

# The Visitor

Devoted to the Interests of Agricultural Education in Minnesota Schools

Vol. LIX

October 1973

No. 4

## WHAT IS AGRICULTURAL MECHANICS?

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### BACKGROUND

What is Agricultural Mechanics? The answer depends upon who you ask. Ask your State Supervisor, your University Teacher Educator, your Vocational Agriculture Coordinator, or the Agricultural Engineer. Each person has his viewpoint or philosophy as to the boundaries which are used to define the technical subject matter and the manipulative skills which are included within the framework of agricultural mechanics.

Agricultural mechanics and other facets of the educational field are influenced by pressures. The pressure exerted by Sputnik practically eliminated the grease from under the fingernail. It was quite obvious to many educators that all of the world's problems would be solved by mathematics, physics, computers and seasoned with a liberal sprinkling of foreign language.

But in the seventies the trend is career education with the emphasis being placed on vocations. To some it would appear the vocational pendulum is swinging in the outer limit of its arc, however, when you consider the low percentage of the total youth attending the University I feel that vocational education has only started its swing.

With the present emphasis on career education and having students acquire a specific vocation, or if not, at least the abilities and skills which would satisfy a cluster of careers, the student is being provided an opportunity to have "hands on" experiences. This trend is good. However, in some situations so much emphasis is being placed on obtaining teachers with practical experience that formal education of the teacher has been neglected. The instructor walking into the classroom may have a wealth of experiences but his ability to develop a curriculum and organize a structured class is nil. There must be a blend between the two ends of this continuum - the man on the job that can do everything with his hands but is completely illiterate about the academic and the other end of the continuum where we have the theoretical educator who wants to expound on theory and if placed in a laboratory

situation would not recognize the items and components about which he has been theorizing. A blend between these two extremes is needed. Research can provide us with a listing of activities and abilities which must be achieved for clusters of occupations. Given these facts, the instructor needs to discipline himself, to offer and provide these experiences to the students. With this dedication and the philosophy of taking the student from where he is to where he should be will result in a desirable education.

## WHAT IS AGRICULTURAL MECHANICS

### BY THE TEACHER EDUCATOR

When we educate teachers a competent job must be achieved in the technical subject matter and the manipulative skill areas. Since competency is hard to define, let's say each teacher requires enough education to erase the fear of performing tasks or proceeding on a self-instructional basis. If he has this confidence he can learn as the instructional program dictates. After all, the earning of a degree in higher education is only a license to learn. The university level does not permit enough time to develop a high degree of manipulative skills with our students, therefore, a great variety of experiences must be taught. Some of these experiences can be taught by viewing films, slide sets, pictures or completing worksheets, but a great many of the experiences can only be learned with a "hands on" approach.

Traditionally, agricultural engineering has five areas of instruction: farm power and machinery, structures and environment, soil and water management, electrical power and processing, and agricultural construction and maintenance. These five areas were possibly conceived to satisfy the need for production agriculture and have done a commendable job. Are these five areas indicative of the educational needs today? The United States Office of Education and the Vocational Education Act of 1963 defined seven occupational areas in agriculture. These seven areas are: agricultural production, agricultural mechanics, agricultural supply, agricultural product, agricultural resources, ornamental horticulture and forestry.

Considering the wide diversity of possibilities let's take a peek at the possible

courses at the University level and the course contents. Many of these are designed to solve educational problems for the multitudes. During this interval of time the U.S. Office of Education and other educational agencies have been trying to define careers. Career education has a more specific objective and does require a different educational emphasis which is usually more restrictive in subject matter content but in greater depth. My basic contention is that four or five credit courses are not geared to our agricultural mechanics classes. Maybe the three-credit course is too broad and we should be thinking of one and two-credit modules. After adjusting the nervous system to a change from "what's always been done," let's stab another sacred cow—"what's the course content." To the future teacher who will be required to teach courses on small power units a full quarter course on farm tractor power has limited appeal. Courses could be divided into smaller components, for example, the electrical area could have three packages such as fundamentals, a wiring and controls and a motors and controls module. It boils down to two points of view either more and more subject matter in smaller credit packages or more general education leaving the specialization until later. The student sponsors the first viewpoint because he is faced with immediate need at the firing line. The University accepts the latter point of view because it prefers not to ruffle tradition, the professors teaching notes or the budget. It is easier to let "George" do it; after all vocations are vocational and let them go to the vocational school!! One answer to this problem is specific courses for vocational education majors such as those in agriculture and industrial education. The first cry would be to think of the expense, but as a rebuttal let's think of the doctor and the dentist. They are preparing for a vocation and their training is expensive. We hear, don't spare the expense, after all they will

## Vol. LIX THE VISITOR No. 4

Published quarterly during the calendar year in January, April, July and October by the

Department of Agricultural Education,  
University of Minnesota, St. Paul, Minn. 55101

Second class postage paid at St. Paul, Minn.

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be working with a molar or an appendix but we can cut back on the teacher education. They only work with the student's mental development and his possible vocation. Face reality, if **EDUCATION** is our business it will cost money. We can't afford cheap results.

To develop a better teacher education program in agricultural mechanics I would propose the following action program.

1. Identification of subject matter pertinent to the new clusters for agriculture and agribusiness.
2. Determine the manipulative skills most applicable to the cluster of careers.
3. Organize courses in smaller credit modules.
4. Teach courses specifically for the major but permit others to enroll to fill classes.
5. Invest in the laboratory equipment necessary for the instructional program.
6. Select instructors with both expertise and interest.
7. Provide independent study and special problems as alternatives.
8. Provide in-service training programs for smaller group with varying credit modules.

Regardless of the approach all instruction must be relevant as possible with both the theoretical and the applied with emphasis on **who we are teaching** as well as **what we are teaching**. The name of the game is working with people, training them for gainful employment and becoming an asset in the society - not a liability.

### AGRICULTURAL MECHANICS IN HIGH SCHOOL PROGRAMS

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Vocational training in Agricultural Mechanics has had its problems as a teaching discipline over the years. The demands placed on this training, realistic or otherwise, have made it difficult for teachers to develop satisfactory programs for teaching. The complexity of today's machinery and equipment makes it appear we face an insurmountable task in teaching mechanics to students. Yet we know there is much to gain if an individual has the know-how and skills taught in Agricultural Mechanics.

This brings us to the crux of the mechanics training problem. What can we expect to teach and what does the student expect of us, the teacher? We cannot satisfy everyone, yet we have the opportunity to provide needed training which will be useful in future work. The problem is to define these

needs and provide for them. There are different levels of competency in these needed skills.

One idea is to develop a knowledge of equipment as to how it performs. The training is not concerned with the design features of a device but relates to its functionality and the responsibility of the user to use it properly. It is designed to teach users how to keep the device operative and properly adjusted. The thesis of this type of training is that the owner has more to gain by proper usage and care than by spending time making costly repairs.

Admittedly, this idea covers only a portion of the needed skills. The daily need to make repairs on a farm is a problem as technical help is scarce and expensive. Many of these jobs are routine if one acquires certain skills in the use of hand tools and basic shop items plus an understanding of the problem. Training in these skills is beneficial to all who acquire it, both in urban and rural areas. Knowing these skills is a time and money saver and we should provide this training. The skills developed in this teaching program should enable the student to perform tasks consistent with the tools and equipment he would be expected to have available in the future. This criteria, I feel, places a limit on what the student can expect from an Agricultural Mechanics program at a secondary school level.

One of our problems is to train students to use and respect mechanical and electrical equipment. This includes recognition of maintenance needs, how to get repairs and to know when we have quality service. An example is the low voltage problem on farms. We can recognize dim lighting, a pale, narrow TV picture, sluggish motors and other symptoms of this problem. The solution is a better wiring installation. Yet, should we expect the owner to change the wiring? Far more important is an understanding of basic electricity and, in this case, wiring requirements so the owner can satisfy himself as to quality of the workmanship and materials provided to him by a contractor.

The level of competency to be developed in the student has always troubled us. It appears to me we have a solution to this problem. The two levels of instruction, high school and post-high, allows teachers and students to develop broader skills in the post-high programs. Students need advanced training at this level as many are now engaged in farming. Yet, I suggest their beginning training should be in understanding equipment and facilities, how to use them properly and to keep them in working order.

## AG MECHANICS INSTRUCTION

### AS VIEWED BY THE STATE DEPARTMENT

**Paul Day  
State Supervisor  
Agricultural Education  
State of Minnesota**

Agricultural Mechanics should be an integral part of the instructional program in agriculture, agribusiness and natural resources education.

The curriculum should be designed to develop basic competencies in the following areas: agricultural power, machinery and equipment, agricultural electrification, soil and water management, agriculture buildings and conveniences and basic shop skills.

It would be reasonable to assume that the educational program will begin with an introductory course in basic shop skills.

After the foundation course, additional courses should be developed which will assist in preparing the student for his or her desired occupational objective.

One would assume that it would be logical that alternatives be established for the designated areas of instruction that are relevant to the agricultural program in the area.

For example, machinery and equipment relating to the forest harvesting industry, or the horticulture industry will be utilized instead of the common production farming machinery.

In the secondary program students should experience an exploratory type of curriculum with exposure to all of the areas of agriculture mechanics. An understanding of the principles, plus hands-on experiences in the adjustment, maintenance and operation of the specific phase of the total program is a desired outcome.

The development of good work habits, safety practices and a proper attitude are important aspects of this phase of the educational program at the secondary level.

Instructors at the secondary level should not expect to produce fully qualified mechanics or repairmen. This specialized, in-depth training most logically belongs at the post secondary level.

It is my personal opinion that some aspects of the Ag Mechanics program need improvement and revision.

It would appear that undue emphasis and in many cases insufficient instruction has become commonplace in the following areas:

1. Welding. One questions the need for Arc Welding 1, 2, advanced, etc., especial-

ly if the industry in the community does not use "stick" welding. Often overlooked in welding are the principles of metallurgy, metal identification, etc.

2. Excessive project construction work. Can the principles of Agricultural Mechanics be readily applied to all students or is it a convenient way to escape lesson plan preparation?

3. A noticeable lack of emphasis on machinery. We recognize that many laboratories will not accommodate large machines, but why can't some work be done outside before the weather becomes inclement or in late spring, i.e., plow, combine, planter, baler, sprayer adjustment and calibration?

Minnesota Farm Management record analyses reports indicate 10-15% of the total investment in farming is represented by power and machinery, while 5-10% of the total cash operating expense is spent for repairs. Are our programs providing adequate instruction in the nomenclature, operational theory, maintenance and adjustment of these investments?

4. A glaring lack of organized instructors for adults (with the exception of welding) utilize the resources of implement dealers and others for instruction in maintenance, adjustment and operation of power units and machinery as well as building supply and power suppliers for building design, ventilation, insulation, etc.

5. The excessive use of repetitive, industrial arts type nonmotivating exercises and projects. Should junior and senior students be making tool sharpening gauges, practicing soldering or building scale model buildings?

A series of curriculum guidelines has been developed by committees of instructors.

There has been excellent utilization of the FFA Agricultural Mechanics contest as an instructional vehicle. Participation in the home improvement agriculture mechanic and agriculture electric proficiency awards has reflected the contemporary and relevant instructional program developed by instructors.

It is strongly recommended and encouraged that each instructor evaluate his or her program and initiate a curriculum which will insure the continued development of proficient graduates.

#### WHAT IS AGRICULTURAL MECHANICS?

**Bill Guelker**  
**Area VoAg Coordinator**  
**Staples A.V.T.I.**

As I see it, Agricultural Mechanics is an integral and increasingly important part of

the total Agricultural Program. In my opinion, the purpose of an Agricultural Mechanics Program is three-fold.

1). The original intent of the Agricultural Mechanics Program was to train students to understand, maintain and to a limited degree, repair the machines they use in production Agriculture. This is still a valid purpose for many students.

2). Exploration is an important part of Career Education. The Agricultural Mech. Prog. properly structured allows the student to sample many occupations. Almost all Agricultural Mechanics instructors have had the pleasure of helping students discover that there really is an area in which he can do as well or better than his classmates. In cases like this, Agricultural Mechanics not only helps reduce the drop-out rate, it gives many students a whole new lease on life.

3). The third and perhaps the most important purpose is training the student for a career in Agribusiness. In most schools Agricultural Mechanics is no longer a single course, it is broken into segments so that the students may choose the area or areas that interest them. In the area selected, they are given practical hands-on experience under conditions that simulate those they will encounter in industry. Hopefully, an Ag. Occupations Program will also be available so that the student may gain some actual Industry experience.

I do not mean to suggest that students in the high school Agricultural Mechanics Program will not need additional training beyond high school. Most of them will. What I am suggesting is that a good Agricultural Mechanics Program can help a student choose a career and give him some of the basic skills and competencies he will need and hopefully instill in him attitudes and work habits that will help insure success in his chosen occupation.

Last spring, I had the privilege of helping choose the Minnesota Star Agribusiness winner. All of the candidates were outstanding, but I was particularly thrilled as I interviewed a candidate in the Holm Brothers Implement shop in Atwater. This young man was confidently overhauling an expensive tractor on his own. He knew what he was doing. He knew how to use the tools of his trade, but most importantly, he had found a career that suited him. He was later named the Star Agribusiness winner of Minnesota. He is a product of the high school Agricultural Mechanics and Agricultural Occupations Programs. What more can you say?