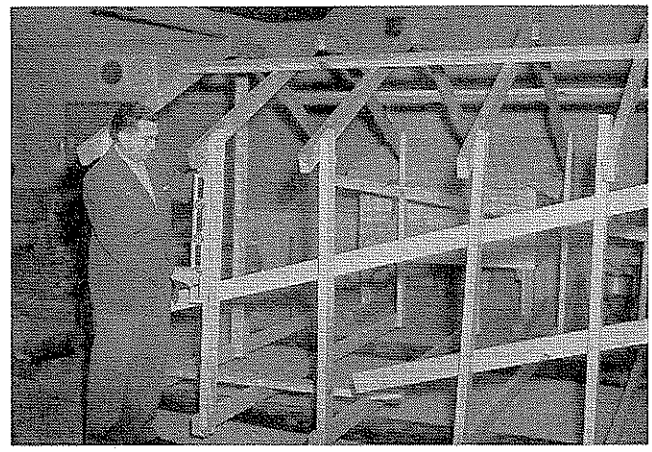
Definition of Building Terms

Before you get too far into your unit, you will want to make sure that terminology is defined correctly. The following terms are often used in Farm Building construction.

Can you define them? How could they be used in the class?

Flexibility			Expansibility	
Type of roofs:				
Shed	Gothic (arch)	Combination	Gable	Monitor
Hip	Gambrel	Half-Monitor	Flat	
Starting a building:				
Batter boards		Pole setting	Footing	
Foundation		Moisture proofing	Corner stakes	
Termite shield				
Framing:				
Mud Sill	Sill plate	Rafter	Joists	Plate
Bridging	Studs	Cap	Truss	Beams
Stringer	Ridge board	Header	Lintel	Nail girt
Finishing a building:				
Siding	Rake	Stop	Sheathing	Eave	Roofing
Casing	Jamb	Ridge rool		Flashing	
Materials, Fasteners, and Methods of Construction:				
Cement coated nail		Fire resistance	Ring shanked nail	
Acid resistance		Diagonal braces	Pressure treated wood	
Framing anchors		Joist hanger	Timber connectors	
Contact cement				

Whenever you need help, it was once said by a Greek philosoper, you should go to someone who has been in trouble before and he'll help you. The same applies to you. Your building supply or lumber dealer is a good man for you to know. He'll be able to give you many teaching aids such as blue prints, pictures, charts, materials, and posters. Many of the questions or problems that you will have he has had and worked out before. This is his business. He might even be in the process of building a farm building in your area so you could use this to a better advantage as a field trip. There is nothing like seeing for believing.



Kenneth Fox, vocational agriculture instructor, at Dodgeville, Wisconsin High School is shown checking farm building construction in his shop.

Building and Erecting the Frames

Nail-gluing is an efficient method for making structural joints or laminated rafters. Joints produced in this manner are exceptionally stiff and strong. Since the glue gives the structural component most of its rigidity and strength, the importance of using the correct glue, properly mixed and spread, cannot be overemphasized.

If you are teaching high school students or young and adult farmers how to build trusses or laminated rafters you first must have a place large enough to lay out your jig. The use of a jig speeds up the assembly and insures that all the trusses or laminated rafters will be identical in shape. If the truss is too large for your shop, build a half-frame truss, which consists of a stud, a rafter, and the eave gussets, and put them together when you are ready to put up your building. They should set for at least 24 hours before you move them for storage.

One instructor recently used the methods shown to teach proper building assembly. The trusses were built in the farm shop during Christmas vacation by an enterprising young farmer. In the spring, he got the telephone company to drill the holes for the poles. Then under the guidance of the agriculture teacher the young farmer class was organized into crews. The building, a machine shed, was erected in a day, and the fellows really enjoyed their community effort of "learning by doing."

A Look to the Future

When we look into the future we must keep the following points in mind in order to keep the flexibility and versatility in buildings that we need.

1. Reduce cost of production—good buildings and equipment substitute for labor. Proper balance of labor and equipment in relation to the job is important in minimizing unit costs of production.
2. Balance use of resurces. One of management's chief jobs is combining buildings, equipment, labor, feed, and other resources into a balanced program with neither excess waste nor stress.
3. A well-planned building, either new or remodeled constructed in accordance with suggested practices from Agricultural Engineers, and in which good workmanship and durable materials have been incorporated, will result in a sound building investment, will give years of service with a minimum of upkeep, and will be a source of pride to the owner. □

D. D. White, Ft. Stockton High School, vocational agriculture teacher for the past 13 years was honored by the Texas Sheep and Goat Raisers Association for his work with that industry in December.

My Students Demonstrate Their Shop Skills

J. L. YATES, Teacher of Vocational Agriculture, Town Creek, Alabama

Teaching shop skills is one of the most important jobs facing vocational agriculture instructors in this day of mechanized farming. Boys entering farming as a career must know how to repair and maintain numerous machines and equipment in order to keep the farm operating efficiently. The ability to handle tools will save the farmer lots of time and money if he can construct buildings, storage sheds, or a home for his family.

In teaching shop skills many instructors fail to stress quality workmanship to their students. Some do not teach students the complete mastery of their tools. The student must attain much more than just a working knowledge of the tools and their use if quality shop work is to be achieved. The poorest public relations any vo-ag instructor can have is to let poorly constructed or improperly repaired shop jobs leave his shop. It is his duty to see that each student knows how to use the different shop tools correctly and then insist that he do quality work on his shop jobs.

In teaching shop skills I start students studying the basic fundamentals of tool identification, figuring bills of lumber, squaring lumber, etc. Each student gets a chance to practice his skill in each of these jobs before the class and instructor before he goes to work in the shop. A demonstration of the use of each tool is first given by the instructor and then each boy performs this skill until he has mastered it.

A Planned Teaching Procedure

When teaching how to square a piece of lumber the use of the square is first taught as to the parts, how to hold it, how to place it on the board, etc. The instructor then demonstrates it to the class and then each class member takes his turn before the class in performing this skill. The instructor may use numerous devices in testing their skill, such as placing the square incorrectly on the board and other testing devices.

After each boy has performed this skill in class, the class is then divided into groups and assigned to the different areas in the shop and given a job to perform. For example, in the plumbing area he will be required to thread a pipe, cut a pipe, bend it, and make all the connections. This is a good time to test him to see if he knows all the pipe fittings and the names of the tools used in this area.

The groups are rotated to the different areas in the shop until each boy has had a chance to work in each area and master the tools in the area. Only after the boy has mastered these tools is he ready to start work on a shop project of his own.

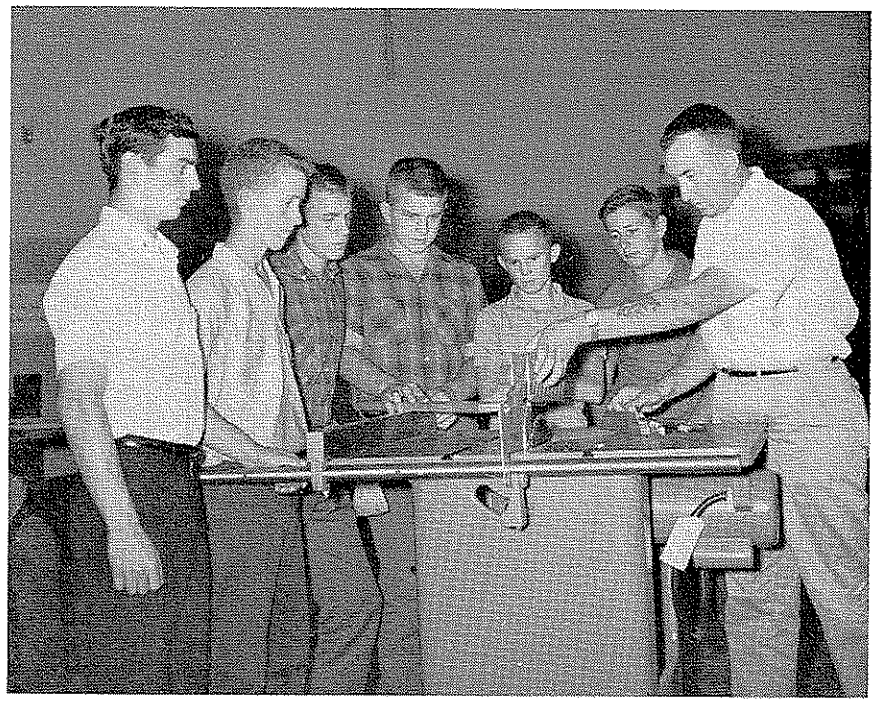
Evaluating Workmanship

When a boy has decided on what job he is going to work on, a standard is set up for him to go by in constructing his project. The instructor should stress good workmanship and let the student know that if his job does not meet the standard agreed upon between the student and the instructor that he cannot take it out of the shop. Sometimes this means a boy may have to take his whole project apart and do it again. Once a boy has had to do this he will be impressed of the importance of doing a job right the first time. Grades will help the instructor a lot in impressing upon the student that quality should be the most important factor in grading the projects. Of course more difficult jobs that challenge the student would receive more consideration than simple jobs.

I believe that if a boy is taught the importance of handling tools correctly, good workmanship, and pride in his skills that it will help him to do a better job in any task assigned him. □

The Department of Agricultural Education at the University of Kentucky report that they will move into a new one and a-quarter million dollar college of education building next fall. The building will provide new quarters for the department of education along with agricultural education, trade and industrial education, distributive education and home economics education.

J. L. Yates, teacher of vocational agriculture, Town Creek, Alabama, demonstrates the use of a power saw to one of his classes.

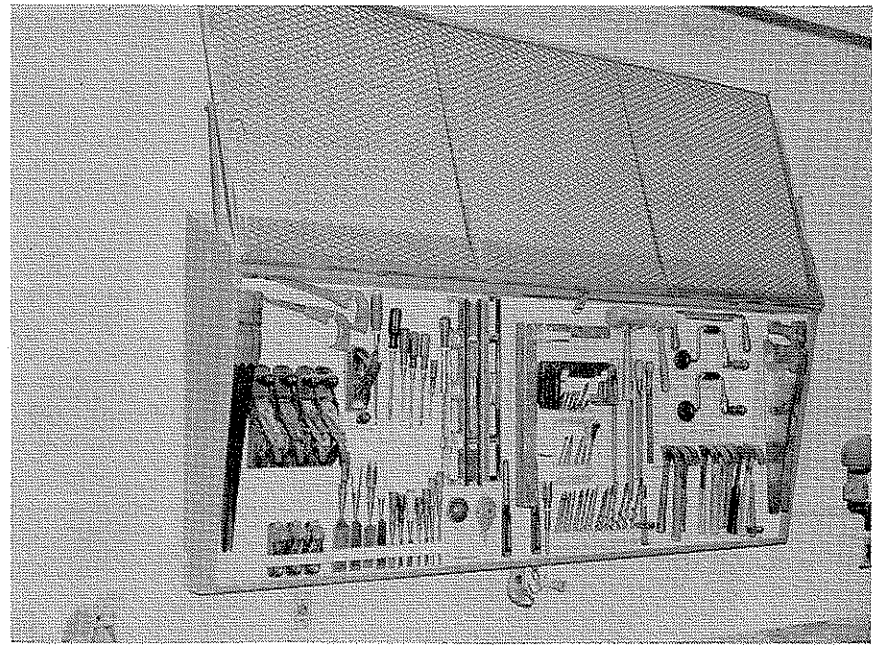


Making Tool Storage Attractive and Functional

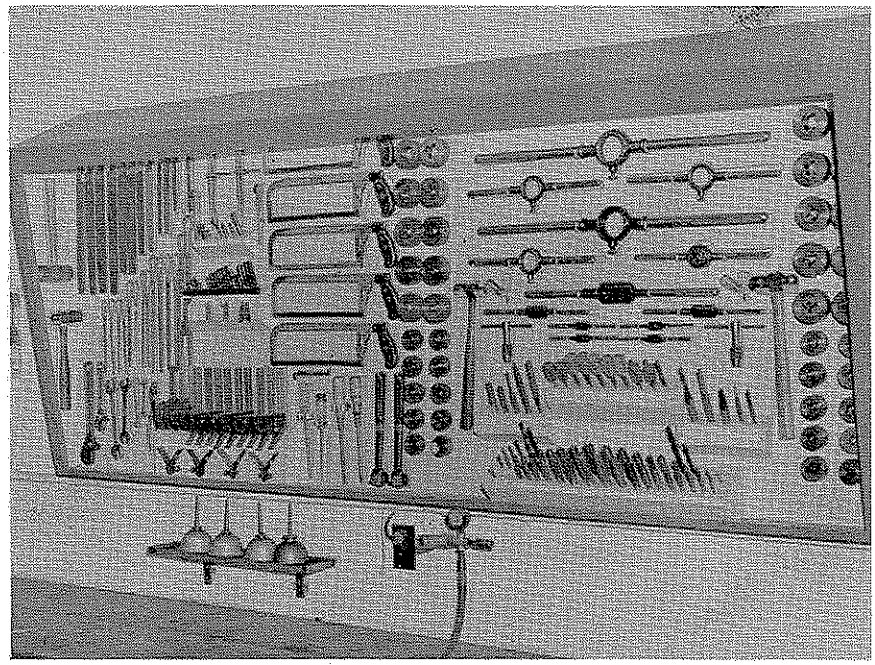
C. O. JACOBS, Farm Mechanics, Kansas State University

The mechanics of locating a tool at the start and having it returned to the place of storage at the end of a class period can be extremely frustrating to both student and teacher, without functional tool storage facilities. In fact, management of the agricultural mechanics shop is very often centered about having the proper tools for the job stored in a manner readily accessible to the student and returned to the place of storage at the close of the work period. The tool panels pictured are believed to be a very workable solution for tool storage in school shops organized on the area basis, and present the following features:

1. Economical construction using commonly available material.
2. Convenient for teacher or supervisor to check for missing tools at the end of the class period, thus helping to promote good housekeeping practices.
3. Makes an attractive display panel for tools.
4. A quick glance tells student or worker where to find tools needed.
5. Fluorescent light fixture in the top of panel assists to supply illumination for bench work and to highlight tools on their hangers.
6. Sloping top project keeps dust from settling on panel and materials from collecting on top.
7. Three-quarters inch, four by eight foot AD plywood sheet provides an adequate base upon which to anchor tool holding fixtures such as ell hooks, wood screws, or metal and wood hangers.



An expanded aluminum screen provides a means of locking up this tool panel.



The completed tool panel is convenient and attractive.

A measure of security can be provided by constructing a screen to cover the exposed portion of the panel. The above pictured panel shows a screen consisting of three-quarter inch by one and one-half inch expanded aluminum secured to a three-sixteenth inch by one and one-quarter inch aluminum angle frame. Note that the screen swings up and out of the way when open.

The screen side supports are attached to a "torsion bar" of one-half inch hot rolled steel running full length of the panel adjacent to the fluorescent light. This bar acts as a hinge and holds the screen square when being raised or lowered.

Plans for prints of construction details can be obtained by addressing your request for Farm Service Center Leaflet No. 11, to the Agricultural Engineering Dept., Kansas State University, Manhattan, Kansas 66504. □

Unit Operations for Teaching Farm Machinery

R. PAUL MARVIN, Teacher Education, University of Minnesota

The preface of most machinery texts contains statements similar to Davidson's in his *Agricultural Machinery.*[1]

> "The kinds and types of agricultural machines are so numerous that it is impractical to include a discussion of all in a book of the size to which a textbook must be limited."

Teachers of Vocational Agriculture have had the same difficulty in selecting the machines to be included in their course of study. The problem is amplified when one considers that there are many manufacturers of the same machine and that each "make" is different in many respects.

The writer's experience in observing and analyzing a number of courses of study in Farm Mechanics prepared by teachers of agriculture, and discussions in graduate classes for teachers has led to the conclusion that farm machinery generally is taught inadequately.

A study by the Minnesota Vocational Agriculture Instructors' Association supports such a conclusion. The summary of responses from 694 individuals throughout Minnesota rated farm machinery as the most important phase of mechanized agriculture but suggested also that the instruction now being offered is below an acceptable standard.[2]

Other studies point out the need for improved methods in teaching farm machinery. Jacobs[3] reported that 412 teachers in Kansas rated as "high" the need for improved instruction in machine operation, calibration and power transmission.

Hamilton[4] of Michigan states that there is a natural lag in time between machinery development and the consequent changes in curriculum. Recent advancements have been so rapid and so radical that our present teaching programs are lagging far behind the actual problems faced by farmers.

TABLE I

THE UNIT OPERATIONS FOR VARIOUS TYPES OF AGRICULTURAL FIELD MACHINERY

Minnesota Agricultural Field Machinery	Unit Operations									
	METERING	MIXING	PACKING	PREPARING	POSITIONING	ROTATION	SHEARING	SIZE REDUCTION	SORTING	CONVEYING
Moldboard Plow						X	X	X		X
Harrow						X	X	X		X
Spring Tooth							X	X		X
Rotary Hoe							X	X		X
Row Crop Cultivator							X	X		X
Row Crop Planter	X		X	X	X					X
Row Crop Duster	X				X					X
Sprayer (Crop)	X				X					X
Stalk Cutter							X	X		X
Scoop							X	X		X
Blade		X					X	X		X
Post Hole Digger		X					X	X		X
Mower							X			X
Disc Plow							X	X		X
Fork Lift										X
High Speed Saw							X			X
Grain Drill	X		X	X	X					X
Fertilizer Distributor	X		X	X	X					X
Baler			X				X			X
Side Delivery Rake						X				X
Spike Tooth Drag							X	X		X
Combine				X			X	X		X
Corn Picker							X	X		X
Manure Spreader								X		X
Forage Harvester							X			X
Potato Digger				X					X	X
Potato Planter	X		X	X	X					X
Sugar Beet Harvester			X						X	X
Transplanter	X		X	X	X					X
Hammer Mill	X	X						X		X

Early farm machinery developments often were crude and haphazard, with the cut-and-try system predominating. Present-day farm machinery design, however, is more scientific and the development of a machine is based increasingly upon fundamental prin-

[1]Davidson, J. Brownless, *Agricultural Machinery* (New York: John Wiley & Sons, 1931) p. 11.

[2]Minnesota Vocational Agriculture Instructors' Association, *Report by Research Committee*, p. 31, 1958.

[3]Jacobs, C. C., "Evaluation of Job Activities" *The Agricultural Education Magazine*, Vol. 26, No. 8 (February 1959), p. 177.

[4]Hamilton, James R., "The Preparation of Michigan Teachers of Vo-Ag in Two Areas of Farm Management" (Unpublished Doctorate Thesis) Michigan State University, East Lansing, Michigan, 1955, p. 37 & 265.

TABLE II
CONVEYORS USED IN VARIOUS FARM MACHINES

Farm Machines	Conveyor Type										
	Gravity	Belt	Screw	Flight	Drag	Chain	Slat	Bucket	Pneumatic	Pump	Oscillating
Hammer Mill	X								X		
Forage harvester	X		X			X			X		
Potato planter	X										
Potato digger	X	X				X					
Elevator		X	X	X	X	X		X	X		
Row crop planter	X										
Post hole digger			X								
Fertilizer distributor	X		X						X	X	
Baler			X								
Manure spreader				X		X	X				
Sprayer										X	
Grain drill	X										
Combine	X	X	X			X		X	X		X
Row crop duster	X								X		
Corn picker	X		X			X			X		X

ciples and information obtained by research.[5]

The first experimental designs of new machines are primarily functional and generally deal with machine elements rather than complete machines, the chief objective being to test and develop (or discard) certain ideas or principles of operation.[6]

A study of the principles of operation would seem to be a sound psychological approach to learning the operation, maintenance, repair, and adjustment of farm machinery. Machine design may change in the method of incorporating the principle, but the principle will remain the same and appear repeatedly in different machines.

The unit operations method of organizing the subject matter for teaching farm machinery is based on two assumptions. They are: (1) although the number of individual processes is great, each may be broken down into a series of steps called operations, which in turn appear in machine after machine and, (2) the individual operations have common characteristics and are based on identical scientific principles.

The Development of Units of Operation

In the study of unit operations it must always be remembered that a unit operation is simply one unit of many in the operation of a complex machine. The first step in classifying the units is to identify each individual operation that a farm machine performs. In developing the unit operations, a variety of machine operations are analyzed in an attempt to identify those operations which occurred in machine after machine.

When machine operations are categorized, the results indicate that ten different unit operation will probably include all of the operations found in Agricultural Machinery.

Ten unit operations which might be selected are shown in Table I. Table I illustrates the number of different machines that may have the same unit operation. The underlying principle and the basic function of the unit operation is the same regardless of the type of machine in which it occurs. As an example, the mixing operation is found in plowing, feed grinding, weed spraying and fertilizer spreading machines. In the plow subsoil, top soil and crop residues are mixed. The feed grinder mixes feed grains, forage meals, protein supplements and other ingredients of a specified ration, while the weed sprayers and fertilizer spreaders mix both liquids and dry compounds.

After units are established which are assumed to be adequate, each unit operation may be considered as a teaching unit. Farm machinery courses are best taught when they employ a laboratory where principles of operation are applied in combinations to perform the functions of tilling, seeding, harvesting, storing and processing the crop. Teaching for understanding of the operation, adjustment and maintenance of a machine should not be considered complete until all units are covered. Table II indicates the applications of a teaching unit on conveyors.

The unit operations method of teaching farm machinery possesses certain characteristics which distinguish it from the conventional method. It appears to have a number of advantages worthy of examination, some of which can be listed as follows:

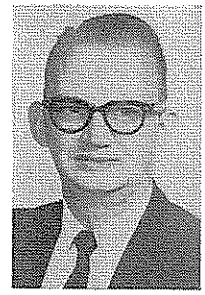
1. The unit operations method provides an approach to studying principles which apply to the operation and maintenance of component machine assemblies without regard to differences by manufacturers of makes and models.
2. The method focuses attention on important considerations by eliminating the distracting influences of external appearances.
3. New machinery will be introduced, some present machines will become obsolete, but there can be little change in the basic unit operation which the machine performs.
4. Effective teaching of farm machinery will be possible and probable because the various unit operations are identical regardless of the particular machine involved. Thus, if theory and application occur together the principle will be recognized in any machine whether it be for field preparation, tillage or harvesting.
5. The operational unit concept provides for stimulation of ideas for combinations of component parts and for modification of

[5]Bainer, Roy; Kepher, R. A.; and Berger, R. L., *Principles of Farm Machinery*, (New York: John Wiley & Sons, Inc., 1952) p. 11.
[6]*Ibid.*, p. 13.

existing machines to perform specialized functions.

6. Considering operations as individual units should enhance the students' ability to plan a materials handling system for an entire farmstead. There is no one system that will fit all farms, but a successful plan will require a wise selection and combination of conveying units. Knowledge of the limitations and advantages of the various units will help to assure a functional and economic plan for mechanizing the flow of materials in a planned direction throughout the farmstead. □

Hay Racks or Hat Racks?



V. E. CHRISTENSEN, Teacher Education, Cornell University

Remember the saying "don't look now, but your slip is showing"? *Forget it.* Today, we had better take a look, a long hard look, because many of our agricultural shop "hat rack" slips are showing. Take a look at some of the projects coming out of some vocational agriculture shops; six-place gun racks being built by boys with one old single-shot 22 rifle, eight shelf-wall "whatnots" by boys whose mothers are never going to hang them when they do get finished (the shelves, not the boys), and three-tone laminated nut bowls by boys who would be better off if they learned how to adjust the water level in a dairy barn stanchion cup.

These in contrast to the shops "turning out" boys who have *learned* how to pour a concrete feeding floor, to do a thorough overhaul of a piece of farm equipment complete with needed adjustment and possibly a repainting, boys who after learning the fundamentals of electricity can go home and check, repair and, if necessary, do such replacement as knowledge and safety will permit. In these same shops you will find more boys working on silage boxes than show boxes, more spraying barrels being welded than birdhouses being sanded and, thank goodness, more *hay racks than hat racks.*

What should be the criteria for farm shop projects selection or rejection? Is the first obligation instruction or construction? We have criteria for about everything we do in our teaching, but what are the specific guides for farm shop project evaluation?

We have to make the assumption that there is a valid reason for projects in the first place, and second, that there is possibly some workable balance between instruction and construction.

This writer suggests that we look again at the word P R O J E C T for within it are seven guiding words that may serve as project criteria.

Plan—Does the student have a plan? There may not be a ready-made plan for everything that can or could logically be made in farm shop, but that doesn't mean one cannot be drawn and checked before the "poundin' " begins. Too often where an acceptable plan is available the student is encouraged to follow it to the letter, rather than permitting and encouraging creative design alterations.

Readiness—Is the student ready for a project of this size, both physically and mentally? Is he ready for something far more challenging than just another feed scoop? Do you fit the boy to the project and the project to the boy?

Objectivity—Just as you ask yourself the question concerning the boy's readiness, so must the question be raised, "am I ready to supervise a project of this nature?" What are my teaching objectives when a class of eighteen sophomore boys is started on making eight-compartment nail boxes? There is a great deal of difference between shop activity based on "busy work," "boys needs," and "better-built-than-bought" objectives.

Justification—Ask the question, does this type of project belong in an agricultural mechanics shop? Can this sort of thing be justified as part of a vocational agriculture program? What new learning will develop from this experience for the student?

Education—Is there educational value in this activity? Has the balance swung too far toward construction instead of instruction? What is to be derived from the construction that could not be taught more efficiently by other instructional methods?

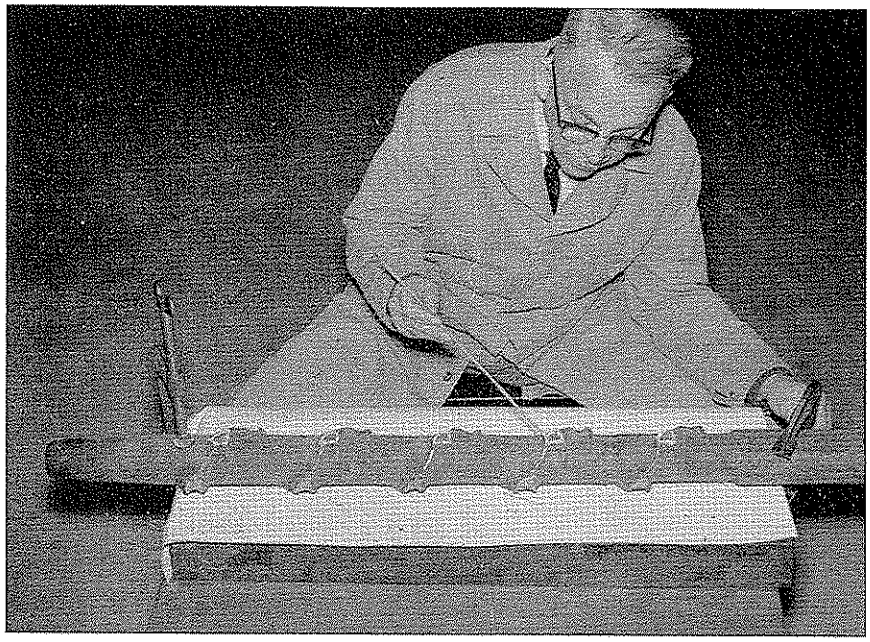
Cost—Does the cost justify the learning outcome? Would it be cheaper to buy a commercially-made item?

Time—Granted, we must expect good workmanship and develop pride in accomplishment, but is too much time spent sanding native timber feed bunks, painting stone sleds, etc.? Can we justify the twelve weeks a boy spends in converting an old car chassis into a four-wheel running gear while others are learning to solder, weld, adjust carburetors, etc.

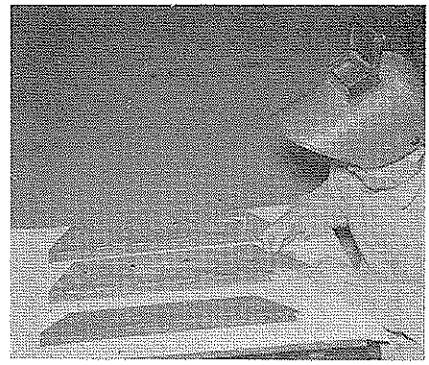
For the most effective teaching-learning to take place in agricultural mechanics classes, the word P R O J E C T might well be used as a reminder of criteria available for evaluating project potential.

P—Plans available and used
R—Readiness in learner and instructor
O—Objective clear and logical
J—Justification to student and program
E—Educational value predominant
C—Cost considered
T—Time efficiently used □

A farm radio broadcasting contest was one of the features of the Texas state F.F.A. leadership conference which was held at Huntsville in December.



C. F. J. Miller of Oshkosh with a snapping roll in various stages of repair and hard facing. NOTE: The snapping roll is clamped to the 12" channel with a "C" clamp. A pass of hard facing material has been deposited around the outside edge of the "lobe" on top as shown by chalk outline. The lobes on the bottom, near the paper have been ground so they are all the same height. Also note that this roll was broken between the fourth and fifth lobe and has been partially repaired by welding with Ni-rod.



A. Bernard Madigan, Vocational Agriculture Instructor at Rosendale, Wisconsin is shown with a series of three Allis Chalmers Bullet Blade Shares in various stages of repair. The share in front has been trimmed with the cutting torch. The edge is ready to be welded to the properly ground share. The share in the center has the edge welded to it, using the skip welding technique. The edge has also been notched and Madigan is holding the point. The share in the back has the point welded on. Never weld at right angles to the share as shown by the heavy chalk mark next to the rear portion of the point.

Teach Them Hard-Surface Welding

ARLYN W. HOLLANDER, Teacher of Vocational Agriculture, Markesan, Wisconsin

Are you as a teacher of Vocational Agriculture keeping up with the times? Are you teaching the necessary additional skills to students that are needed to make maximum use of the dollars invested in welding equipment on the farm? Not only should teachers be attempting to maintain technical competence, but they should be willing to grasp and put into teaching use the skills which will make the greatest contribution in repairing, maintaining, and increasing the life of original farm machinery and equipment.

Which Skills Should Be Taught

Certainly it is important to teach the proper hitching of plows to tractors and the proper adjustment of colters, along with adjusting jointers and scrapers on older plows—but, isn't it just as important to have plowshares and plowshare parts some where near the new size? Too many plowshares are worn off far too much to be doing an efficient and an effective job of plowing. I would suggest that you make a check of the various types of shares and see how they compare in width with new shares. For example: Three bolt shares for Oliver, Ford, Case, and John Deere plows are 4⅛" wide. Most of the new four bolt shares are 3¾" wide. The International Plow Chief shares are 4½" wide. The old style regular plowshare is 6½" wide. Perhaps you too have measured the width of an "old style" regular share and found it to be only 4 to 4½" wide. We should be teaching how to weld new points and edges on these shares, as well as repairing raydex shares, Allis Chalmers Bullet Blade shares, I. H. C. Plow Chief spearhead points and shares, and the late model Minneapolis-Moline raydex share. We have welded points and edges on Allis Chalmers Bullet Blade shares which were worn down to a width of 3¼". New Bullet Blades are 4⅜" wide. I. H. C. Plow Chief spearhead points have been replaced which have been worn back 1½". The shares on this same unit were worn to 3¼".

We can increase the life of new plowshares, raydex shares, and other shares three to five times by the proper application of hard-facing material by either oxyacetylene or arc welding process. Various hard-facing alloys can be used, depending on whether you need to solve the problem of abrasion, impact, or both.

Hard-Surfacing Helps

The life of tractor tire chains can also be extended three to five times each time they are hard-faced with a suitable alloy. The oxyacetylene unit is the answer in this case. Tungsten carbide is the most satisfactory material to hard-face with. Iron base alloys also give dependable service.

The hard-facing of snapping rolls on corn pickers is another skill which can be taught. This job is best done with the arc welder. The type of wear which we have in this case is abrasion. Eight years ago a member of an adult farmer class in farm machinery repair brought in a set of snapping rolls to hard-face. They had picked 225 acres in three seasons and were well worn down. They were hard-

faced with Ranite "F." Checking these same rolls on a recent visit shows that they had picked over 600 acres in eight years and appear to be able to pick several more seasons—thus giving at least four times the normal wear.

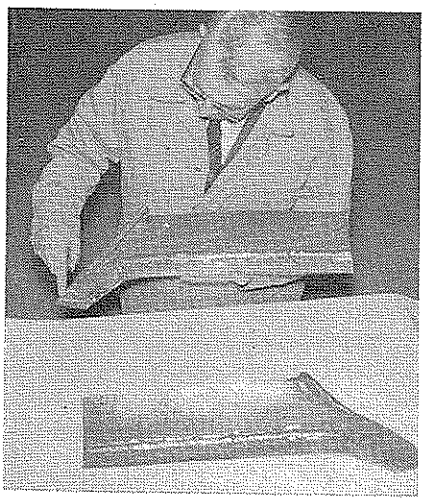
The repairing of corn planter runners is a skill which can be taught in farm machinery repair units. Young and adult farmers as well as juniors and seniors can learn this skill. On this job excess stock on the runner has to be ground out, as cutting with the torch will warp the runner. In the past I. H. C. has used a wide runner produced from a type of cast iron. It is necessary to weld repair units on this type of runner with a nickel electrode.

An inventory stock of hard-facing electrodes for arc and hard-facing rods for oxyacetylene is needed. In addition, repair units for the various types of plowshares as well as various types of corn planter runners are needed.

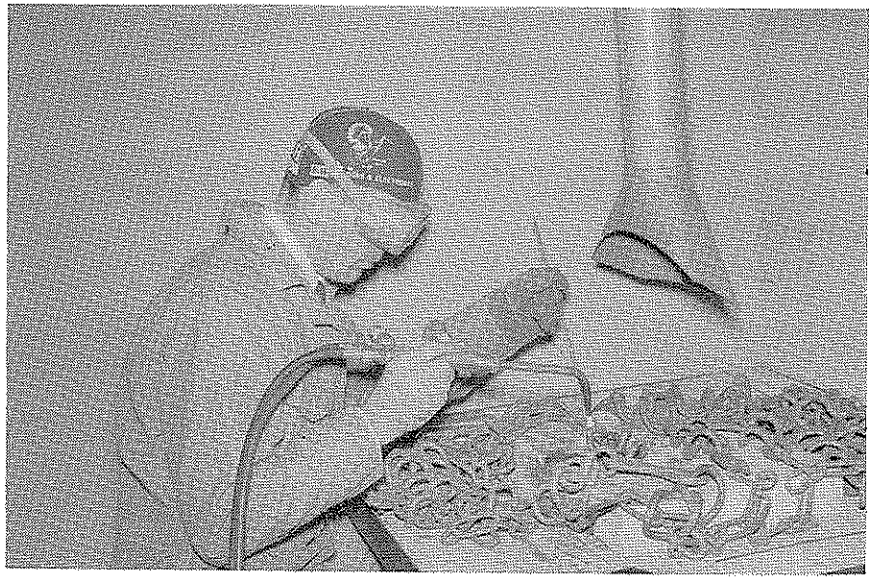
One of the companies in the business of producing plowshares repair units and corn planter runner repair units is the Wiese Plow Welding Co., Inc. of Perry, Iowa. Welding supply shops serve as jobbers and handle repair units. We buy repair units for the same price as a welding repair shop does.

How Can Technical Competence Be Maintained?

During the past two years five special one day work shops for Vo-Ag teachers have been held at Markesan to improve technical competence in plowshare repair, corn planter runner repair, hard-facing, and to develop techniques in the construction of shop projects by welding.



B. F. J. Miller, Vocational Agriculture Instructor at Oshkosh, Wisconsin is shown with two "old style" shares. Beads have been ground flush with a portable grinder. Miller is pointing to the hard-facing on the bottom of the point. The reclaimed width of these two shares is 5½". The cost for new points and edges is about $1.50 per share.



D. The author, Arlyn W. Hollander of Markesan demonstrating the proper procedure in hard-facing tractor tire chains. The cross chains are supported by extra bricks. This job is best done by having 2 or 3 cross chains on the extra bricks and the rest of the chain in front of the person doing the welding. As cross chains are completed they are moved to the back of the table. In this way work on the chain can proceed without worrying about hot links in front of you.

Each instructor at the work shop could bring two types of repair jobs from the following list: (1) Spearhead points and shares for I. H. C.; (2) Allis Chalmers Bullet Blade shares; (3) Either three bolt or four bolt raydex shares: (4) Regular plowshares to be repaired with points and edges; (5) The hardfacing of new and used plowshares of the various types; (6) Miscellaneous hard-facing jobs as snapping rolls from corn pickers, tractor tire chains, and cultivator sweeps or shovels; and (7) The repair of corn planter runners. The proper techniques in repairing and hardfacing each of the above items was demonstrated. Instructors then proceeded to repair or hardface the items which he had brought to the work shop with supervision from the author.

At some of the work shops teachers polished up on their techniques with the oxyacetylene unit by doing fusion welding of the various kinds of joints on practice strips of ⅛" steel. Other instructors have built steel saw horses, after watching a demonstration with proper techniques and procedures. Steel shop stools of various heights for use in their Agriculture shop have also been built.

Each instructor was charged a basic fee of three dollars for the work shop. In addition, each participating instructor paid for what he actually used in the repair and hardfacing of items brought to the work shop. All costs, including steel for special projects, was on our school cost basis. Six to eight instructors makes an ideal group for a work shop of this type.

The instructor must be well grounded in the basic fundamentals and techniques of welding before he tackles the more difficult jobs. (NOTE: See article in Jan. 1962 issue of the Ag. Ed. Mag., "Upgrading Welding Instruction in the Farm Shop.") Perhaps it would be best if the teacher would concentrate on two or three items at one time rather than attempting to do too many jobs at one time. It is much better to do and teach a limited number of skills with a high degree of proficiency than to do a larger number of jobs unsatisfactorily.

Some teachers are beset with small enrollments whereby they have to teach an extra class to satisfy the school administration. Why not teach a class in welding and farm machinery repair? This could be done either on a semester basis or a yearly basis. There isn't any reason why a student with at least average mechanical ability and aptitude could not weld with a degree of proficiency needed to do the repair jobs and hardfacing jobs listed in this article.

Your units or classes in farm machinery repair and welding in the high school group as well as Young Farmer Classes and Adult Farmer Classes will be much more effective and productive in terms of outcomes when a shop program of this type is in operation. □

Maryland Farmers Suggest Farm Mechanics Curriculum

DAVID M. TUGEND, Agricultural Extension Agent, Ellicott City, Maryland

In a recent survey, the Farm Equipment Institute found that the American farmers' investment in farm machinery and equipment was more than eighteen billion dollars. This represents ten billion dollars more than the investment in the steel industry and five times the investment in the automotive industry.

With increased farm mechanization and increased cost of capital farm investment, the American farmer will not likely return to the days of the horse and binder. Farm operators need to select, operate and maintain farm equipment, and the vocational agriculture teacher seems to be in the best position to provide the needed training to care for this equipment.

Evidence indicates that many teachers of vocational agriculture feel farm mechanics is important as they are devoting from 40 to 60 per cent of their teaching time in the area of farm mechanics.[1] There is reason to suggest that the determination of the farm mechanics course of study deserves much planning and careful thought.

Research on Farm Mechanics Teaching

Methods used for determining a farm mechanics course of study have been measured in much research. A majority of the studies indicate that farm mechanics courses of study were based upon the opinions of farmers, vocational agriculture teachers and supervisors, farm mechanical experts and others. Research findings also indicate that vocational agriculture teacher opinions appear to offer little basis for planning a course of study. Anthony,[2] found there was a significant agreement between what teachers think should be in their programs of farm mechanics and what they include in their program of instruction.

Surveys of farmer opinion have shown what instruction farmers need in various areas of farm mechanics, but to base the course of study upon the responses of nonselected farmers would seem to have limited value. It should be the goal of vocational agriculture teachers to teach skills and abilties which will enable their students to become successful. Little research evidence was found which indicates that the farm mechanical programs in high schools are based upon the skills performed by successful farm operators.

A normative-survey was designed to determine if farm mechanical skills performed by successful farm operators were being taught by vocational agriculture teachers. With the use of predetermined criteria, county Cooperative Extension Agents identified successful farm operators residing within their counties. Eighty successful farm operators, randomly selected from eight Maryland counties, were interviewed. Farm operators were asked to: (1) indicate which of 100 farm mechanical skills were used in their farming operations between April 1, 1959 and April 1, 1963, (2) identify persons performing the skills used, and (3) indicate the level of knowledge they possessed for skills applicable on their farms.

Forty Maryland vocational agriculture teachers were sent questionnaires asking each to: (1) indicate which of 100 farm mechanical skills were taught to in-school students between June 1, 1961 and June 1, 1963, and (2) explain why certain skills were not taught during this instructional period.

Farmers Needed More Training

Over two-thirds of the successful farm operators not performing farm mechanical skills used on their farms indicated they were not trained to perform the skills. Another finding was that the most frequent reason why certain skills were not taught by Maryland vocational teachers was a lack of equipment.

The difference between the number of certain farm mechanical skills performed by successful farm operators and the number of the same skills taught by vocational agriculture teachers was significant in 56 of the 100 skills (5 per cent). However, the significant difference between skills performed by the farm operators and taught by teachers was due to the increasing proportion of vocational agriculture teachers teaching the skills.

It was interesting to find that the following skills were performed by a greater proportion of farm operators than taught by teachers: (a) adjust tractor brakes, (b) repair tires on farm machinery, (c) repair field mower knives, (d) calibrate field sprayers, (e) repair building foundations, (f) lay out foundation lines, (g) repair metal roofing, (h) install insulating materials, (i) replace and putty window panes, (j) hang farm gates, (k) splice woven wire fence, (l) measure and cut plastic pipe, and (m) adjust the combine for proper running speed by use of a tachometer.

Deciding What to Teach in Farm Mechanics

The above procedure for determining a farm mechanics course of study is rather complicated and requires more time than teachers of vocational agriculture can afford to concentrate on one aspect of their total teaching program. However, vocational agriculture teachers need to evaluate their programs and it is recommended that teachers survey their communities to determine the skills performed by the most successful farm operators.

One of the best qualities of a vocational agriculture teacher is the ability to ask good questions. Farm visits should be used for the purpose of exploring community needs and evaluating current vocational agriculture programs.

As a member of the Cooperative Extension Service, I realize the tremendous educational potential within the high school farmshop facility. Few

[1] "Agricultural Engineering Phases of Teacher Education," *Agricultural Engineering*, XLI (June, 1958), 382.

[2] Frank Anthony, "An Evaluation of the Current Objectives of the Farm Mechanics Phase of Vocational Agriculture in Selected Pennsylvania High Schools" (unpublished Doctor's dissertation, Pennsylvania State University, University Park, 1956).

agriculture educational institutions have this advantage. Due to the need for technical information which will help farm operators protect their high investment in farm equipment and the cost of maintaining a high school farmshop, it should be the goal of vocational agriculture teachers to teach those skills which will help in-school students as well as adults become successful farm operators. □

Science and . . .

(Continued from page 199)

of science. The good instructor will not leave to chance the possibility that his student will see the application of the isolated knowledge of chemistry, physics and mathematics.

Many teachers of vocational agriculture are concerned with jobs other than farming which are basic to agriculture. There are many such opportunities which instructors in the agricultural engineering aspects recognize and can relate to the prospective teacher. Many jobs will require a technician level of education at the thirteenth and fourteenth grade level. Departments of agricultural engineering should have staff members willing to help in developing such programs even though they may not do any of the instruction.

If the preservice teacher education phase of vocational agriculture is to stay abreast of space age developments it is imperative that the undergraduate curriculum be re-evaluated. New objectives must be implemented to provide for the emerging concepts of agricultural education with emphasis on science in the farm mechanics curriculum. □

From Former Issues

In the December, 1952 issue, Raymond C. Firestone wrote, "It has been my own good fortune to observe the activities and appraise the results of those who work in the field of agricultural education and it has been a valuable experience. It is from this viewpoint that I feel best qualified to best evaluate agricultural education and its results. I am convinced that these boys who you are guiding not only academically, but also morally and spiritually, constitute one of the greatest influences we have left for the preservation of the kind of an America that has been built for us and passed into our custody for safe keeping, and where can you find better custodians than the boys in your classrooms?"

Some Good Bets for Better Communications

JAMES E. HAMILTON, Past President N.V.A.T.A., Audubon, Iowa

It has been said that if communications were perfect between countries and between the leaders and the people, there would be no more wars.

With good communications by all Vo-Ag departments there would be several more Vo-Ag departments open today. The failure of vocational agriculture departments to keep the public, the school board, and the faculty informed of the aims, purposes, activities, and achievements of the chapter has caused some to be closed.

A good teacher should always have good communications with his students, parents, school officials, and the community. With the type of programs every Vo-Ag teacher should have, the public will accept it if they know about it.

Every teacher should keep his community informed by regular newspaper articles prepared by himself or the chapter officers and reporter. One of the most important areas of communications is with the school board and school administration. It is the administration's job to know what each teacher is doing. Help them by submitting reports, lesson plans, and similar materials on time. To keep good public relations and keep communications open, invite the superintendent and principal to visit a class, field trip, contest, or to speak on an FFA program to the chapter on scholarship or citizenship. Every department that fails to use a local soil conservation service technician, Production Credit Assistant Manager, banker, or other local agricultural specialist is missing a good bet for favorable publicity and a good contact with the community. Using local specialists can help you be sure that you are teaching up-to-date material and can help the specialist know more of the quality of your program.

The state and national legislators should be invited to your tours of farming programs and to special programs. As speakers, these legislators will study and learn much more about the Vo-Ag program as they prepare to speak.

Probably one of the most effective methods of communications is to take an active part in church, Chamber of Commerce, clubs, and organizations where you can learn to know local people better. Another effective way to tell the story of Vo-Ag is to have a program of work team use colorful pictures, slides, or films and explain the FFA program to urban and rural groups on a volunteer basis.

Use the printed material prepared for distribution by the NVATA to show the size, scope, and need of our training program, and use material from the *Agricultural Education Magazine* on communications.

Improved communications for Vocational Agriculture can be achieved through a planned program directed toward those with whom we work and the public. The acceptance of our program depends upon how well the public and the co-workers understand it. To be effective a good communications program must: (a) be planned, (b) be continuous, (c) be clear, (d) be accurate, (e) involve people, (f) be well-timed, (g) be based on a good program, and (h) be interesting. □

Special Editors

Since the special editors are largely responsible for securing contributions from the states which they represent, the content of the magazine is greatly influenced by their activities. Each of these editors works with a group of state editorial representatives, and it is apparent that this latter group have become more effective during the past year.

Instead of asking all special editors to secure "key articles" relating to current themes, special assignments have been made to individual editors. This has resulted in many excellent contributions. □

An Appraisal of 25 Purposes of Vocational Agriculture[1]

JOHN K. COSTER, NORBERT J. NELSON, and FRANK J. WOERDEHOFF
Teacher Education, Purdue University

This article presents a list of 25 purposes of vocational agriculture, shows the qualitative scores for importance of the purposes as assigned by three groups of educators, and concludes with a brief analysis of the information in terms of relevance for program planning for vocational agriculture.

The Preparation and Appraisal of the Purposes

The 25 purposes were based on an analysis of social, economic, and technical trends related to vocational education, summarized as a "Contemporary Design for Vocational Education," (7, pp. 62-64); official publications of the United States Office of Education (3, 4, 5); publications of state departments of public instruction (cf. 6); and standard references in the field (cf. 2).

The purposes were scored for importance in relation to current trends by three groups of educators, including specialists in agricultural education, school administration, and curriculum construction. The purposes were scored on a 9 point scale, with a score of "1" indicating little or no importance, and a score of "9" indicating very great importance. There were 30 specialists in each group.[2] The list of purposes, the average scores for the entire group of 90 specialists, and the average scores for the three separate groups are shown in Table I.

The group averages shown in Table I have been adjusted by adding a constant so that the average of the 25 purposes for each group is equal to the overall average of 6.85. Differences between the averages of the 25

TABLE I
AVERAGE SCORES ASSIGNED TO PURPOSES OF VOCATIONAL AGRICULTURE

Rank	Purpose	Groups of specialists: Total	Ag. Ed.	Admin.	Curr.
1.	To assist students to develop the ability to organize and apply technical agricultural knowledge and information to the solution of farm problems	1# 7.83	1# 8.18	1# 7.90	4.5# 7.42
*3a.	To assist persons to analyze critically the economic requirements essential for establishing and maintaining efficient farming units	3 7.42	3 7.98	4 7.40	13.5 6.89
3b.	To assist students to develop the abilities to organize land, labor, and capital resources into efficient production units	3 7.42	4 7.88	10 7.13	7.5 7.25
3c.	To assist students to develop the abilities to understand marketing processes and to market products and services profitably	3 7.42	5 7.78	7 7.26	9 7.22
5.	To assist persons established in farming to adjust to changing occupational conditions in farming	5 7.37	6.5 7.62	11 7.06	4.5 7.42
6.	To assist students to develop an appreciation for and an understanding of technological developments in agriculture	6 7.32	13 6.82	3 7.50	1 7.65
*7.	To assist students to develop an understanding of scientific knowledge, concepts, and methods related to agriculture	7 7.31	14 6.62	2 7.86	2.5 7.45
8.	To assist students to develop the abilities essential to maintaining healthful and safe conditions on the farm and in the home	8 7.22	9 7.28	7 7.26	11 7.12
9.	To assist students to develop traits such as cooperation, industry, and initiative, essential for successful occupational adjustment and human relations	9 7.17	11 7.15	12 6.90	2.5 7.45
10.	To assist students to develop the abilities essential for assuming leadership and citizenship roles	10 7.13	10 7.22	5 7.30	13.5 6.89
11.	To assist students to develop the abilities to procure and utilize efficiently equipment, supplies and services	11 7.07	7.5 7.42	13 6.83	12 6.95
*12.	To assist students to develop the abilities to maintain, operate, and adjust farm power, machinery, and equipment	12 6.99	7.5 7.42	9 7.23	20 6.32
*13.	To assist out-of-school youth and adults enter into and/or become more effectively established in farming	13 6.79	2 8.12	18 6.46	25 5.79
14.	To assist persons to explore the redirection of agricultural patterns, practices, and concepts	14 6.78	16.5 6.45	17 6.60	6 7.29
15.	To assist students to develop an appreciation for the place of agriculture in the emerging pattern of American society	15 6.77	18 6.32	15 6.73	7.5 7.25
*16.	To assist students to develop mechanical skills—such as carpentry, welding, and cold metalwork—involved in farm improvement and maintenance	16 6.71	13 6.78	7 7.26	22 6.09
17.	To assist persons to understand and interpret the role of agriculture in society	17 6.56	21 6.15	16 6.70	15 6.82
18.	To assist students to develop nonmechanical skills—such as pruning fruit trees, identifying weed seeds, and culling hens—involved in farm production and improvement	18 6.54	16.5 6.45	14 6.80	19 6.39
19.	To assist high school students to formulate realistic occupational goals	19 6.53	15 6.58	22 6.26	17 6.75

[1]The data reported in this article were collected as part of a project entitled "Vocational Education in Public Schools as Related to Social, Economic, and Technical Trends," which was financed, in part, with a contract with the Cooperative Research Division of the Office of Education.

[2]For a more detailed discussion of the selection of the specialists and the scoring procedures, see I, pp. 51-78.

TABLE I (CONTINUED)

*20.	To assist students to develop an appreciation of the economic contributions of agriculture to society	20 6.49	24 5.95	19.5 6.36	10 7.15
21.	To assist students to explore the possibilities of employment in agricultural occupations	21 6.42	19 6.28	21 6.30	18 6.69
22.	To assist academically talented students to prepare for education beyond the high school level	22 6.30	22 6.08	24 6.03	16 6.79
23.	To assist high school students to obtain employment in appropriate agricultural occupations	23 6.18	20 6.22	19.5 6.36	23 5.95
24.	To assist out-of-school youth and adults enter into and/or become more effectively established in farm-related occupations	24 6.16	23 5.98	23 6.20	21 6.29
*25.	To assist persons to develop interests and abilities of an avocational nature—e.g. aesthetic appreciations and leisure time activities, such as landscaping, gardening, and establishing lawns—related to agriculture	25 5.30	25 4.52	25 5.53	24 5.85

#The rank for each group is shown above the score.

* Denotes purposes where the difference between the highest and lowest group average was 1.00 or greater.

purposes for the three groups are to be expected. Indeed, it would have been surprising if the agricultural educators had not scored the purposes higher, on the average, than the other two groups. It is of greater interest to examine the averages of each purpose, with the effect of the difference of the overall averages removed. The original averages were:

	Total	*Ag. Ed.*	*Admin.*	*Curri.*
Original averages	6.85	7.30	6.52	6.73
Constants (e.g., 6.85-7.30)	.00	—.45	+.33	+.12
Adjusted averages	6.85	6.85	6.85	6.85

Once the differences among the group averages have been removed, the average scores for each purpose may be examined for indications of disagreement among the three educator groups. Taken as a whole, there are indications of substantial agreement among the three groups. Indications of disagreement are noted where the difference between the highest purpose average and the lowest purpose average is 1.00 or greater. Seven of the 25 purposes demonstrated variations of this magnitude, and these purposes have been identified in Table I by an asterisk (*). Examination of the seven purposes so marked shows that the curriculum specialists tended to assign relatively lower scores to the purposes that deal with mechanical abilities (ranks 12 and 16) and with establishment in farming (ranks 3a and 13) than did the other two groups, and that the agricultural educators assigned lower scores to the purposes that might be included in programs of general education in agriculture (ranks 7, 20, 25).

Classification of Purposes

One way of summarizing the data presented herein is to classify the purposes into three categories, then examine the averages of each category as a clue to program development and emphasis. The 25 purposes may be divided into three categories: (1) purposes related to occupational proficiency, (2) purposes related to occupational adjustment, and (3) purposes related to occupational appreciation. Within the occupational proficiency category, the purposes may be sub-classified into (a) purposes of a scientific-managerial nature, (b) purposes related to skills, and (c) purposes related to personal development. The ranks and scores of the purposes in each category and sub-category are shown in Table II.

The following conclusions may be drawn from the data in Table II:

1. The key used in scoring the purposes was:

   a. 1—No importance.
   b. 3—Limited importance.
   c. 5—Moderate importance.
   d. 7—Considerable importance.
   e. 9—Very great importance.

Hence, no purpose was scored less than "moderate" importance, and most purposes approached or exceeded "considerable" importance. None of the purposes, therefore, may be excluded from consideration in planning future programs of vocational agriculture, on the basis of scoring, although the purpose dealing with avocational pursuits, rank 25, probably should not be given extensive consideration.

2. The directional emphasis, based on the average ranks and scores shown at the bottom of Table II, indicates that major consideration should be given to the purposes classified as "occupational proficiency," and that, within this category, preference should be given to the scientific-managerial and personal development purposes. The high scores assigned to the scientific-managerial purposes probably reflects the increasing importance of managerial behavior in American society.

3. The generalized trends pertaining to the extension and expansion of educational programs, especially at the adult level, are reflected, partially at least, in the scores assigned to purposed ranked 5 and 13 in the occupational adjustment category. The purpose dealing with helping established workers in agriculture adjust to changing conditions (rank 5) was scored high by all three groups, but the administrators and curriculum specialists score the purpose dealing

TABLE II
CLASSIFICATION OF PURPOSES OF VOCATIONAL AGRICULTURE

Occupational proficiency									
Scientific-managerial		*Skills*		*Personal development*		*Occupational adjustment*		*Occupational appreciation*	
Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
1	7.83	12	6.99	8	7.22	5	7.37	15	6.77
3a	7.42	16	6.71	9	7.17	13	6.79	17	6.56
3b	7.42	18	6.54	10	7.13	14	6.78	20	6.49
3c	7.42					19	6.53	25	5.30
6	7.32					21	6.42		
7	7.31					22	6.30		
11	7.07					23	6.18		
						24	6.16		
4.9	7.40	15.3	6.75	9.0	7.17	17.6	6.57	19.3	6.28
	For 13 purposes.....8.2 7.28								

with becoming established in farming (rank 13) relatively low, as compared with the specialists in agricultural education, who scored it relatively high. □

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5. _____, *Public Vocational Education Programs.* Pamphlet No. 117; Department of Health, Education, and Welfare; Washington: Government Printing Office, 1957.
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7. Woerdehoff, F. J., N. J. Nelson, and J. K. Coster, *Vocational Education in Public Schools as Related to Social, Economic, and Technical Trends: Part I. The Analysis of Trends and Concepts.* Studies in Education, No. 1: Lafayette, Ind.: The Division of Education, Purdue University, 1960.

Letters . . .

(Continued from page 196)

trying to be "specialists" in many areas of instructions.

Can we invent a way, educationally, to solve our problem? I believe we can. Specialized education in agriculture can best be given our students by allowing flexibility within groups of school systems in an area larger than the local school district. Transferring students between several schools in an area, making available several instructors, each with varied "special skills and abilities," is both feasible and desirable. Modern transportation makes this possible both at the high school and post high school levels.

The authors state; "Vocational education is a process of development of individuals." Vocational education in agriculture must also be a process of growth and development of programs and individual educators at all levels in education. Each of us can help by placing emphasis where we see fit within the limitations of our situations and abilities until expanded programs can be developed.

LLOYD A. MORNINGSTAR
Hillsdale, Michigan

News and Views of the Profession

Magazine Reports a Year of Progress

The Editing Managing Board of The Agricultural Education Magazine held their annual meeting in Atlantic City on December 12 with chairman Cola D. Watson of Vermont presiding. Believing that our readers are interested in progress of the magazine excerpts from some of the reports and actions of the board are given below.

Content and Format

The Agricultural Education Magazine should be considered as a supplement to teacher education and supervision as a means of assisting teachers. This purpose should greatly influence its content and format. More than 90% of its readers are teachers of vocational agriculture and if the magazine is to assist in their professional growth it must create initial interest, enough to compete with other periodicals. It must deal with important problems and issues of the profession in a positive and progressive manner. It must acquaint its readers with programs and personalities across the nation. It must be written at a challenging intellectual level and at the same time be brief and concise. Finally, it must include areas ranging from editorials to "Stories in Pictures" so as to appeal to differing interests of our readers.

In comparing Volume 35 with Volume 34, it will be noted that four new classifications have been added including "Program Planning," "Occupational Experience," "Young Farmer Education," and "Teacher Education" while some of the older categories have been dropped. It should be noted that a desirable balance existed among articles dealing with each of these aspects of the program. This information is shown in Table I.

New features of Volume 35 include four presentations of "Both Sides of the Issue," two "Special Reports," regular inclusion of "Letters" and "From Former Issues." A larger proportion of articles are related to the theme of the various issues in Volume 35. An adequate supply of good quality copy has been available for most issues.

Themes for Future Issues

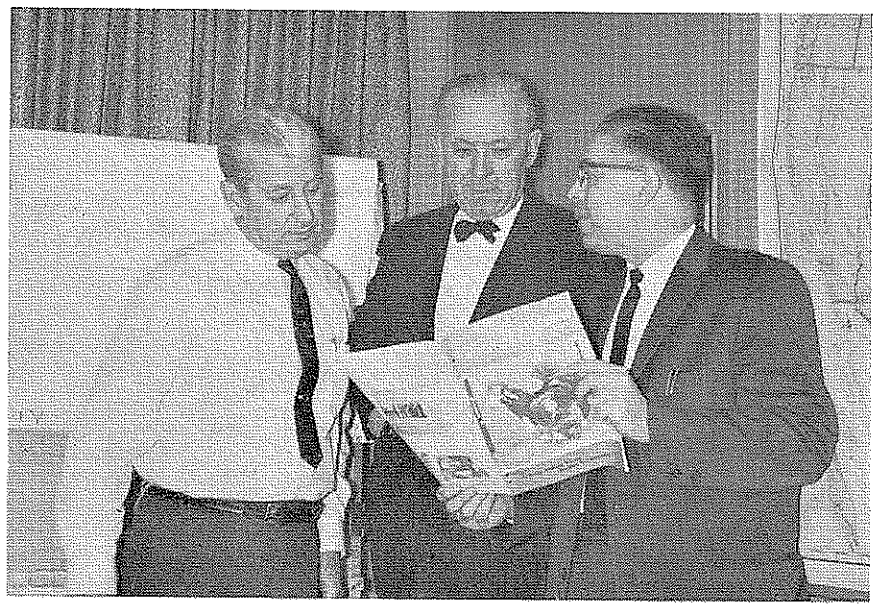
Themes for the coming year are planned as follows:

January 1964—"Today's Teaching Methods"

February 1964—"Better Communication"

March 1964—"Teaching Farm Mechanics"

April 1964—"Guidance for Agricultural Occupations"



Karl Roesler and Russell Guin of the Interstate Printing and Publishing Company confer with the editor on a forthcoming issue of the Agricultural Education Magazine.

May 1964—"Today's Classrooms and Shops"

June 1964—"Evaluating Our Efforts"

July 1964—"Coordinating Vo-Ag and Vocational Education"

August 1964—"Developing and Utilizing Professional Leadership"

September 1964—"Teaching High School Classes"

October 1964—"New Horizon for the F.F.A."

November 1964—"Aiding Young Farmers"

December 1964—"Public Understanding of Vocational Agriculture"

Evaluation

This year an evaluation of Volume 35 of The Magazine was conducted by the School of Journalism at The Ohio State University.

After making use of as many of these suggestions as possible, a second evaluation is planned upon the completion of Volume 36.

Additional Changes

Plans have been made to make several changes in content during the coming year. More but shorter reports of research are to be systematically secured by one of our special editors. An improvement in reporting of "Professional News & Views" will also be attempted. Improved art work will be secured for each of the regular sections. An additional number of teacher articles are needed and an attempt will be made to secure their contributions to the magazine.

An encouraging development seems to be that of state staffs using the magazine as a means of communication by sending complimentary copies to related offices in the state.

Change in Name

A proposal to change the name of the magazine from "The Agricultural Education Magazine" to "The Journal of Agricultural Education" was made in December of 1962. Action was deferred for one year in order to obtain additional information. The April 1963 issue presented reasons for and against this change and readers were asked to indicate their preference. A letter was also written to all state supervisors asking them to secure the opinions of teachers in their states during annual conferences. Replies were received from 24 states of which 15 favored the name of The Agricultural Education Magazine. Twenty individuals responded and of these, 12 favored continuing the present name.

The editing managing board decided not to change the name at their last meeting in December.

The report of Business Manager, T. L. Faulkner, shows the magazine to be in a healthy financial condition. Total income from subscriptions for the year was $26,718.26, while total expenditures were $20,893.22. While the number of subscriptions changes from month to month the highest number of issues mailed was 9,800 in September. The December count showed a total of 7,884 subscribers of which 456 were student subscribers.

Looking Ahead

Without doubt the next decade will bring far reaching changes to the profession and it is fitting that our professional magazine not only report these changes but also that it give leadership to change. This calls for long range planning for the magazine on the part of the Editing Managing Board. Editor □

Small Engines . . .

(Continued from page 197)

become the basis for and structure the discussion.

The Operator's Manual

There is no substitute for having the appropriate manual for a particular engine when adjusting or repairing an engine. The good teacher will attempt to determine the manual needs well in advance of the time the engines are brought into the shop and will help his students obtain them. He will stress the importance of keeping and studying the operator's manual.

By following these steps of *Study—Demonstrate—Practice* and *Discuss* the basic understandings and skills concerning small gasoline engine maintenance and repair may be learned, and the student is well on his way in transferring the information learned to the larger, more complex power units commonly found on the farm. □

The Pennsylvania Young Farmers Association has just printed a handbook for local young farmers association in their state. □

N.V.A.T.A. News

James Wall
Executive Secretary

The House of Delegates at the 1963 AVA Convention voted to increase the AVA dues from $5.00 to $10.00. The proposal, which becomes effective July 1, 1964, was supported by the NVATA executive committee and by a large majority of the delegates representing state associations affiliated with NVATA.

The Amendment to AVA By-Laws includes a plan for recognizing achievement of a high percentage of potential membership by making rebates to the various services according to the following schedule:

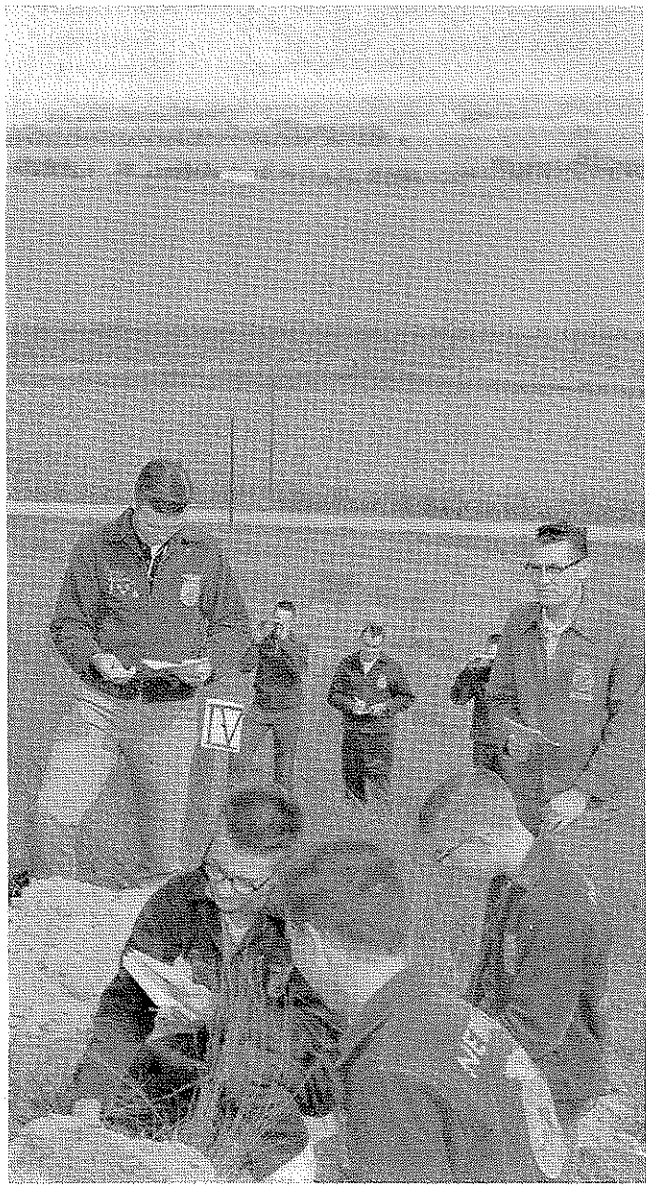
Percent of Potential	Percent rebate	Rebate per member
60	2.5	.25
65	5.0	.50
70	7.5	.75
75	10.0	1.00
80	12.5	1.25
85	17.5	1.75
90	22.5	2.25
95	27.5	2.75
100	30.0	3.00

Each division of the AVA may submit a plan to the AVA Board of Directors, for its approval, specifying the manner in which such rebates will be distributed. In other words, the Agricultural Division will submit a plan for distributing rebates received by the division.

The NVATA Executive Committee supported the proposed increase with the rebate feature and urged delegates to the convention to do likewise because the plan offered a possibility of some relief to those engaged in agricultural education who have always carried more than their share of the load in supporting AVA because of the high percentage of potential membership maintained in comparison with the other services. The proposal was also supported because of a recognized need of additional income for AVA if present services are to be maintained.

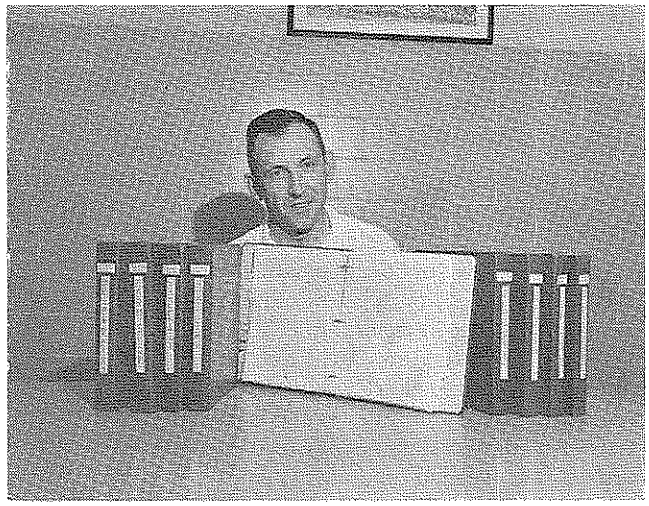
A plan for distributing the rebates which will be made to the Ag Division needs to be formulated. All members of AVA engaged in Vocational Agricultural Education, including *supervisors, teacher educators,* and *teachers of vocational agriculture,* should have a voice in formulating the plan. □

Stories in Pictures



Many Nebraska Vocational Agriculture Students receive experience in evaluating various soil types within the state as illustrated by this class which is making a field study of local soils.

Senior Students in vocational agriculture help teach Freshmen students metal working at Madill High School, Madill, Oklahoma. As a result of their effort, Seniors get special credit and gain confidence. Several members of the class have found that they have an interest in teaching as a career as a result of their experience in teaching farm mechanics.



A series of notebooks containing copies of shop plans is one of the most valuable references in his department according to John Sherrick, Teacher of Vocational Agriculture at Union High School, Mansfield, Ohio. Mr. Sherrick has collected these farm mechanics plans over a period of 10 years.

27 contestants turned out for the Washington State Junior Dairy Show showmanship contest in the Holstein Breed. They are shown lined up just before the contest began.