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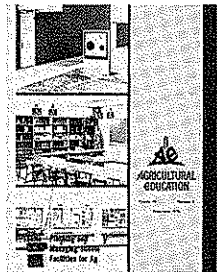
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The cover photographs show several features of modern and well-planned school facilities for agricultural education at the Larimer County Vo - Tech Center in Fort Collins, Colorado. The top photo shows an attractive sign identifying the vocational agriculture building. In the center, a well-lighted and neatly arranged classroom is shown. The bottom photo shows tools which have been properly stored in the various work areas. (All photographs from Joe Sabol and Irving Cross, Colorado State University.)

The top photo shows an attractive sign identifying the vocational agriculture building. In the center, a well-lighted and neatly arranged classroom is shown. The bottom photo shows tools which have been properly stored in the various work areas. (All photographs from Joe Sabol and Irving Cross, Colorado State University.)

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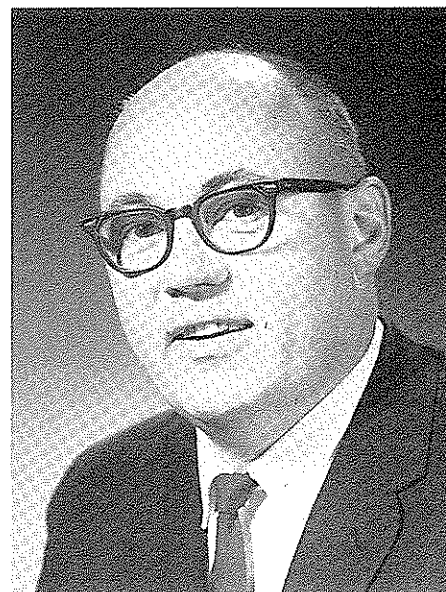
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Facility Planning for Vocational Agriculture

W. Forrest Bear, Professor
University of Minnesota



W. Forrest Bear

The need for assistance in planning a new vocational agriculture facility is a pleasant problem for the vocational agriculture teacher. It indicates that the school district will be constructing a new facility or rejuvenating the present building, and the instructor is becoming involved before the dedication ceremony.

As a teacher-educator, my initial response to a request to help plan a facility is, "What will you or should you be teaching in the facility?" A curriculum based on needs of the community and region should be the first prerequisite for planning the facility. The capabilities of the staff are of secondary importance. Staff members' responsibilities can be shifted within the vocational agriculture department (multi-teacher departments) and within the vocational educational department of the school.

One phrase that should not be permitted when planning is "We've never done it that way before." Maybe we have never done it because it has been impossible. To illustrate a point, let's consider the services and maintenance of the self-propelled combine. Instruction can take place in the field (land laboratory or farm site), at a dealership, outside the agricultural mechanics door or inside the building. The first two options are difficult with one-hour class periods, weather conditions, and the coordination of curriculum and crops. Outside, the agricultural mechanics door makes a dealer hesitant if his \$45,000 machine is left unattended at night, exposed to vandalism, and used as a jungle gym for neighborhood children. The choice has been reduced to one. If the old shop has a 12 x 8 foot door, you probably have never taught combine service and maintenance because you will need a 20-24' x 14-16' door to handle the implement. A future oriented view is a must for facility planning.

TOOLS

After reviewing the curriculum, ask for the present inventory of tools and equipment, those planned to be purchased immediately, and items on the long-range purchase schedule. In addition to the tool name, I want the following information about the tool: (a) type of electrical service, (b) exhaust and ventilation requirements, (c) water service, (d) gas service, (e) air service, (f) the area covered by the

base of the machine. Data of this nature are essential for an efficient and economic layout of the utilities for an agricultural facility. Tools requiring common utilities and those providing an instructional function for common courses can be grouped together. The floor space covered by each tool is needed to determine the area which will "evaporate" when tools, workbenches and storage facilities are located within the building. This space is significant and when the safety zone is included, the free floor space can become limited. Since two objects can't occupy the same space at the same time, it is essential that both have their space allocation.

STUDENTS AND SPACE

The amount of space needed in a facility is dependent upon the number of students enrolled and the type of instruction.

Classroom instruction can handle more students per class than agricultural mechanics classes. I believe the ideal agricultural mechanics class size is no more than 16, and the ideal classroom number should be no more than 24. Many educators accept 20 as the magic number which places a strain on the agricultural mechanics instruction, but is an easier classroom situation. The classroom with forty-five square feet per student in the largest class has been an accepted standard. The class of twenty would need 900 square feet of space. There is, however, a minimum amount of space needed regardless of class size. This figure should be 840 square feet and a room dimension of 28 x 30 is a workable module in many buildings. The conditions which help make this a workable classroom are that an additional 120 square feet of classroom storage and a minimum of 320 square feet of laboratory space is also provided. This minimum laboratory space is tolerable if the area is at the side or back of the classroom and has a folding curtain wall.

The agricultural mechanics area (shop or agricultural mechanics laboratory) needs 150 square feet of free floor space per student in the largest class plus 1400 square feet of space (dead floor space) which will be taken up by workbenches, tables, power tools and the safety zones. A class of 20 will require $(20 \times 150 = 3000 + 1400 = 4400 \text{ sq. ft.})$

(Continued on next page)

4400 square feet. If you are asking what can be done with that much space, consider the local implement dealer. He plans 480 square feet per each work stall for a tractor and 900 square feet for each machinery set-up work station. A 4400 sq. ft. facility does not allow each student the luxury of his own work station which is frequently planned in other vocational programs. In agriculture facilities large power tools have not been anchored to the floor so they can be moved to accommodate program changes, but OSHA regulations require that tools be anchored. This may necessitate a quick change anchoring system for tools in agricultural mechanics.

The minimum space for the agriculture mechanics area should be 3800 square feet. The width-to-length ratio of not more than 1.5 to 2 is a good planning rule. Another cause of shop shrinkage is the absence of storerooms. One hundred square feet of storage space is recommended for each 1000 square feet of agricultural mechanics area: 440 square feet or a minimum of 380. The dimension (length) and door placement should accommodate standard lengths of steel, tubing and lumber.

Court yard storage should be provided with chain link fence, locking gate and security lights. This area should be a minimum of 40' x 60' where large agricultural machinery is stored. Additional storage facilities could be made available in this area for lumber, steel, scrap metal, concrete blocks, sand, gravel, etc.

I believe the ideal agricultural mechanics class size is no more than 16, and the ideal classroom number should be no more than 24.

OFFICE

Staff members with 12-month appointments should have an office, telephone, and secretarial services. An office should have 120 square feet and be strategically located in relation to the classroom and agricultural mechanics work area. If the school has two high school teachers they could be expected to share office space. If the two- and three-man department has adult instructors and/or veterans' instructors, the offices should be individual and separated so that high school students are not an interruption for instructors' work and conference periods with the veteran and adult class members. This office should be located for easy access by the adult and veteran class members.

RESTROOM FACILITIES

Restroom facilities will have to be provided if the vocational agriculture facility is a separate building and might need to be provided if the facility is a wing on an existing building. Washing facilities and locker space for shop coats or coveralls should be available in the shop area regardless of the restroom facilities.

MULTIPLE TEACHER FACILITY

How much more space is needed for the two- and three-teacher department is plain addition. Office space is

Let the door be large enough that the teacher doesn't have the "too small a door" crutch for not teaching the curriculum needed by the community.

120 square feet per head. If another classroom is required, the additional needs are 840 to 900 square feet. Some additional storage should be provided, and if this involves more shop classes, the space should be increased somewhat, 400 to 1000 square feet. Conference rooms should also be added and space for a full-time secretary.

SPACE SUMMARY*1

Area	Number of Teachers		
	One	Two	Three
Office	120	240	360
Classroom	900	900	1800*2
Classroom storage	120	120	200
Laboratory	320	320	320
Mechanics shop	4400	4800	5200
Shop storage	440	480	520
	6300	6860	8400

*1 Based on 20 students per largest class.

*2 Additional classroom facilities may be available within the school.

SPECIAL FEATURES

The agricultural mechanics area should have a door wide and high enough to accommodate the agricultural machinery and projects to be constructed. In northern Minnesota that could be 12-14 feet wide to accommodate forest harvesting machinery but 20-24 feet wide in the Red River Valley and cash grain areas. Let the door be large enough that the teacher doesn't have the "too small a door" crutch for not teaching the curriculum needed by the community.

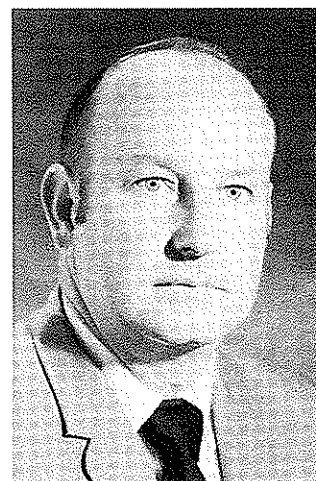
The building ceiling height will need to be 20-24 feet. In the agricultural mechanics area the height is essential for the door, and it helps with noise control. If the same height is above the mechanic's storeroom, offices, classroom storage, laboratory, etc., the building can be designed for two levels. The upper level makes an excellent location for electrical panels, air compressors, heated air intake, ventilation system, and off-season storage of teaching materials and supplies. The classroom area could have a lower roof or a false ceiling.

All stationary power tools should have a permanent dust collection system, and all tools which must be moved to facilitate curriculum changes should have portable dust collection units.

General ventilation is needed for the entire building. Fumes from the welding area and carbon monoxide from the engine and machinery area are major ventilation concerns. Remember, all air exhausted from an area must be replaced. Spray paint booths require special ventilation systems too.

(Concluded on page 61)

A Facility Dream Coming True



*Richard B. Carter, Sr.
Local Director of Vocational Education
Appomattox, Virginia*

R. B. Carter, Sr.
Court Yard Area

Many teachers of vocational agriculture have often dreamed of planning new facilities. Few have such a dream to come true. However, teachers of vocational agriculture at the Appomattox County High School in Appomattox County, Virginia had their dreams come true. This was a dream where teachers had much freedom and made many of the decisions in planning the department for agricultural education in a new comprehensive high school that was opened in September 1974.

The planning started in 1968 when school officials were directed to begin planning a new comprehensive high school for the County. Four teachers of agricultural education were involved in the planning process and one was appointed to work with the architect to coordinate planning activities. These four teachers had a total of fifty-seven years of experience in teaching vocational agriculture and definitely had some ideas about what they wanted included in the new facilities.

The first step in the planning process was deciding upon the curriculum to be offered. The next step was a meeting with the architect to discuss what features should be included in the vocational agriculture department. From this initial meeting, the architectural firm translated the desired program into a set of preliminary plans. These plans were then reviewed by the instructors of vocational agriculture with the architect on many occasions to clarify ideas. When final agreement was given by the instructors and school officials, the plans were sent to the State Department of Education for review and acceptance by the Vocational Education Service.

What should be included in a dream department of vocational agriculture? The features to be described in this article include what teachers of vocational agriculture at Appomattox County High School considered to be desirable improvements in previously constructed departments of vocational agriculture in Virginia.

Experience in our old facilities dictated a need for an outside area for storage of projects, farm equipment, and consumable materials such as lumber and metal. Experience further indicated a need for a concrete area that would be covered and enclosed with a metal fence. There were no plans in Virginia to use as a guide to determine how much space should be included in a court yard. After much discussion on the part of teachers, a total space of 3400 square feet was agreed upon with 1800 square feet included under a shelter. This area has proved to be a valuable addition to the facilities. Placing an arc welder outlet and other extension outlets near the back roll-up door of the shop allowed for students to perform project work in the court yard area. This option of performing work relieves the congestion inside the laboratory area.

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COMING ISSUES COMING ISSUES COMING ISSUES

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- OCTOBER — Preparing Teachers of Vocational Agriculture
- NOVEMBER — Teacher Organizations and Professionalism
- DECEMBER — More Effective Teaching
- JANUARY — Production Agriculture — Preparing to Feed the World
- FEBRUARY — FFA — The Intracurricular Activity

- MARCH — Agricultural Mechanics — Keeping the Wheels Turning
- APRIL — Supervised Experience Programs — Learning by Doing
- MAY — Agricultural Products — Preparing Agricultural Processors
- JUNE — Camping and Summer Activities
- JULY — Facilities — Planning, Maintenance and Improvement
- AUGUST — In-service Education and Teacher Conferences

Overhead Hoist

Another need, which had not been met in the old department was for an overhead hoist to lift or unload certain items which has to be handled at various times. A two-ton hoist that could be moved in a parallel direction with the length of the mechanics laboratory was included in the building design.

No Overhead Storage Area

Most farm mechanics facilities in Virginia included provisions for overhead storage. Newly enacted safety regulations and past experience indicated that overhead storage was not desirable. Therefore, it was decided no provisions would be made for overhead storage in the new facilities. The architect in planning the facilities stated that an overhead area must be included for the placing of several electric transformers, but would not be designed to allow for overhead storage. Neither would an access ladder to this area be acceptable for use by employees. In lieu of overhead storage, an area in the front of the mechanics laboratory was designed for storage of a limited quantity of lumber and metal. This area would handle material up to twenty feet in length.

Locker Rooms

An area for students to dress and have locker facilities was included. This area which measures fourteen by fifteen feet would accommodate 92 lockers of a 12" x 12" x 36" size. Unfortunately, when planning was being done the idea of having girls enrolled in classes of vocational agriculture was not fully realized. Today, we find that a locker room for girls would be highly desirable.

Paint Room

Agricultural mechanics has always been a major strength in the agricultural education program in Appomattox County. The painting of farm machinery such as farm tractors has been accomplished in the past by painting outdoors on warm sunny days or inside the mechanics laboratory after school. This arrangement was satisfactory, but certainly had many disadvantages. It was agreed early in the planning process that provisions would be made for a paint room. This room was

to be well ventilated, lighted, and have an entrance from outside. Although certain problems have been encountered in the use of this room, the experiences over the past eighteen months have proved that this was a step in the right direction.

Project Room

Every instructor of vocational agriculture has experienced a lack of storage area for projects being constructed by students. To alleviate or make some progress toward solving this problem, a project storage area of fourteen feet by twenty feet was planned. This area was located near the front of the shop and was equipped with much shelf space along two sides of the room. Also included in the project room was a plywood storage rack, which is of metal construction and will hold several thousand square feet, depending upon thickness of the plywood sheets. "I never dreamed that we would be allowed this space," stated one of the younger teachers of vocational agriculture, "but I am sure glad we got it. How did we ever get along in the old department without a project storage room?"

Tool Panels

"A place for every tool and every tool in place" is often quoted as an ideal situation for departments of vocational agriculture. The new facilities have natural finished wood panels that fold out and may be locked when not in use. Each panel is color coded and a silhouette is neatly painted in the panels. These tool panels have definitely aided the teachers in the department to make progress toward an ideal situation.

Tool and Supply Room

Some tools such as a portable saw and certain consumable items need to be kept away from students but yet readily accessible when needed. The old department of vocational agriculture had a small area for storing consumable items, but had proved not to be adequate in size or arrangement. The new facility has a tool and supply room of fourteen by fourteen feet and is well equipped with bolt and nail cabinets and shelving space.

Greenhouse Facilities

A fiberglass, automated greenhouse of 23 feet by 26 feet was included in the facilities for the new department. When planning started no instructors in the department had ever had any experience in operating a greenhouse. Therefore, only what was to be considered as minimum facilities for teaching ornamental horticulture was planned. However, it was decided that these facilities would be so planned as to allow for future expansion as the program in ornamental horticulture expanded. At present, plans are being made to add another unit and possibly two units of the same size as the original greenhouse. When these units are erected a preparation area will also be included.

Additional Information

Today, a total of 264 students in grades 9-12 are enrolled in programs of vocational agriculture at the Appomattox County High School. These students are taught by four fully certified graduates of agricultural education. Two of these instructors have a master's degree and the other two will complete requirements this summer.

Programs of vocational agriculture in the department include Agricultural Science and Mechanics II for grade 9, Agriculture Production III, IV and V; Ornamental Horticulture III, IV and V, and Agricultural Machinery Sales and Services III, IV and V for grades 10-12.

The Future

"A Dream Coming True" describes the situation for instructors of vocational agriculture at Appomattox County High School. The instructors decided upon a curriculum and were involved in planning a facility to accommodate the program. Since 1974 the teachers have been implementing this program. Considerable work remains to be done. However, it is a department where teachers of vocational agriculture are involved in continuous planning. This planning will be reflected in adequate facilities for a modern program of vocational agriculture.

Planning and Managing School Facilities for Agriculture

*Bernie Staller, Department Chairman
Parker Senior High
Janesville, Wisconsin*

The Agribusiness Department at Janesville-Parker Senior High involves 360 students and three instructors in three different buildings. Facilities were provided through a variety of methods, at low cost to local taxpayers. Major emphasis at Janesville-Parker is urban and thus our facilities reflect this.

Orchards. Four area orchards have been operated the past seven years. These orchards with seventeen varieties of apples are *rented* by Parker FFA from owners. Generally our rental agreements allow total decision making by Parker students with a 50-50 profit sharing agreement. Through profits the Parker FFA has purchased its own sprayer; truck; tractor; mower; washer, sorter and polisher; bagger and automatic scales; as well as small hand tools.

All pruning, spraying, picking, sorting, and bagging are done by horticulture students and/or FFA members. All apples are sold under the Parker FFA label through local supermarkets.

Besides actual orchard operations, students learn safety with pesticides; advertising; quality control; bookkeeping; disease, insect and weed identification; and "how to work." Students receive scholarships from the profits on the basis of seven ratings including quality of their work. Thus students realize more income from better quality work or take a cut in pay if they slack off in their work. We feel this encourages students to develop an attitude of "an honest hour's work for an hour's wage." About 1000 hours of work experience are provided for students at little costs to local taxpayers.

The orchards are also the site of numerous field trips for local groups as well as an adult field day. The field day, utilizing FFA members, extension personnel, and University of Wisconsin resource people is held annually in February with the general topic being pruning, although many topics are discussed. Area adults actually prune the fruit trees in the orchard and thus "learn by doing."

Greenhouse. Parker FFA also operates a 50' x 30' greenhouse. All types of bedding, flowering, and foliage crops are grown each year. Some 2,000 hours of student experience are gained in all aspects of greenhouse work. As all plant materials produced in the greenhouse are wholesaled to three local outlets, students learn the business end of greenhouse management as well as growing techniques. Cost accounting, markups, special sales arrangements, and quality of plant products are all part of the students' training.



The author, explaining "grading factors" for fresh apples to Parker FFA members active in the Orchard Projects.

Students again receive scholarships on the basis of the quality of their work. The greenhouse will be paid for over a 10-year period by Parker FFA. The greenhouse is operated year round with 75 percent of the bench space being committed to commercial production schedules and the remainder being used for identification and specialized experimentation.

I feel that a great many programs utilizing greenhouses fail in their attempt to teach "commercial greenhouse" types of activities.

Certainly experimentation with light, temperature, moisture and so forth are important to understand plant care and growth. However, appreciating and working with common *commercial* situations are also important for careers in greenhouse work. This is why 75 percent of our unit is committed to a "production schedule" similar to local commercial greenhouses.

Gardens. Some five acres of community gardens are provided by Parker FFA for our members and area adults. Plots measuring 30' x 30' are sub-rented for \$8.00 per season. The five acres are rented by Parker FFA from a local church.

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A Filing and Materials Handling System

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and

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Many school boards will pay for secretarial support when they are made aware that the vocational agriculture department often handles as much or more paperwork than the high school principal.

Many Kentucky teachers of agriculture, faced with an increasing amount of instructional and related materials, have expressed the need for a manageable filing system. In response to this need, the authors developed a guide for systematic handling of departmental materials, which is the basis for this article.

A rising flood of paperwork, instructional supplies, and related materials threatens to inundate vocational agriculture departments and teachers of agriculture throughout the nation. Unless proper steps are taken to manage this "flood," the effectiveness of beginning and experienced teachers alike may suffer. Some of the problems that could arise are:

- Cluttered offices, classrooms and storage areas which are eyesores to visitors and a problem for users;
- Delayed reports, incomplete records, lost or misplaced correspondence and resultant delayed responses which may cause others to view the teacher, department and even the school as unbusinesslike or unprofessional;
- Confusion and inefficiency which may result when making the transition from a one-man department to a multiple-teacher department, when changing teachers, or when busy teachers within a department change assignments or seek to coordinate activities.

Clearly, every Vo-Ag department needs a systematic means to handle, file and store departmental materials. Busy teachers of agriculture can find few better uses for their time than those hours spent organizing their office facilities, storage and filing system for efficient operation. Setting aside a few days for organization at the beginning of the school year will pay dividends that year and for years to come. Some suggestions for establishing the system are as follows: "The best way to get a job done is to begin work on it!" This familiar saying applies here. The best time to work on a management system for departmental materials is now, today! The teacher should analyze the situation and develop a schedule of improvements he or she will make each week of the year. During the summer extended employment period, at least two weeks should be designated for working on the file and storage areas.

Step One—Stemming the Flow
Of immediate importance is controlling incoming ma-

terials. This can be done by:

Securing a competent secretary. Every department of vocational agriculture needs a good secretary for at least a portion of each day. Filing, processing mail, typing letters, answering the telephone, preparing reports, and keeping records are examples of major tasks that a competent secretary can handle, thus releasing the teacher for professional activity. Arrangements can often be made to "hire" a co-op student from the business education department, or funds may be available through a government program, such as the Neighborhood Youth Corps, or Work-Study. Many school boards will pay for secretarial support when they are made aware that the vocational agriculture department often handles as much or more paperwork than the high school principal! Once hired, the secretary should be given a thorough orientation to the program and the procedures used in the department.

Setting up a "flow pattern" for incoming materials. The office should be set up in such a manner that the secretary has a separate desk and/or work table. An "in" basket should be used to hold the mail, folders, and any materials coming in each day. Three or more "out" baskets are also needed. Letters should be opened by the secretary and the date received should be stamped or written in the upper margin, before they are forwarded to the appropriate person. (Teachers in a multiple-teacher department should each have a slot or basket for correspondence.) Papers or materials to be filed should be initiated by the recipient and placed in a basket or box marked "file." Materials requiring typing should go to a box labeled "Secretary," and those requiring further consideration could go into a "hold" file or basket. All incoming material should be sorted daily, and no items should remain unattended for more than one week. A weekly session of filing reference materials, correspondence and the like will usually keep order in most departments. An orderly desk will pay dividends; this can be accomplished by following simple rules for "desk efficiency":¹

- Work on one task at a time and finish it before starting another.
- Keep the desk-top work surface free from "storage items," such as excess papers and supplies. Have only those items on the desk that are needed.
- Shelve material that is not urgent. For example, magazine articles to be read later should be marked with a slip of paper and then put aside for reading in off moments.
- Keep the work moving over the desk. Take action on each

(Concluded on next page)

paper coming to the desk as quickly as possible.

- Act on important work first. Have a daily schedule, and make use of a desk calendar to guide the sequence of work.
- Clear the desk top and other materials at the end of the day, so a fresh start may be made the next day.

Designating separate storage areas for each type of material used in the department. "A place for everything, and everything in its place" is as good a motto for the vocational agriculture department as it is for the home. By dividing the department into areas, the teacher can better control the flow and the buildup of materials. A general arrangement might be as follows:

Classroom Items:

- Student references
- Bulletins (boxes, files or rack)
- Magazines
- Charts
- Bulletin board
- Award display
- Optional (if file can be locked)
 - Student records
 - FFA officer and committee files

Office Items:

- Departmental management file
- Teacher references
- Appointment (reminder) record (card file, calendar, or memo)
- “Tickler” check-out file (card file—recipe size—for checking out files, tools, equipment, or etc.)
- In/out baskets
- File of frequently called telephone numbers (flat, card or rotating file)

Laboratory Items (or any area that can be locked)

- Audio-visual equipment and aids
 - Projectors
 - Filmstrips
 - Slide storage
 - Displays
 - Models, samples
- Inactive file (storage)
- Miscellaneous storage

NOTE: Place files/storage near to where they will be convenient to use and where they can be controlled (locked, supervised, and/or protected from vandalism).

Step Two—Adopting an Appropriate File System

Most departments will have a filing system already installed, but an unmanageable or unused system is worse than none at all. The teacher should review the current recommendation from the state department regarding filing and also (if different) look over the Agdex system² which was developed by the Agricultural Education Division of AVA.

Agdex is undoubtedly the most comprehensive standardized system available for vocational agriculture departments; as such it probably should be used in all departments. In addition to being standardized and comprehensive, Agdex saves time by providing pre-coded stickers for marking

divisions. The teacher has only to study the system and then put it into use.³

Regardless of the system adopted, “localization” will be required. This can be done when installing the system or as problems develop in using it. It should be remembered, however, that no system is perfect. Consequently, the teacher should adapt the system to the needs of the department. A good example of this is the case of technical agriculture bulletins. Several means to provide student access to these materials are available:

- Bulletin boxes—whether commercial or homemade, these 3" x 9" x 12" boxes can be of wood, card board or masonry construction, and labeled on the closed end to indicate topics. An advantage is the neatness of handling and storing a number of odd-sized brochures together; a disadvantage is in the limited number of copies that can be held.
- Visual display boards—county extension agents commonly punch bulletins and place them on pegs for easy viewing and selection. Finding space is a problem, as is keeping the display orderly.
- Vertical files—the most common means is to keep bulletins in a four-drawer file system in the classroom where students have easy access to the total supply available. A difficulty lies in returning bulletins to the correct place in the file drawer.

Whether one of these systems or other modifications are used depends on the teacher(s) involved. What is important is that bulletins be identified with a filing classification as they come in so that the secretary, user, or other person doing the filing can quickly identify where the item goes. A little time spent in coding technical bulletins can save much time in keeping these valuable learning resources in their place and available when needed!

Similarly, bulky audio-visuals, such as models, charts, samples, and displays can be identified with a simple sticker label on which the filing code, name of item and title are printed or typed. Color coding can be used to give the user an instant appraisal of where the material is filed.

Step Three—Organizing to Maintain and Improve the Materials-Handling System

Most teachers of agriculture are inadequately prepared to manage the kind of extensive “business” operation that the average vocational agriculture department often turns out to be. Help in the form of individual study, in-service course work and/or assistance from specialists, is needed to overcome this lack of expertise. If aid is not available from state department or teacher education personnel, the teacher should ask the local teacher of business and office education to assist in setting up the management system.

It is also necessary to secure and maintain adequate filing and storage facilities. Generally, at least two four-drawer files are needed for a one-teacher department; additional file cabinets are required when the teaching staff is larger. File cabinets, properly painted, labeled and positioned can serve as decorative additions to the office or classroom. In small offices, four-drawer files can separate teacher, secretary and student work areas. A pair of two-drawer file cabinets, supporting a door or plywood top,

(Concluded on page 71)

Planning High School Facilities

Julian M. Carter*
Assistant State Director for
Vocational Education
Montpelier, Vermont

For many years the typical one-teacher vocational agricultural department in a rural high school was composed of a classroom and a shop. Often a program was started in makeshift facilities without a shop or in a shop and classroom located in different parts of the school plant. New high schools constructed in the decade before or after World War II usually contained a classroom of 500-800 square feet and an adjacent farm shop varying greatly in size with the average being from 1500 to 2000 square feet.

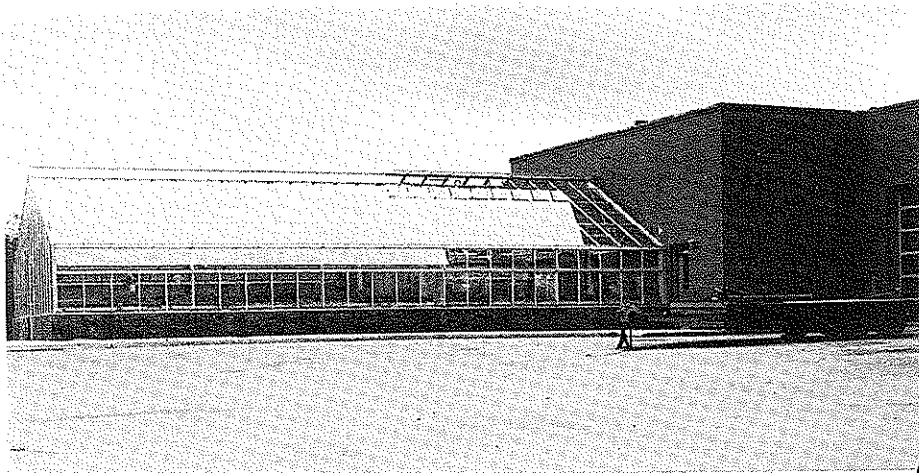
The Vocational Acts of 1963 and subsequent amendments lead to the area vocational school concept with increased emphasis placed on training for the off farm occupations in agriculture. A trend developed towards multi-teacher departments with excellent facilities and equipment. Also, many high schools that are not area centers have provided adequate facilities.

Several questions need to be answered when planning facilities. A few of these questions are listed below and unfortunately clear-cut answers are not always available.

Who will be served and in what numbers?

Facilities should be planned to serve day students, adults, disadvantaged and handicapped persons. Getting a handle on future enrollments is often very difficult. The attacks on vocational agriculture that were prevalent in the fifties and early sixties combined with the decrease in the number of farms led many planners to be pessimistic about the future of secondary agricultural education programs. Actually, enrollments have increased. For example: in Vermont, area vocational centers when

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Greenhouse at the Addison County Area Vocational Center. Notice large paved area adjacent to the main building. (Picture by Ronald Slicer.)

first opened had on the average 1.2 teachers each with no centers having more than 2 teachers. For the 1976-77 school year, because of increased enrollments, the average number of teachers per center will be 2.3 with one center having 5 teachers. In spite of local surveys and the use of local craft committees this growth was not anticipated at the time the centers were built. School officials whether they are using federal, state or local dollars are reluctant to provide excess space for future expansion.

What instructional program will be offered?

The prevailing type of agriculture in the area served by a high school or an area vocational center combined with the total student population are two important factors to consider when planning programs. Some area vocational centers in rural areas are offering too many vocational programs in relation to numbers of students to be served. Consequently class size may be small and when competition for tax

dollars is keen, programs with low enrollment are eliminated. The cluster concept may be the answer but a word of caution in trying to "cover the waterfront with a limited staff and facilities." Effective individualized instruction is difficult to manage for the teacher if student interest is widely different. For example, one area center in Vermont was unsuccessful in providing individualized instruction for students in the same class with vocational objectives in Horticulture, Forestry, Agricultural Mechanics and Farm Production.

What are the space needs?

As guidelines, the following square footage is suggested:

- Classroom—800-900 square feet. Science-type tables desirable. If two or more classrooms are needed they should be connected with a moveable partition to provide more space for FFA meetings, large adult classes, community gatherings, etc.
- Farm Mechanics—Shop 4000 square feet per teacher.

(Concluded on next page)

CONTINUED PLANNING HIGH SCHOOL FACILITIES

- Farm Production and Management—Shop 3000 square feet. Could also serve the Forestry and Conservation classes.
- Greenhouse—Size depends on importance of horticultural crops in area served by the school. In Vermont a 2,000 square foot two temperature zone structure is adequate. An adjacent headhouse and classroom is essential.
- Storage for each program area—200-400 square feet.
- Separate toilets and lockers for boys and girls should be located near the center of the agriculture facilities. Size depends on numbers and mandates required by State Department of Education.
- Outside storage is often provided for trailers, trucks, bus for field trips, tractors, lumber, implements, etc. A substantial pole-type storage building can be erected by students at the cost of about \$2.00 per square foot. A steel storage building may be more compatible to the main building but cost is greater than a pole-type.
- Vocational facilities costs vary considerably in Vermont. Cost per square foot at the present time is estimated to be in the neighborhood of \$40. This includes a limited amount of fixed equipment such as sinks, hoist, circular saws and jointers fastened to the floor, ventilation fans, etc.
- Within a service area, such as agriculture, sharing facilities and equipment sometimes presents problems. Most instructors in shop oriented programs like a place to convene a class at the start of a period to conduct related lessons, give a demonstration or a test and give announcements. Many shop teachers lacking a classroom will often use valuable shop space for an armchair class area.

Miscellaneous Information

- Facilities should be flexible to allow for innovations, new programs and technological changes.
- Modern education techniques should be provided to include visual aids, educational TV, carrels and other aids for individualized instruction.
- Services of an architect are required by most states when planning education facilities as they are knowledgeable about OSHA regulations, environmental considerations, fire marshal regulations, quantity and quality of light and numerous other requirements.

Summary

When planning school facilities for agriculture it is essential to:

- Have someone connected with local education agencies knowledgeable about agricultural education programs. As a general statement; in Vermont better new facilities for agriculture were provided in those area

centers having a vo-ag teacher on the staff of the school responsible for the planning, equipping and operation of the new facility.

- Input from local craft or advisory committees is important and is required in Vermont before plans are approved by the State Department of Education. Members of these committees are usually knowledgeable tax-paying residents of the area and their recommendations are respected by the final decision makers.
- To the extent possible, facilities should be planned to allow for new programs whether additional facilities are added or existing facilities are updated to meet needed changes.
- Facilities should be planned to meet community needs rather than the interest and teaching strength of existing staff.
- Brick and mortar alone don't insure an effective program. Adequate space and equipment, combined with good teaching, are essential ingredients of any education program. ◆◆◆

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- (3) *School Shop*, Special Issue: Planning Facilities for Vocational Education, April 1976.
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CONTINUED PLANNING AND MANAGING . . . FACILITIES

Sweet corn for urban members' projects is also provided on the community garden plots.

The major educational thrust involves a 200-variety comparison plot developed by Parker FFA. The students follow each variety from greenhouse sowing to transplanting and through harvesting. A field day for the general public is provided during the summer. Best gardener awards are provided to encourage proper garden techniques as well as weed control. Parker FFA also cooperates with the Rock County Horticultural Society in sponsoring eight to ten adult meetings (800 to 1000 attendance each year for the past eight years) on various horticulture subjects.

Landscaping. Horticulture classes and/or Parker FFA members are also involved in many landscape projects. We landscape a city park each fall (1 to 3 acres), present the plan to the city parks department, and, after approval, install that landscape plan in the spring. Nearly 200 hours of actual

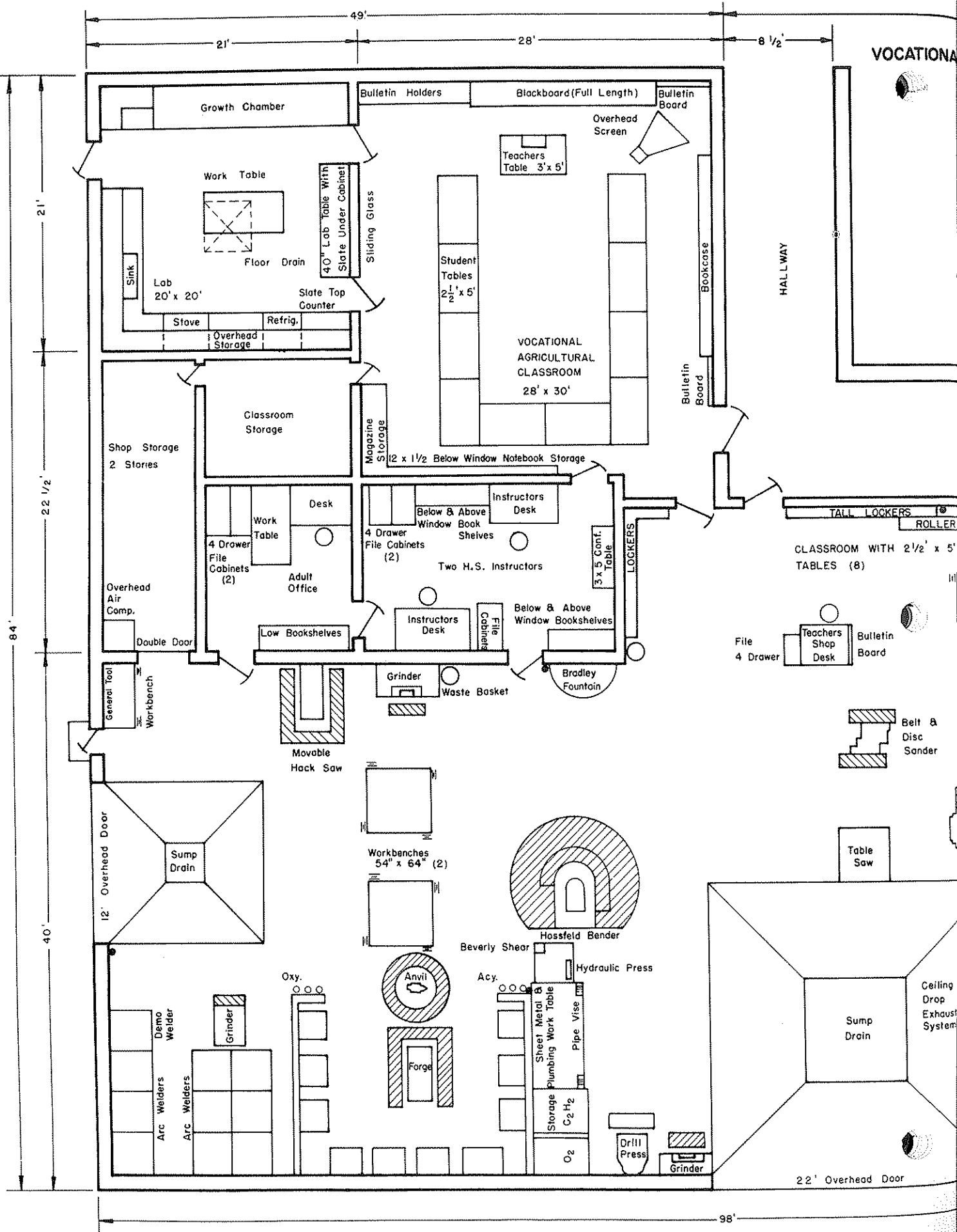
landscape design and installation experience are provided at little cost to local taxpayers. Many of these "sub-division" parks exist in Janesville, and we hope to continue these projects for several years.

Others. We also have students with traditional "farm experience projects" and on-the-job training where applicable. We do not have a cooperative type of training program at this time. Our students also have access to an 80-acre conservation demonstration laboratory for use with our conservation classes.

Small fruit areas are provided by two of the orchards we rent. Commercial types of learning experiences with strawberries, raspberries, blackberries, grapes, and asparagus are provided on a limited scale.

We at Janesville-Parker are always willing to share our thoughts and ideas. Please feel free to write us with your questions. ◆◆◆

VOCATIONAL



HALLWAY

VOCATIONAL AGRICULTURAL CLASSROOM 28' x 30'

Classroom Storage

Shop Storage 2 Stories

Adult Office

Instructors Desk

4 Drawer File Cabinets (2)

Two H.S. Instructors

Instructors Desk

Grinder

Waste Basket

Movable Hack Saw

Workbenches 54" x 64" (2)

Anvil

Forge

Hydraulic Press

Hossfeld Bender

Beverly Shear

Sheet Metal & Plumbing Work Table

Pipe Vise

Storage C₂H₂

O₂

Drill Press

Grinder

TALL LOCKERS ROLLER

CLASSROOM WITH 2 1/2' x 5' TABLES (8)

Teachers Shop Desk

File 4 Drawer

Bulletin Board

Belt & Disc Sander

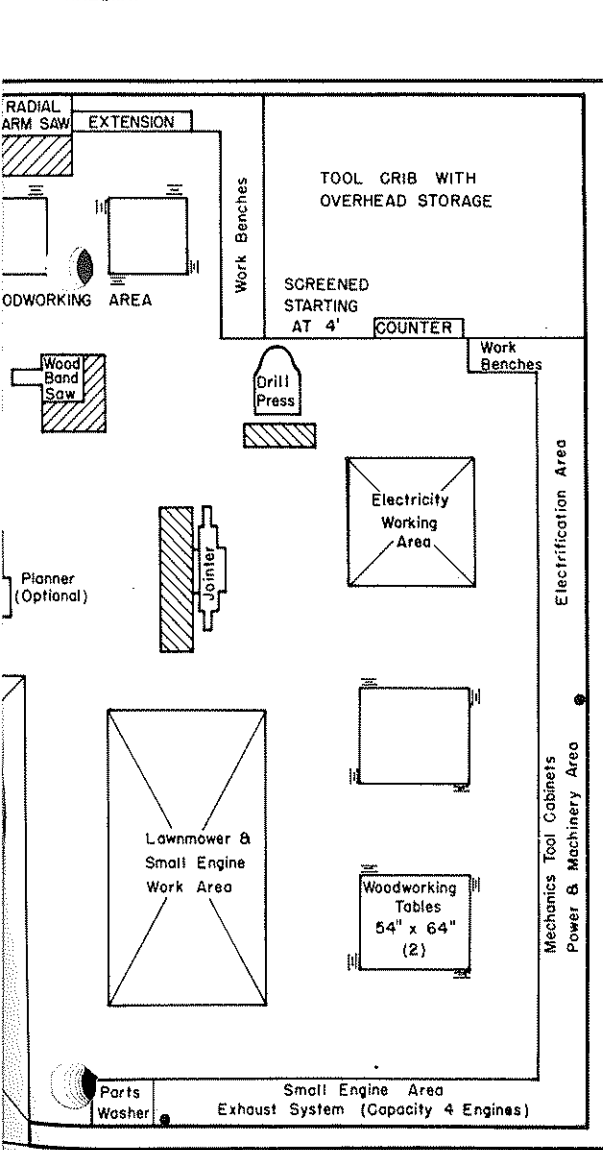
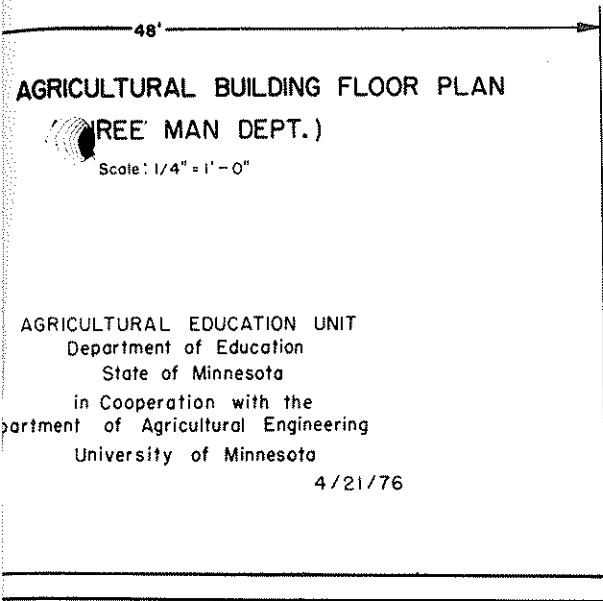
Table Saw

Sump Drain

Ceiling Drop Exhaust System

22' Overhead Door

CONTINUED FACILITY
PLANNING FOR . . .



Floor strength is needed. In 1970 the most popular tractor was 60 HP and weighed 10,000 lbs. In 1976 the new four-wheel drive units weigh 20,000 pounds with a potential of 10,000 pounds of ballast. Floor finish should be smooth and sealed for ease of cleaning and non-skid applied in the work areas around tools.

Sump type floor drains are needed with water service located for interior and exterior work.

Walls are for bulletin boards, chalk boards, tool panels, demonstration displays, movie screens, storage cabinets and book cases. Windows are sources of heat loss, poor providers of ventilation, a depository for dirt, and providers of frames for blinds and curtains.

Electrical service bars with 120-volt or 208-/240-volt service are to be located strategically in work areas with tools. Many 120-volt drop cords should be provided for power tool use. OSHA and National Electrical Code regulations need to be consulted for both inside and outside circuits. One master shut-off for all stationary power tools is an excellent safety device.

General lighting should have 35-40 foot candles with additional units being provided over workbench space and around power tools. Provide plenty of circuits and switches so electrical energy can be saved. Skylights are good, but so is a roof that doesn't leak!!

Provide several thermostats for the heating system. The agricultural mechanics and classroom storage areas need limited heat and the laboratory needs are regulated by usage. The agricultural mechanics area needs a thermostat that cannot go much higher than 55 to 60 degrees for these reasons: (1) shop activities are to be working activities and not lounging affairs, and (2) each student should have a pair of coveralls to wear. Coveralls will normally be slipped over regular clothes so the lower temperature is satisfactory.

OUR OWN BACKYARD

Not all Minnesota Vo-Ag facilities look like the illustrated plan. Some communities could use less space and others would prefer more.

Every community has its own restraints which must be considered when preparing the building plan. Hopefully some of these facility planning ideas were observed as a group of Minnesota Vo-Ag instructors developed new one-, two-, and three-man plans. These plans are to be used as planning guides. Each one must be evaluated for structural restraints, fire regulations, electrical codes, OSHA, etc. Plans are available for \$2.50 each from the Agricultural Engineering Department, University of Minnesota, St. Paul, MN 55108.

Planning a new facility is a pleasant problem, and many architectural firms are not familiar with the vocational agriculture program; therefore, the local instructor has a selling job to do. Assistance can be obtained from your state department and university staff, but the local instructor must start early, move fast, and think big at the first hint of a new bond vote.



Innovation Creates a Dynamic Program

*Dr. Gordon E. Ferguson
Career Education Director
Eagle Butte, South Dakota*



Gordon E. Ferguson

How does an Agribusiness Program operate with no facilities? This was the problem facing the author when he was employed by the Cheyenne-Eagle Butte Cooperative School in 1973-74. Under the newly enacted Indian Education Act of 1972 (Title IV), an initial grant from the U.S.O.E. was received to fund a proposed Agribusiness Program. The school had no available shop or other space suited to starting an agricultural education program. Due to late approval of the proposed project, classes were started at mid-year in one classroom shared with an elementary art program. This article discusses subsequent activities relative to creation of a Vocational Agriculture/Agribusiness Department.

Faced with desperate needs, desperate actions were initiated. Working with the Public School Board of Education, the Bureau of Indian Affairs School Administration, and a newly created Indian Parent's Committee, a bold (some said impossible), program was planned. In the first semester, basic groundwork was laid for a comprehensive agribusiness/vocational agriculture department. Within the first month of classes an FFA Chapter was established, and embryo plans made for a long range construction project. By February, a proposal to have agriculture students build their own facilities was submitted to the U.S. Office of Indian Education. Meanwhile references, teaching aids, and other material goods were being accumulated, with little space to house them.

By the time the 1974-75 school year began in August, arrangements had been made to move the department to a basement roughly 32' x 40' which was to serve as classroom, shop and laboratory while a new building was

being erected. Approval from Washington was secured to purchase teaching supplies to offer agriculture students experience in the building trades, as applied to agribusiness mechanics. It was agreed by all the concerned organizations that circumstances favored construction of an agriculture building as a class project.

It should be made clear at this point that the local school serves approximately 1200 (K-12) students, of whom roughly 80 percent are Indians and 20 percent non-Indians. In 1959 when the Oahe Reservoir was flooded, the B.I.A. headquarters and Tribal Administrative offices moved to Eagle Butte—a ranch service community of about 500 population. The resulting community has expanded to over 4,000, with a large number of rural residents attending a jointly operated Public/BIA School System. This school serves the major portion of the Cheyenne River Sioux Reservation. Family incomes of many local residents are below poverty levels—some as low as a few hundred dollars per year. Unemployment is consistently greater than in most other areas.

Prior to 1973 no lasting success had been achieved in attempts to provide a diversified vocational program to local students. In an area where 93 percent of the employment is in the production or related fields of agricultural sales and services, a vocational agriculture program seemed to be a vitally needed addition to existing offerings.

The original proposal provided for student work-study programs, whereby all enrollees were to be paid half of minimum wages from Title IV funds, with employers (in most cases the rancher parents) expected to provide the balance. As might be predicted by experienced vocational cooperative pro-

gram teacher-coordinators, this policy had to be changed, creating severe obstacles to student involvement in later years when such employment was withdrawn.

To create jobs for Vo-Ag students who had no other potential employment, the first year of construction on the Vo-Ag building included summer employment for varying numbers of students. Class instruction in all phases of construction was supplemented by work experience on the project for all students during classes, and up to ten hours per week during evenings after school for a few individuals who were not otherwise employed.

From its inception, this building program was designed to involve as many local people in the project as feasible. The Parents Committee, (elected by parents of Indian students) consisting of parents, teachers and high school students, has had a major role in trying to get community involvement. Each year the community residents are surveyed to identify what the following years' proposal for Title IV funds should include. Therefore, every Indian parent of (K-12) students is given the opportunity to at least express opinions. In addition, a ground breaking service involved about 60 residents. Periodic news releases dealing with FFA activities and progress have helped keep the community informed.

Much of the work on the building (both in and out of agriculture classes) has been done by students, under the supervision of the teacher and teacher aide. However, architectural assistance, and licensed electricians' and plumbers' services have been required to provide supplemental instruction as well as complying with laws controlling school

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construction. However, the basic design of the facility was developed by the author, members of the Parents' Committee, and Public School Board, as well as students were directly, and many others were indirectly involved. Community surveys provided for expression of what the most urgent needs of residents are, which might be met by the FFA and Vo-Ag program in the future. Thus, the resulting building plans were drawn to meet needs identified by the whole community.

One urgent need, already referred to, is provision of part-time employment of students from low income families to supplement other family earnings. A serious lack of off-farm businesses suitable and available for training stations is another problem which is apparently common to all small rural communities. Another need, perhaps unique (or at least very uncommon), relates to game hunting on the reservation. Because game animals may be taken all year long, a need has developed for training in, and facilities for processing of field dressed game. Federal meat processing regulations discourage commercial meat markets from shutting down, cleaning, and shifting constantly from private meat processing to retail sale of commercial meat and vice versa. Another local need results from the isolation of the community. Many items such as nursery stock, started plants, cut flowers, and other horticultural goods and services are not available. Therefore, a real need for a small but steady supply of flowers, etc. In addition, welding, painting, carpentry, small engine repair, and several other services are not locally available.

Small student enrollments (400 in 9th through 12th grades) limit the numbers of vocational courses which can be offered. A diversified agricultural occupations program can meet a larger variety of occupational aspirations than any other single program.

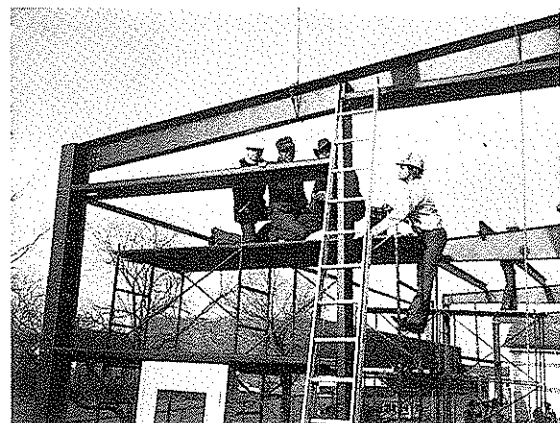
To help meet (at least minimally) some of the above mentioned community needs, the conclusion was reached that a comprehensive Agribusiness/Vo-Ag Program should be created. To house this type of program, a building is being designed and constructed in

stages. Because much of the future development must be based on strong agricultural mechanics training, the first phase of construction has been a 40' x 75' shop, with an office, bathrooms and janitors' closet.

The second phase construction begun during the 1975-76 school year, will be continued in 1976-77 with assistance from a newly created "Building Trades" program. This program is an outgrowth of the initial Title IV Agriculture Education Program. This will allow the agriculture students to concentrate on other aspects of agricultural education, and give different students the valuable experiences of participating in a construction course. This 40' x 25' second phase will house the Vo-Ag classroom, one office and a conference room. The 50' x 50' third phase is scheduled to house a small retail store, meats laboratory, cooler and sharp-freeze unit, additional rest rooms, a locker room, plus a soils and horticultural laboratory. A greenhouse is being planned as the next phase.

When all the above units become operational, the FFA will be able to provide work for several students each year in furnishing goods and services not otherwise available locally. Since small volumes of any specific types of services and/or goods prevent economically profitable private enterprenurial involvement, this arrangement may prove very beneficial to all concerned. It will give students a "half-way house" or "sheltered workshop" setting in which to develop saleable skills, and tryout (on a part-time basis) several occupations.

To allow expansion of training types, and make training as realistic as possible, a new "Youth And Recreation Development" non-profit corporation is being established. It has both students and adults on it's board of directors. Financial contributions from the local FFA Chapter and a one thousand dollar State Department of Agriculture grant under the Building our American Communities program are spearheading a long-range extensive community development project. In cooperation with many other groups and individuals, the "YARD" Corporation and FFA are making some dreams of improvement a



Vo-Ag students assembling framework for the 40' x 75' Ag. Mech. shop, using scaffolding built in agriculture classes.

reality. As some dreams materialize others are being formed. For example the FFA is sponsoring annual regional high school rodeo competition. When the local movie theater closed, the FFA ran movies in the school auditorium to help meet a community need. A small theater may become a part of new facilities later. Since an adequate supply of water is now available via a pipeline from the Missouri River, a swimming pool is being planned. Other rural recreation is also being contemplated, with the FFA actively leading others to join forces to develop both natural and human resources.

In summary, there are several concepts included in the project discussed in this article which may have potential in many small, rural, agriculturally oriented communities. Many ways have been used to involve large numbers of local residents in planning for meeting unique local needs through the establishment of facilities and programs new to the community. Valuable work experiences (and for some students supplemental incomes) are being created through employment in building the required facilities. Future jobs will be created by the operation (by students) of various portions of the program. By involving students at all levels of jobs in the corporation, management as well as other employment skills are being developed through this approach to education. Limited placement opportunities are being supplemented by creating student work stations for future enrollees in Vocational Agribusiness. ♦

COST ANALYSIS OF SHOP EQUIPMENT FOR AGRICULTURAL MECHANICS IN MINNESOTA SECONDARY SCHOOLS

by
Jesse L. McPhearson, Jr.
and
W. Forrest Bear*



Jesse L. McPhearson

The expanding field of agricultural technology presents new challenges and opportunities for agricultural education. These changes in agricultural technology have necessitated the development and use of highly specialized production, processing, and storage equipment. Vocational agriculture must keep abreast of these changes and provide quality instructional programs to prepare students for employment in production agriculture and agribusiness occupations.

Agricultural mechanics is one of the instructional areas directly affected by mechanization in agriculture. It is essential that our agricultural mechanics training programs keep pace with these changes in agriculture. Facilities and equipment must be provided that will meet the demands of our present and future instructional programs. The need for improved training facilities and equipment is apparent, and the perennial problem is cost. These costs involve the physical plant, instructional tools and equipment, and personnel. Administrators are also concerned with alternative ways of providing equivalent or better instructional programs on a least cost basis.

The major object of this study¹ was to determine the initial, fixed and operational cost of equipment used in agricultural mechanics programs. The study was designed to assess the cost

of instructional programs where depreciable machinery and equipment make up a significant percentage of the program cost. Specific objectives of the study were to determine: (1) the cost of tools, equipment and supplies, (2) the depreciation cost for shop equipment and tools, (3) student contact hour cost for the agricultural mechanics classes, and (4) the cost of specialized courses in agricultural mechanics.

The data for this study were obtained by questionnaire, interview, and an appraisal of the equipment in each shop. The collection and analysis of data were limited to a stratified sample of 27 schools based on schools participating in the Minnesota Future Farmers of America Agricultural Mechanics Contest and the curriculum pattern in agricultural mechanics with respect to course length. The curriculum patterns were: (a) schools offering courses on a yearly basis, (b) schools offering courses on a semester basis, and (c) schools offering 50 per cent or more of their courses on the semester basis with the remainder on the yearly basis.

A majority of the teachers surveyed, 83 percent, were involved in teaching agricultural mechanics classes. Approximately 61 percent of the teachers in the study had one to eleven years of teaching experience, and 54 percent had been in their present school district from one to five years. Approximately 43 percent of the teachers had taken more than 17 quarter credits of agricultural mechanics courses at the university level. Utilization of the shop for vocational agriculture increased as college credits increased.

The study revealed a wide variation in the budgets available for purchasing consumable supplies. The low budget was \$200.00 and the high was \$2400.

Approximately 93 percent of the departments had a policy requiring students to pay for consumable supplies used for personal project construction.

Vocational agricultural departments offering courses on a semester and yearly basis had the best utilization of the shop for agricultural mechanics. The shop was used 76 to 100 percent of the time for vocational agriculture by 78 percent of these schools.

A comparison between the hours of agricultural mechanics instruction and the amount of investment in shop equipment yielded an *r* value of .69 which was highly significant at the one percent level. This indicated that the departments which invest more money in equipment tend to provide more hours of agricultural mechanics instruction for the students. There was a significant positive relationships, *r* value of .42, found between quarter hours of agricultural mechanics credits and years of teaching experience, indicating that teachers tend to take additional agricultural mechanics courses. A negative relationship was found between cost per student and agricultural mechanics enrollment, *r* of $-.30$, which was not significant. Negative relationships were also found between cost per student and total vocational agriculture enrollment, cost per student and number of teachers, and cost per student-contact hour and hours of shop instruction. None of these negative relationships were significant.

The cost per student-contact hour had a range of \$6.83 (\$.42 to \$7.45). The average cost per student contact hour was \$3.36. The analysis of variance revealed that the range of cost per student-contact hour was not due to the type of curriculum or the contest ranking of the schools. The difference
(Concluded on page 66)

¹Jesse L. McPhearson, Jr., "A Cost Analysis of Shop Equipment Used in Agricultural Mechanics Programs in Secondary Schools in Minnesota." (Unpublished PhD Dissertation, University of Minnesota, 1975).

*Jesse McPhearson is a University of Minnesota PhD who works for Ford Motor Company in Sterling Heights, Michigan. Forrest Bear is Professor of Ag Engineering and Ag Education at the University of Minnesota.

The Importance of Good Planning

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Louisiana State Department of
Education

Well-planned and meaningful instructional programs in agricultural mechanics are an important and integral phase of a total program in vocational agriculture/agribusiness. Teachers who do not emphasize this importance, often find that the enrollment and interest in their total program lessens over a period of time. Adults in their school communities often do not continue to give the support to the program they have so willingly offered in the past.

Teachers must realize and accept the fact that modern-day farmers have a tremendous investment in machinery, buildings, and equipment. The training offered to all students in farm mechanics enables farmers and prospective farmers to not only be skilled in the care and management of this outstanding investment but also teaches them to make proper selections of machinery and equipment. This assists them in obtaining the best economical results on the farm.

Being skilled in repairing all types of farm machinery and allied equipment has been a financial saving to many former students of vocational agriculture and adults trained in vocational agriculture adult classes. Farm shop training has also resulted in the ability of many individuals to actually plan and construct many pieces of equipment and labor saving devices they would have otherwise been forced to purchase at a much higher cost.

Skillful and time consuming planning must be accomplished by individual teachers if their agricultural mechanics programs are to be successful.

A priority in the planning is the proper and economical use of space in the shop. The enrollment in most departments shows an increase each school year resulting in a need for

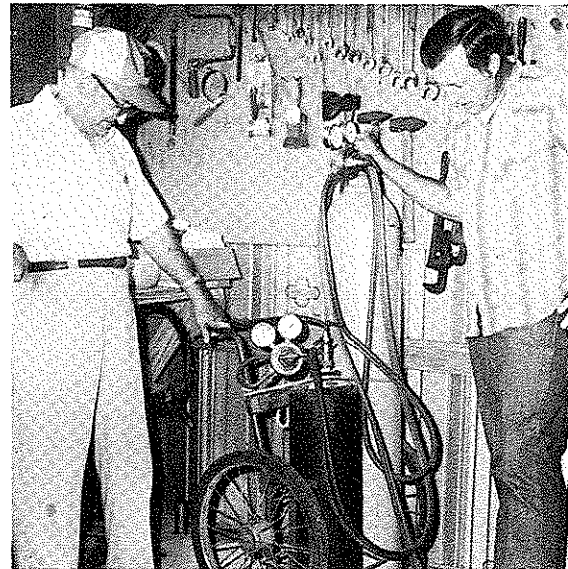
... it is important that formal class meetings be planned and conducted in the classroom rather than going directly to the shop at the beginning of each class.

better organization in the shop so that all students will be properly instructed. Shops vary in size and design. It is suggested that teachers prepare a plan of their shops to scale and study these plans closely for the purpose of better locating work stations. Beginning teachers may obtain good ideas from the more experienced people in this field and also by observing other departments.

A plan of continued good house-keeping practices should be followed at all times with adult and day students. A cluttered and ill-kept shop offers little incentive to students in learning skills and putting them into practice. Situations of this type also violate safety practices. It is important to have each group clean up the tools and area in which they were working. Cleanliness and orderliness should constantly be stressed by the teachers while students are working.

In planning the instructional program for first year, day students or for adults enrolling in their first classes, it is very important that a basic program in agricultural mechanics be followed. There have been situations, where, rather than introducing the units of instruction in the classroom first, some teachers merely announce that "... today we will go to the shop."

Careful planning must go into the scheduling of classes in the shop for day students. Regular classroom instruction must be taken into considera-



A teacher of vocational agriculture (left) and one of his adult farmer class members examine the equipment and tools in the home shop built by the adult student. The teacher assisted the student in planning the construction of the shop.

tion. The majority of teachers plan their schedule to the extent that the shop is placed in continuous use, which facilitates daily care and maintenance of tools and equipment. Another factor to be considered is that of "breaking the monotony." This refers to planning the classroom and shop schedules to the point that students are not in either the classroom or shop for too many class periods. Many teachers consider the activity of the shop as a motivating factor in encouraging students to better acquire knowledge in the classroom.

The first unit relating to the shop should be several class periods of well-planned orientation, especially for freshmen students. This orientation should include instruction relative to the expanding importance of the large

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field of the agricultural mechanics program, use of reference materials, the relating of basic shop procedures, the importance of shop safety, emphatic emphasis on the proper care of tools and equipment as directed by the teachers, etc.

Orientation would also include a brief tour of the shop. This tour includes observation of the physical layout of the entire facility. Some teachers require each student (freshman) to make a rough sketch of the shop indicating the location of major equipment. After a field trip into the shop has been completed, the teaching of tool identification and use is the next step followed by most teachers.

Members of the adult classes are, in most instances, more knowledgeable of safety regulations and tool identification and use. However, to perhaps a lesser degree, safety must also be taught if the instruction given these adults is to have adequate results.

In freshman classes, after the completion of orientation, it is important to begin with the very basic agricultural mechanics skills and progress to the intricate skills as the ability of each student progresses. As a result of good instruction in these basic skills, many students develop their abilities to the extent that they are capable of con-

structing and repairing much of the equipment on the home farm or they obtain positions through the department's cooperative program in some type of local agribusiness. It is certainly obvious to them by this time that their development to this point could not have been accomplished without first learning the basic skills.

Over the past few years, adult classes in farm mechanics have tended to become too informal in many departments. As a result, many classes become very disorganized and the teacher finds that he is in a situation where too few skills are being achieved in his adult classes.

To assist in avoiding this, as previously pointed out, it is important that formal class meetings be planned and conducted in the classroom rather than going directly to the shop at the beginning of each class. After several class meetings, less time is needed for individual assistance to class members as they begin to construct their projects. These projects to be constructed by individuals in the program should not be a "trial and error" type of thing. In discussing proposed ideas for individual shop work, the teacher should stress to the students the high cost of materials, thus encouraging the construction of projects needed and that

would be of value on the home farm. The importance of preparing plans for all projects should be pointed out. There have been many instances where the lack of this has resulted in adult and day students alike in having to start all over after almost completing their work. This type of experience is expensive and also time consuming.

Many vocational agriculture teachers proudly discuss and display the accomplishments of their adult and day students. They are very pleased to note that many of these projects were constructed by students who knew very few basic skills when first enrolled in vocational agriculture.

Many adult farmers have built and equipped their own farm shops as a result of the training and instruction received in their local departments of vocational agriculture. This has become a source of pride with many teachers as they observe their students and former students doing much of their own farm mechanics work.

The most successful teachers in the instruction of farm mechanics continue to emphasize that proper planning is very important and must not be neglected if a good program in this important phase of vocational agriculture/agribusiness is to be developed and maintained. ◆◆◆

CONTINUED COST ANALYSIS OF SHOP . . .

in cost per student contact hour for equipment can be attributed to the following factors:

1. The amount of money invested in shop equipment and tools.
2. The number of students enrolled in agricultural mechanics.
3. The number of hours the equipment was used.
4. The percentage of the total hours of equipment used for agricultural mechanics.
5. The age and condition of the equipment which directly affects depreciation and repair costs.

Based on data from this study, the following recommendations were made concerning the cost of shop equipment

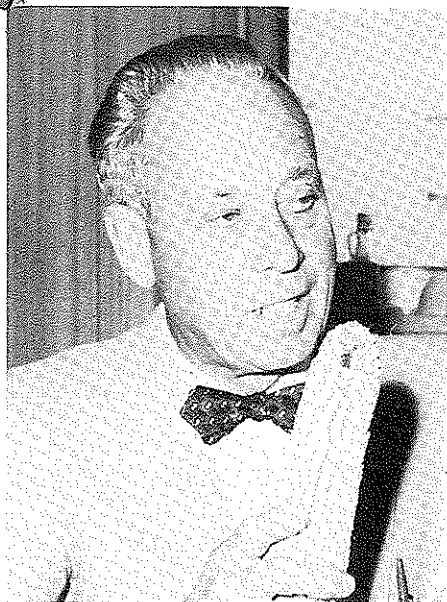
used in agricultural mechanics programs in secondary schools in Minnesota:

1. When purchasing shop equipment, instructors and administrators should be concerned with providing adequate amounts of quality equipment that will last beyond its economic life and minimize cost.
2. Instructors and administrators should not be concerned primarily with providing the least cost program but emphasis should be on providing adequate training for the students.
3. Agricultural mechanics tools and equipment cost should be mini-

mized through maximum use of the equipment with proper maintenance and repair.

4. Vocational agriculture departments should offer agricultural mechanics instruction to all adults who want the training and can benefit, thereby, making more efficient use of available resources.
5. Specialized equipment should be provided where there is a justifiable need.
6. Type of curriculum should not be used as a predictor of equipment cost per student-contact hour. Curriculum design should be used to provide adequate educational opportunities for the students. ◆

Leader in Agricultural Education:



NORMAN N. ROWE

by F. J. Doering*

For many years the AGRICULTURAL EDUCATION MAGAZINE has seen fit to honor the leaders in vocational agriculture across this nation. Seldom, however, has the person so honored been a vocational agriculture instructor during the entire tenure of his teaching career. Such a man is the subject of this article.

On July 10, 1975, the Wisconsin Association of Vocational Agriculture Instructors honored Norm Rowe of West Salem for one-half century of service to vocational agriculture. Just think of it — fifty years and still going. He was presented a plaque and the expressions of heartfelt thanks from all the instructors present for the momentous occasion. This is the longest continuous tenure that can be traced in the history of Wisconsin Vocational Agriculture.

Norm Rowe was born in Portland, Oregon at the turn of the century. A short time later he moved to his uncle's farm in Brown Valley, Minnesota. After graduating from grade school, he worked for a full year to raise money which would enable him to enter high school. He enrolled in West High School in Minneapolis at the age of sixteen. During time off from school, Mr. Rowe met Victor Nylon (who later headed up the agriculture teacher education program at the University of Wisconsin-Platteville) who encouraged him to attend the farm classes Mr. Nylon taught at nearby Bloomington.

This inspired Mr. Rowe to enter the University of Minnesota College of Agriculture from which he graduated in 1925 with high honors. While at college, he worked in the veterinary division earning sufficient funds to pay his way through school. In 1924, he was on the University of Minnesota Livestock Judging team which placed second at the International Livestock Exposition in Chicago. Mr. Rowe was the only person to win three gold medals in one year in the fitting and showing of livestock (in sheep, beef, and hogs).

In 1925 he became the vocational agriculture instructor at West Salem High School in Wisconsin. His entire teaching career was devoted to serving the people in the West Salem School District, but his leadership qualities made him a leader of all people in Wisconsin in the field of agriculture.

Mr. Rowe received his master's degree from Colorado State College at Fort Collins in 1940. While at Fort Collins, he served two terms as student body president. Rowe was very active in Wisconsin Association of Vocational Agriculture Instructors and served the organization as president in 1959. He has been active in a variety of organiza-

tions and holds a great number of awards including both the Honorary State and the Honorary American Farmer degrees.

Rowe possesses unquestioned expertise in all areas of livestock management and has received the Wisconsin Livestock Breeder's coveted award. His record in coaching FFA livestock judging teams is unsurpassed. Fourteen of his state winning meat and livestock judging teams have participated in the FFA National Meats and Livestock contests in Kansas City. The teams always finished among the top entries and one team became national champions. Rowe can point to a long list of accomplishments made by his many former students engaged in farming and all facets of the world of agribusiness.

Norm Rowe "slowed down" a bit in 1968 — retirement was out of the question — and turned over some of the program at West Salem to another vocational agriculture instructor. Norm continues to teach a rural appreciation class in agriculture at the junior high level. He also manages the school's 160-acre outdoor educational center and makes farm visitations dealing with a variety of projects.

Rowe, and his wife Maude, are the parents of four children, have 18 grandchildren, and five great grandchildren. In the opinions of both present and past colleagues and supervisors, Norm Rowe represents the epitome in vocational agriculture teaching across the nation. When questioned, Rowe gives most of the credit of his success to a former state supervisor in Wisconsin, Mr. Louis M. Sasman, and his long-time school administrator at West Salem, Mr. Robert Tremain. We are proud to salute Norm Rowe for a record that will never be equalled in Wisconsin — and perhaps not in this nation. ◆◆◆

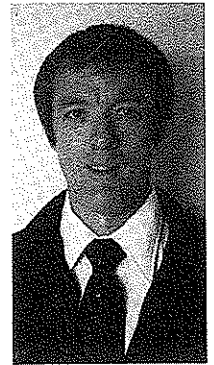


F. J. Doering

*F. J. Doering is Head Consultant of Agriculture Education in Wisconsin.

ATTITUDES TOWARD EMPLOYMENT OF AGRICULTURE TEACHER AIDES

by David Bakken*



David Bakken

According to state vocational agriculture reports in Minnesota, there have been significant increases in enrollment in vocational agriculture, and existing departments have expanded their curriculums. In recent years we have also seen a shortage of certified vocational agriculture instructors. The employment of agriculture teacher aides to assist with vocational agriculture programs is one possibility for more adequately serving students in these vocational agriculture departments.

To determine the attitudes of vocational agriculture instructors and superintendents of Minnesota schools with vocational agriculture departments towards teacher aides for vocational agriculture departments, a study was conducted. The study consisted of a questionnaire which measured attitudes towards the duties aides could perform, their impact on the efficiency of existing vocational agriculture programs and the educational requirements they should meet. Superintendents were also asked to indicate the level of existing employment of teacher aides, duties performed, salaries received and the future employment of agricultural teacher aides.

The questionnaires were sent to 262 vocational agriculture instructors and 257 superintendents. This represented

*The author conducted this study in 1972 as a portion of a Masters Degree program in Agriculture Education completed in July of that year at North Dakota State University. Mr. Bakken is adult farm management instructor at Barnesville, Minnesota. The school also employs another full-time vocational agriculture instructor for high school and a teacher aide who assists with the vocational agriculture program.

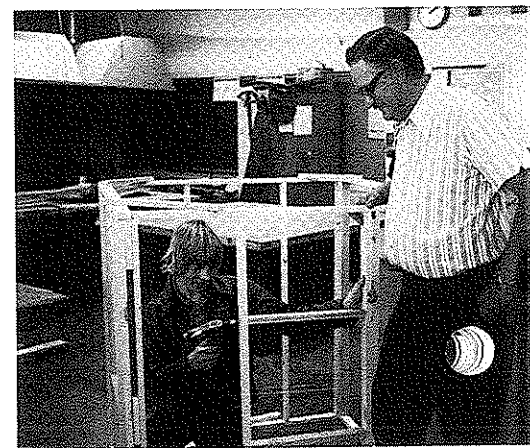
every department in Minnesota. Two hundred and forty vocational agriculture instructors and 198 superintendents returned usable questionnaires. The questions were ranked on a scale of five through one, with five being highly agreed and one being highly disagreed. A comparison of the responses of the vocational agriculture instructors and superintendents are shown in Tables 1 and 2.

Vocational agriculture instructors indicated that agricultural teacher aides, in their opinion, could assist in many phases of the vocational agriculture program including conducting demonstrations, supervising and transporting students, working with the adult farm management program and completing state reports. They also agreed that aides would add to the effectiveness of present vocational agriculture programs.

The superintendents, as a group, indicated that aides could be responsible for duties which would not make them responsible for students, adult farm management or completing state reports. The superintendents only slightly agreed that aides would add to the effectiveness of existing vocational agriculture programs in their schools.

The vocational agriculture instructors and superintendents agreed that agricultural teacher aides should receive training and that vocational schools or technical colleges would be the most logical training institutions. Agricultural mechanics received the highest mean score for the course work needed in training agricultural teacher aides.

The questionnaires showed that most



Elerth Arntson, agricultural aide, in the Barnesville, Minnesota vocational agriculture department serves a variety of functions. Keeping inventories, preparing demonstrations, assisting with field trip transportation and supervision, laboratory maintenance and providing individual instruction to students are all duties he fulfills. Mr. Arntson, a part-time farmer, is in his fourth year as an agricultural aide. This is the fifth year the department has had the services of an aide.

existing teacher aides are employed in elementary schools with the most common salary being \$200 to \$300 per month. Only three schools in Minnesota employed full-time agricultural aides.

Fifty-eight superintendents indicated an interest in employing full-time agricultural aides if they could be hired at what they considered a satisfactorily reimbursed salary and length of yearly employment. Nine months was the most popular length of employment per year. Only eight superintendents showed an interest in hiring aides at salary reimbursement level below 50

(Concluded on next page)

TABLE 1. RESPONSES OF VOCATIONAL AGRICULTURE INSTRUCTORS AND SUPERINTENDENTS TO DUTIES FOR WHICH AN AGRICULTURAL TEACHER AIDE COULD BE RESPONSIBLE

Question	Total group	Mean of		Chi square
		All vocational agriculture instructors	All superintendents	
1. Setting up shop demonstrations	4.20	4.37	3.98	25.0***
2. Setting up lab demonstrations	4.10	4.29	3.85	25.4***
3. Setting up class demonstrations	3.93	4.10	3.70	19.4***
4. Conducting shop demonstrations	2.88	3.20	2.45	42.7***
5. Conducting lab demonstrations	2.83	3.16	2.40	44.8***
6. Conducting classroom demonstrations	2.74	3.04	2.34	41.9***
7. Providing individual student instruction	3.26	3.48	2.96	20.6***
8. Supervising students during independent study	3.70	3.93	3.39	27.5***
9. Assisting instructor with field trip supervision	4.16	4.36	3.91	25.1***
10. Transporting and supervising students or trips to conventions and competitive events	3.49	3.80	3.10	32.6***
11. Maintaining department inventories	4.18	4.26	4.08	8.4
12. Filing department bulletins and correspondence	4.23	4.36	4.07	11.1*
13. Maintaining and repairing department equipment	4.16	4.33	3.93	27.8***
14. Assisting in year-end close out of adult farm management records	3.45	3.48	3.41	5.8
15. Assisting in completing state reports	3.14	3.23	3.03	8.8
16. Preparing visual aides	4.10	4.21	3.95	10.5*

***Significant at the .002 level.

*Significant at the .05 level.

TABLE 2. RESPONSES OF VOCATIONAL AGRICULTURE INSTRUCTORS AND SUPERINTENDENTS TO EMPLOYMENT JUSTIFICATION AND EDUCATIONAL REQUIREMENTS OF AGRICULTURAL TEACHER AIDES

Question	Total group	Mean of		Chi square
		All vocational agriculture instructors	All superintendents	
Employment justification:				
1. Use of an aide would add to the effectiveness of our vocational agriculture department	3.85	4.25	3.33	80.3***
2. By using an aide our vocational agriculture department could expand:				
a. High school programs	3.64	4.10	3.01	90.3***
b. Adult programs	3.53	3.83	3.16	36.1***
c. Disadvantaged programs	3.52	3.88	3.04	48.2***
d. FFA activities	3.86	4.27	3.30	87.1***
Educational requirements of agricultural aides:				
1. Aides would not require special training	1.73	1.65	1.84	6.5
2. Aides would require special training	4.19	4.31	4.03	10.1*
3. If yes, the most logical training institution for aides would be:				
a. Vocational school	3.87	3.85	3.90	1.2
b. Junior college	2.72	2.84	2.54	7.8
c. Technical college (such as Crookston or Waseca)	4.10	4.24	3.90	13.9**
d. Four-year college	2.57	2.67	2.44	4.4
4. Courses best suited for agricultural aide education would be:				
a. Agricultural Mechanics	4.30	4.53	3.95	51.1***
b. Horticulture	3.86	4.04	3.59	24.1***
c. Agricultural Economics	3.15	3.07	3.28	16.2***
d. Plant Sciences	3.75	3.94	3.46	21.6***
e. Animal Sciences	3.79	3.97	3.50	26.3***
f. Agricultural Education	3.26	3.22	3.32	4.8

***Significant at the .002 level.

**Significant at the .01 level.

*Significant at the .05 level.

percent. The remaining superintendents who responded to this question expressed that reimbursement would have to be 50 percent or higher in order to justify hiring an agricultural teacher aide. The most commonly indicated salary was between \$200 and \$400 per month. The majority of the superintendents felt that liability would not be

a limiting factor in employing agricultural teacher aides.

It is the opinion of the author that agricultural teacher aides do have a place in the vocational agriculture program when conditions warrant. When they share the load of the present instructor or instructors to provide more time for individual attention to students

by doing menial tasks requiring less educational know how, they can be an asset. The salaries superintendents would be willing to pay and the reimbursement they indicated they would have to receive could be a seriously limiting factor in the initiation and acceptance of such a program in vocational agriculture, however. ◆◆◆

AGRICULTURAL ACCIDENT PREVENTION --

PROBLEMS AND ACCOMPLISHMENTS

Benton K. Bristol
Department of Agriculture
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Normal, Illinois

Large, formal, and comprehensive efforts in agricultural accident prevention have not been made until comparatively recent years. The National Safety Council was organized in 1913, but it was not until 1943 that the Farm Department was established in the Council. This same year the first farm safety specialist in the United States was employed by the college of agriculture at a land-grant university.

There have been seven editions of the National Safety Council's *Accident Prevention Manual for Industrial Operations*. The latest edition contains more than 1600 pages. There has been one 40-page edition of the *Farm and Ranch Safety Guide*. It should be remembered, however, that many of the accident prevention ideas which have proven successful for industry have subsequently been adopted by agriculture. The *Accident Prevention Manual for Industrial Operations* can furnish many insights of value to the alert farm safety leader or agricultural occupations instructor.

Farming has had one of the poorest safety records of any industry in the United States. The rugged individualism, willingness to take financial and other risks, physical courage, and related characteristics which the more successful farmers seem to have in full measure are the same characteristics which may be the contributing causes to their many mishaps. Lack of effective supervision, inexperienced employees, varying weather conditions, and farm work which must be done at certain times regardless of conditions don't help establish records for accident-free years which are often true in manufacturing.

There are a number of reasons why great efforts in agricultural accident prevention are being made now and will continue to be made in the future. The U.S. government has become mili-

tant about safety matters and seems intent on enforcing the orders and laws relating to safety. The Occupational Safety and Health Administration has announced, for example, that new farm tractors of more than 20 horsepower, purchased after October 24, 1976, and used by employees, must have rollover protection structures. Because of the cost to society in general, it is no longer a farmer's own business if he wants to taken unnecessary chances. The same is true for any other employer in the field of agriculture. In addition, more people now realize that prevention of accidents is good business for themselves and others.

The voluntary effort in agricultural accident prevention in recent years has been impressive. The National Institute for Farm Safety, Inc. was organized in 1962 to promote a safer agriculture. This unaffiliated and non-profit organization has active and effective committees in the following areas: Tractor and Machinery, Fire and Electricity, Farm Chemicals, Rural Traffic, Home and Farmstead, and Emergency Preparedness.

The American Society of Agricultural Engineers' Safety Committee approved a 10-year plan for a 50 percent reduction in farm work-related fatal and non-fatal accidents in December of 1970. Engineering has been, and will continue to be, applied where it can help reduce accidents, and every ASAE committee is expected to contribute to this effort.

All farm machinery manufacturers are giving greater attention to the safe design and use of their products. Some are making special efforts to produce valuable teaching aids and to inform all segments of agriculture about important safety developments. Two examples are: John Deere's *Agricultural Machinery Safety Instructor's Kit*, and two issues of International Harvester's

IH Farm Forum dealing with farm safety, OSHA regulations, results of a questionnaire on farm safety, and related matters.

In addition to the *Farm and Ranch Safety Guide* mentioned earlier, by the end of 1975 the Farm Department of the National Safety Council had produced 16 Rural Accident Prevention Bulletins. These excellent bulletins should be required reading for everyone interested in agricultural accident prevention. Some titles are: Tractor Safety Equipment, Safe Tractor Operation, Safe Movement of Farm Equipment on Public Roads, Lawn and Garden Equipment Safety, Electrical Safety on the Farm and Ranch, and Guarding and Shielding Farm Equipment.

The following committees of the Farm Conference, National Safety Council, are exerting effective leadership which is having many beneficial effects on the nation's agricultural safety efforts: Studies and Research Committee, Program Development and Information Committee, Organizations Committee, Executive Committee, and the Nominating and Membership Committee.

The United States Department of Agriculture is emphasizing safety to a greater extent than ever before. Nearly all states now have full-time safety leaders on their extension staffs.

A series of four regional Farm Safety Leaders Seminars were conducted during February and March of 1976. They were sponsored by the American Farm Bureau Federation, Extension Service, United States Department of Agriculture; Farm and Industrial Equipment Institute; National Institute for Farm Safety, Inc.; and the National Safety Council. Among the topics discussed in the two and one-half day meetings were: Philosophy of Farm Safety, Basic Safety Principles, The
(Concluded on next page)

CONTINUED AGRICULTURAL ACCIDENT . . .

Safety System, Resources Available and Types of Organizations, Women's Safety Programs, Youth Safety Programs, Regulatory Safety Programs, Voluntary Safety Programs, Update on Surveys, and Program Materials Developed through OSHA.

An *Agricultural Accident Prevention* course has been taught at Illinois State University, Normal, Illinois, for the past several years. The course is popu-

lar with both agriculture and industrial technology students.

A comprehensive farm accident survey schedule has been set up for the nation and will be completed by 1980. The standardized farm accident forms used in the program will allow for the collection of important safety data and an analysis of the data which has previously not been possible.

Yes, there have been and will con-

tinue to be problems in the effective implementation of agricultural accident prevention. However, after a rather late start, the agricultural community has significant safety accomplishments to its credit. It would not be at all surprising if agricultural accident rates in the United States were reduced rather dramatically sooner than many would have believed possible just a few years ago. ◆◆◆

CONTINUED A FILING . . . SYSTEM

serves as an attractive and functional desk.

One easy way to have a more functional filing system is to periodically "streamline" the file by removing bulky items, by transferring outdated items to an "inactive" file in a storage area and by removing and destroying duplicates and non-essential or temporarily-used materials. A quarterly, semi-annual or even annual "housecleaning" of the files can greatly increase file manageability.⁴

Conclusion

Every department should have an effective system for managing the ever increasing mass of educational resources. Businesslike efficiency is to be sought after, for without it, the job of handling the wealth of learning aids available to

the program becomes hopelessly bogged down in wasted time, loss of resources and confusion. The key to efficient and systematic management of resources in vocational agriculture is the local teacher. ◆◆◆

¹Source: Dr. Ray D. Bernardi, Business and Office Education, Univ. of Ky.

²Agdex is available for \$4 from Publication Sales, American Vocational Association, 1510 H Street, N.W., Washington, D.C. 20005.

³For advice on using the system, read "Agdex—Friend or Foe?" by David Smith in the March, 1976, issue of *Agricultural Education*, pp. 200-201.

⁴For further information read: *Fast Filing, Finding and Follow-up*, Prentice-Hall, Inc., 1962; and *Progressive Filing* by Kahn, Yerian and Stewart, Gregg Division of McGraw-Hill Book Co., 1969.

ECONOMICS: APPLICATIONS TO AGRICULTURE AND AGRIBUSINESS, by Ewell P. Roy, Floyd L. Corty, and Gene D. Sullivan. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1975, Second Edition, 570 pp. \$8.95.

The first edition of this book was published in 1971. It has been revised and updated, and five chapters have been added. This new edition is divided into five parts and contains 30 chapters. Part I introduces the subjects of agricultural economics and agribusiness; provides a brief history of U.S. agriculture; and discusses the several economic systems, types of business organizations and monetary systems together with a macro-profile of the U.S. economy. Part II is oriented toward the human, natural and capital resources available in agriculture and discusses the principal characteristics of U.S. farming operations. Part III is devoted to the explanation of economic concepts and principles including comparative advantage, physical production relationships, costs, returns, optimum output levels, supply, demand, the interaction of supply and demand, market structures and competition. Part IV is oriented more toward agribusiness including a discussion of the farm supply business, marketing and consumption of food and fiber and agricultural policy. Part V contains the chapters added in the second edition and deals with the Federal Reserve

BOOK REVIEWS

System, input-output functions, principles of agribusiness management, foreign trade and economic development. It is notable that economic problems are discussed both with the use of ordinary terms and the introduction of economic jargon. This should assist the reader in developing a practical understanding of what is being presented as well as becoming familiar with economic theory and economic institutions.

The authors have had extensive experience in the area of agricultural economics/agribusiness. Dr. Roy is Professor of Agricultural Economics and Agribusiness and Distinguished Faculty Fellow, Louisiana State University, and has been engaged in economics research and teaching for over 25 years. Dr. Corty is also Professor of Agricultural Economics and Agribusiness at Louisiana State University and has 25 years of experience in economics research and teaching and foreign assignments. Dr. Sullivan, formerly of Louisiana State University, is an economist with the Federal Reserve Bank of Atlanta. His experience includes

teaching introductory courses in agricultural economics, farm finance, and farm policy and conducting research in finance and production economics.

This book is designed for use as a text in introductory agricultural economics and/or agribusiness courses at junior and senior colleges and universities. It will be useful as a reference for teachers and students of agriculture in senior high schools, junior and senior colleges and universities, professional agricultural workers, young and adult farmers, agribusinessmen and others with similar interests.

J. Dale Oliver
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia

DATES AND EVENTS

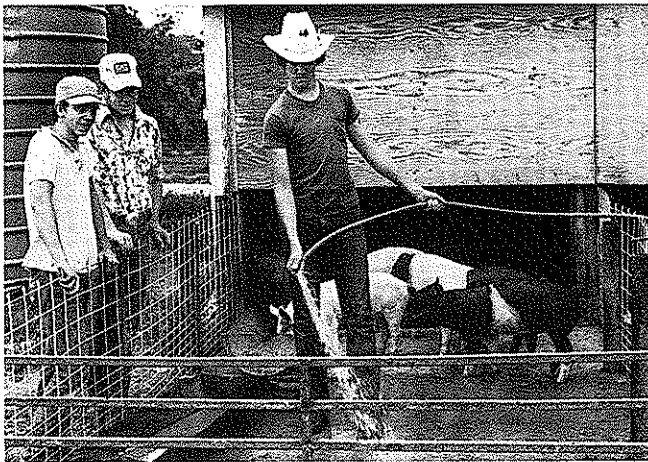
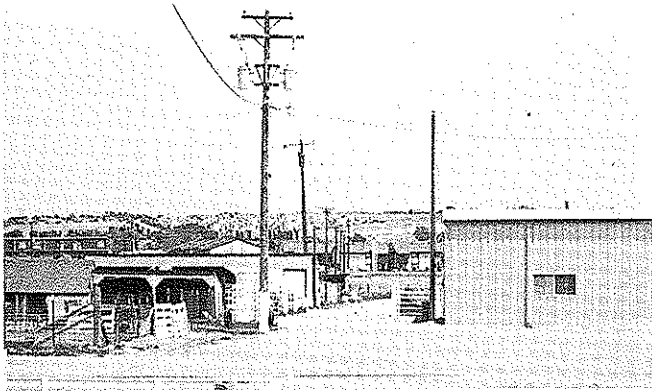
FFA Convention
Kansas City, Missouri, November 9-13

AVA, NVATA Convention
Houston, December 3-8

National Young Farmer Institute
Denver, December 11-15

STORIES IN PICTURES

by
*Jasper
S.
Lee*



FACILITIES IN COLORADO — Laboratory facilities provide for "learning by doing" in Colorado. Shown here (from top to bottom and left to right) are a farm laboratory facility at Cherry Creek, a humidifier being inspected by Dave Hollis at Aurora Technical Center, students cleaning feeder pig pens at Larimer County Vo-Tech Center, Tom Ball of Cherry Creek fueling the school's truck on the laboratory farm, and Curt Johnston demonstrating portable scales at Cherry Creek. (Photographs from Joe Sabol and Irving Cross, Colorado State University.)

