July 30, 1957

To the Graduate Council:

I am submitting herewith a thesis written by J. Eldridge Price, entitled "Vocational Agriculture Building, Facilities and Equipment Based on Instructional Needs in the Rogersville Community." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Education.

R. W. Wigger, Jr.
Major Professor

We have read this thesis
and recommend its acceptance:

A. J. Paulus

Helen M. Dewey

Accepted for the Council:

Dale Wantling
Dean of the Graduate School

VOCATIONAL AGRICULTURE BUILDING, FACILITIES AND EQUIPMENT BASED ON INSTRUCTIONAL NEEDS IN THE ROGERSVILLE COMMUNITY

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

---

by

J. Eldridge Price

August 1957

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CHAPTER I

INTRODUCTION

Vocational agriculture was initiated into the Rogersville High School curriculum program in 1946.

"At present the agriculture classroom and shop is located in a very inadequate, dilapidated building which appears unsafe and is located more than a city block away from the main buildings."[1]

For the past several years the school personnel of Hawkins County has been trying to improve the conditions of its schools.[2] Plans are underway for providing complete vocational agriculture facilities for classroom and shop.

Statement of the Problem

The problem was to determine the need for, prepare a suggested floor plan of and present a list of facilities needed for a new vocational agriculture department building at the Rogersville High School.

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[1] "A Survey of the Hawkins County, Tennessee, Schools" (Knoxville: University of Tennessee, 1956), p. 21.

[2] John C. Horner, Jr., "A Study of Adequacy of Existing School Buildings and Grounds of Hawkins County, Tennessee," Unpublished Master's Thesis, University of Tennessee, June 1956, p. 1.

Importance of the Study

The writer has been employed as a teacher of vocational agriculture since July, 1946. The vocational agriculture program offered by the department was a planned program based on the needs of the students enrolled. However, the building used for housing the department of vocational agriculture is inadequate. It is an old National Youth Administration building that has become dilapidated and unsafe; moreover, the Hawkins County school bus maintenance department is located in the same building. The area occupied by the vocational agricultural department contains an office of eighty square feet, six hundred square feet for classroom and three rooms for the shop of approximately five hundred square feet each.

Due to the inadequate shop space it has been almost impossible to carry out the farm mechanics shop program needed by the students.

The local school administrators found through their own efforts of determining needs for schools in Hawkins County, as well as through a survey made by the Department of Educational Administration, College of Education, University of Tennessee, that there was a definite need for building a new vocational agriculture department building. The enthusiasm shown by the administrators encouraged the writer to make the study. The administrators offered to give all the help possible.

The major purpose of the writer was to bring together some of the important facts and opinions relative to planned vocational agriculture department buildings and to present these findings to the Hawkins County Board of Education for their consideration in erecting

a building to house the department of vocational agriculture to serve the needs of the students and community of the Rogersville High School area.

In examining related literature, the writer found that the Tennessee Department of Vocational Education, unlike neighboring states, has no recorded plan to guide educators, architects and engineers toward designing blueprints of a desirably arranged floor plan for a vocational agriculture department. Since many new departments are being constructed, it is hoped that this study may become a helpful guide to those in charge of construction and planning.

The writer believed that an effective vocational agriculture program could be determined through the use of interviews to explore the farm conditions of the community. He also believed a course of study based on the needs of the students would justify the facilities needed to guide his teaching effectively.

Definition of Terms

The term "suggested plan" as used in this study is interpreted to mean floor plans of the classroom, office, shop and storage, plus the arrangement of equipment and facilities used.

"Building" as used in the study refers to the structure which houses the department of vocational agriculture.

The term "vocational agriculture" refers to the instruction given and learning situation provided all-day students, young farmers and adult farmers for improving proficiency in farming.

"Planned" is interpreted to mean there was a purpose before action was taken.

"Rogersville High School Area" as employed in the study means the area from which students attend the Rogersville High School.

"Farm management" refers to a study of farm organization, business analysis and adjustments, as well as strengthening weak points.

"Students" is used in this study to indicate all persons enrolled in vocational agriculture.

"Administration" refers to the Board of Education, County Superintendent, High School Principal and members of the Quarterly County Court.

Scope and Limitations

This study is limited to the vocational agriculture program at Rogersville High School for adult and all-day students who were or will be regularly enrolled in the course of study. The study was based on an average enrollment of seventy.

The study was restricted to the Rogersville High School area because it was felt that: (1) a more thorough study could be made by limiting it to the one area, (2) the results would more nearly apply to other school areas in Tennessee, (3) the scope of the study was sufficient to produce significant results, (4) by limiting the study to the Rogersville High School area, personal interviews could be arranged with the Agriculture Extension Service, Soil Conservation Service, Agriculture Stabilization Committee, Farmer's Home

Administration, assistant vocational teacher and selected farmers, (5) personal interviews were possible with administrators including Superintendent, members of the Board of Education, Quarterly Court, principals, civic-minded persons and students.

Methods of Procedure and Sources of Data

In developing this study the writer made an extended study of related literature devoted to the subject of establishing a need for vocational agriculture, planning the course of study, recommendations for vocational agriculture buildings and providing necessary facilities for establishing and maintaining a complete program of vocational education in agriculture.

An investigation was made of former students of vocational agriculture to determine effectiveness of the program of vocational agriculture of which they were a part. This study would also show the number of students in the past enrolled in vocational agriculture and provide a basis for determining future enrollment.

Census data were studied to determine the need for vocational agriculture at the Rogersville High School.[3] Census data studied would reveal population trends, the important enterprises, sources of income, types of farms, kind of power and such to be used as a guide in planning

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[3] U. S. Bureau of the Census, United States Census of Agriculture, Vol. I (Washington: Government Printing Office, 1954), p. 3.

the instructional program for students enrolled in Rogersville High School vocational agriculture classes.

Personal interviews were held with two members of the Agriculture Extension Service, Soil Conservation Service technician, ten selected farmers strategically located throughout the service area, three local vocational agriculture teachers, county superintendent of schools, two county school supervisors and the principal of the high school.

The attitude of previous students, census data and personal interviews were used as the basis for formulating the course of study.

A study of plans from other states and conference with Dr. George W. Wiegers, Jr., Head, Department of Agricultural Education, University of Tennessee, were used as guides in planning a vocational agriculture building for the Rogersville High School service area.

The selection of the equipment was based on the instructional materials needed for teaching students the various jobs selected.

Organization of the Study

Chapter I introduces the problem and sets forth the importance of the study, limitations and the procedure followed in solving it.

Chapter II presents the findings and emphasizes the need for instruction in vocational agriculture at the Rogersville High School.

Chapter III presents the course of instruction to be offered to meet the needs of students enrolled in vocational agriculture at the Rogersville High School.

Chapter IV is devoted to a suggested building plan to house the department of vocational agriculture.

Chapter V presents the suggested equipment and instructional materials needed in carrying out the teaching of the students enrolled in vocational agriculture at the Rogersville High School.

CHAPTER II

DETERMINING THE NEED

In 1946 the writer was employed by the Hawkins County Board of Education to establish a vocational agriculture department in the Rogersville High School. It has been the responsibility of the writer to direct the program of vocational agriculture in this school since that date.

The program of vocational agriculture has included instruction for all-day boys, young farmers and adult farmers. It was a part of the total school program and contributed to the aims of education established by the school. The vocational agriculture teacher, community advisory committees and students set up the program of vocational agriculture. It was examined, modified and approved by the County Superintendent of Schools and the High School Principal.

Every five years the writer developed a long-time program for vocational agriculture for the service area served by the Rogersville school. This program included an analysis of the current agricultural situation in the community and the objectives that grew out of the analysis of the situation.

Importance of Agriculture in Hawkins County

According to the most recent census, agricultural products are the leading source of income in Hawkins County. The division of the agricultural land of Hawkins County into its major crop usage is as

follows: cropland harvested, 54,450 acres; cropland used only for pasture, 19,204 acres; cropland not harvested and not pastured, 6,861 acres; woodland pastured, 19,755 acres; woodland not pastured, 59,386 acres; other pasture (not cropland and not woodland), 70,417 acres.[1]

An average of 1,452,496 gallons of milk are received annually at the various markets. An average of $478,450 is paid to the farmers of Hawkins County annually for this milk. The milk for processing is sold to Pet Milk Company with plants at Greeneville, Tennessee, and Abingdon, Virginia. It is assembled at the Surgoinsville, Tennessee, sub-station. The Kraft Milk Company recently built a processing plant at Greeneville, Tennessee, and has established routes in Hawkins County. New as well as old producers of milk are selling to Kraft. The twenty-nine Grade A dairies sell milk to two bottling companies in Hawkins County, also, to Pet Dairy Products and Foremost Dairies of Kingsport and Southern Dairies of Knoxville.[2]

The value of all farm products sold in 1954 by the farmers of Hawkins County amounted to $4,126,666. Of this amount, the crops sold accounted for $2,615,340 (field crops accounted for $2,583,474; vegetables, $15,657; fruit and nuts, $16,209). All livestock and livestock products sold amounted to $1,464,902 with dairy products accounting for $520,384. Poultry and poultry products came to $140,156, livestock and

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[1] U. S. Bureau of Census, "Tennessee Counties and State Economic Areas," 1954 United States Census of Agriculture, Vol. I, Pt. 20 (Washington: Government Printing Office, 1956), pp. 64-65.

[2] Tom Carney, Hawkins County Agent, Personal Interview, June, 1957.

livestock products was $804,362. Forestry products supplemented the Hawkins County farmers' income by $46,424.

Establishing the Service Area

The service area of the vocational agriculture program of Rogersville High School was determined on the basis of enrollment of rural students in the feeder schools, grades one through eight. Upon completion of the eighth grade these students normally enroll in the Rogersville High School. This was done by studying school enrollment records in the superintendent's office.

Table I shows the number of students enrolled in the one-teacher schools, two-teacher schools and the consolidated grade schools of Hawkins County who would attend the Rogersville High School. It also shows the distance and direction of rural communities in relation to the Rogersville High School service area. Thus the service area of the vocational agriculture department of Rogersville extends over an area of 207 square miles, or approximately 42 per cent of the area of Hawkins County.

Table II reflects the past enrollment for the Rogersville High School and the vocational agriculture classes. It also gives the expected enrollment of each through 1964-65. This table indicates that the peak enrollment will be reached in 1958-59. It also shows a decrease of less than 3 per cent for each school year after the peak enrollment has been reached. This table indicates that the peak enrollment for vocational agriculture was reached in 1953-54 and suggests

TABLE I

FEEDER SCHOOL ENROLLMENT, DISTANCE AND DIRECTION
RELATED TO THE ROGERSVILLE HIGH SCHOOL

Feeder School	Enrollment 1955-56	Distance (Miles)	Direction
One-teacher schools			
Clouds Creek	22	10	North-West
Ebbing and Flowing Springs	23	6	East
Fairview	14	4	North-West
Fishers Creek	19	12	North-East
Grigsby	21	10	South-West
Maple Hill	37	15	North
Slate Hill	22	20	South-West
Two-teacher schools			
Choptack	44	7	North-West
Enterprise	41	9	South
Keplar	231	9	South-East
Lake View	49	11	West
Lee Valley	47	10	South-West
Marble Hall	37	4	West
McKinney	50	5	South-East
Mooresburg	261	16	West
New Life	42	18	North-West
Persia	39	6	South-West
Rock Hill	312	6	North-East
Sam Long	52	3	South
Simpson	41	22	South-East
Spruce Pine	72	20	North-West
Stone Mountain	63	16	North
Strahl	56	7	South
Van Hill	42	16	South-East

TABLE II

SCHOOL AND VOCATIONAL AGRICULTURE ENROLLMENT
FOR ROGERSVILLE HIGH SCHOOL, 1946-65

School Year	Grade 9	Vo. Ag. 9	Grade 10	Vo. Ag. 10	Grade 11	Vo. Ag. 11	Grade 12	Vo. Ag. 12	Total School	Total Vo. Ag.
1946-47	99	18	90	14	50	13	64	14	303	59
1947-48	127	26	71	16	61	12	43	13	302	67
1948-49	115	27	72	23	52	9	49	11	288	70
1949-50	153	30	95	26	54	16	47	9	349	81
1950-51	141	40	135	25	50	23	50	11	408	99
1951-52	168	28	115	25	72	15	57	15	457	83
1952-53	170	38	138	30	117	14	96	9	505	91
1953-54	180	49	145	25	101	12	90	17	535	103
1954-55	196	20	160	23	120	13	102	13	590	68
1955-56	195	26	167	17	132	21	126	12	625	76
1956-57	243	28	158	19	137	13	119	15	650	75 *
1957-58	211	25	190	23	126	17	118	10	645	85
1958-59	229	27	163	21	158	20	109	16	659	84
1959-60	172	25	179	24	136	18	143	17	630	84
1960-61	190	26	135	21	149	21	122	15	596	83
1961-62	211	27	149	23	112	17	132	16	604	87
1962-63	208	26	164	23	123	17	101	14	596	80
1963-64	157	24	162	22	136	18	110	14	565	78
1964-65	146	24	122	20	135	18	123	15	526	77

*All figures below dotted line are estimates.

that there will be very little change in the total vocational agriculture enrollment for the next eight years.

The table indicates that approximately the same number of students would be enrolled in vocational agriculture each year. This number was arrived at by a school policy that the teacher of vocational agriculture and the principal would screen the students for vocational agriculture to only those who need it and would profit from the course of study offered.

Replacement Needs

Data on replacement needs of farmers in Hawkins County is shown in Table III. This information was taken from a study made in 1953 by J. W. Brimm.[3]

This study shows that the county has about 13 per cent more farm males than farms (4,572 to 4,029).

The two columns in Table III on deaths and numbers passing their seventieth birthday during the ten-year period, 1950-60, show nineteen more deaths (459 to 440) than the number passing seventieth birthdays.

Replacement needs show 899 farmers are needed for a ten-year period, or ninety per year. The group, 172 per year, passing their twentieth birthday must be considered as a source of replacement. The fact that ninety farm males are needed each year for replacement purposes in Hawkins County presents not only a replacement problem, but

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[3]J. W. Brimm, "Determining the Replacement Needs for Farmers in the State and Counties of Tennessee" (Unpublished Problem in lieu of thesis, University of Tennessee, 1953).

TABLE III

FARMER REPLACEMENT NEEDS
FOR HAWKINS COUNTY

1950		1960		Replacements		
Number Farms	Number Farm Males	Deaths 1950-60	Passing 70th Birthday	10-Year Period	1-Year Period	Passing 20th Birthday
4028	4572	459	440	899	90	172

also a guidance problem for the other eighty-two rural boys not needed. During the first year of vocational agriculture it is evident that guidance could be of value to both groups in selecting vocations of their choice. This guidance program could guide some into and some out of farming, which would be of value to the boys and to the vocations.

Then, too, there is a field for young farmer education which could reach many of these replacements already out of school. The plan provided for those not reached through the above to be reached through adult farmer classes.

It is assumed, therefore, that farmers realizing a need for instruction to meet the increased demands and desiring to improve their farming efficiency would enroll in classes of vocational agriculture if adequately planned adult education was offered.

Table IV gives the program of adult education in vocational agriculture carried on by the Rogersville High School vocational agriculture teacher from 1950 to 1957. It indicates that eight different communities were organized within the service area of the Rogersville High School vocational agriculture department.

Several different courses were taught; however, "farm management" seemed to be the most popular among farmers. Had there been facilities available, "farm mechanics" would have been offered more often.

As indicated by Table IV, 221 farmers were enrolled in the fourteen courses of the seventy-nine meetings for a total of 352 instructional hours.

TABLE IV

ADULTS ENROLLED IN VOCATIONAL AGRICULTURE
ROGERSVILLE HIGH SCHOOL SERVICE AREA
1950-57

Year	Course Taught	Total Number Meetings Held	Total Number Hours Taught	Total Number Adults Enrolled	Community In Which Class Was Held	Number Completing Improvement Projects
1950	Farm Management	15	30	24	St. Clair	20
1951	Farm Management	13	26	22	Cuba	18
1952	Farm Mechanics	12	24	18	Lake View	18
1953	Soils	13	26	16	Cuba	16
1953	Seasonal Jobs	12	18	15	Marble Hall	13
1954	Farm Management	14	28	15	Persia	14
1954	Seasonal Jobs	13	26	16	Grigsby	12
1955	Farm Management	12	24	16	Keplar	14
1955	Farm Management	13	26	17	Grigsby	17
1956	Farm Mechanics	12	24	12	Rogersville	12
1956	Farm Management	12	24	12	Persia	12
1957	Farm Management	12	24	13	Persia	10
1957	Farm Management	14	28	13	Grigsby	13
1957	Farm Management	12	24	12	Keplar	8

Table V shows what happened to the senior vocational agriculture students for a ten-year period, 1947-57.

Of the 139 vocational agriculture graduates, 25 per cent are established in farming, while 12 per cent are engaged in part-time farming and 11 per cent are employed in related agricultural occupations. Thus a total of sixty-seven, or 48 per cent of the graduates, are engaged in farming and its related occupations. It is believed that the 24 per cent in the armed services will return to the farm upon their completion of service.

The needs, interests and wants of students were determined from information blanks, observation, conferences, committees and the study of census data and records. Table VI shows the supervised farming program of the Rogersville High School students for the year 1955-56. It also shows his major interest in relation to the enterprises produced on the home farm. The adaptability to the area and the opportunity for production was based on the relative success farmers were having in producing the crop or livestock. The trend as shown in the table was found by comparing the 1949 census report to the 1954 census. The time allotted to teaching of the enterprises is also shown in the last column of the table.

TABLE V

OCCUPATIONAL FOLLOW-UP OF VOCATIONAL AGRICULTURE
GRADUATES ROGERSVILLE HIGH SCHOOL 1947-57
(NUMBER IN EACH GROUP 1957)

Graduate Year	Number Graduating	Farming	Part-time Farming	Related Agricultural Occupations	Other Occupations	Armed Services	Unknown
1947	14	1		5	3	2	3
1948	13		1	2	2	6	2
1949	11	3	3		1	1	3
1950	9	3	1		2	1	2
1951	11	1	1	1	3	4	(Deceased)
1952	15	2	2	2	1	7	1
1953	9	4	2		3		
1954	17	5	1	3		5	3
1955	13	3		1	5	4	
1956	12	4	2	1	1	3	1
1957	15	8	4	1	2	—	—
Total Number	139	34	17	16	23	33	15
Total Per cent		25	12	11	17	24	11

TABLE VI

FARM ENTERPRISE SITUATION ROGERSVILLE HIGH SCHOOL AREA 1955-56

Enterprise	Supervised Farming Program		Enrollee's Major Interest		Produced On Home Farm		Adapt-ability To Area	Opportunity For Production	Trend		Time Allotted	
Crop	No.	Per Cent	No.	Per Cent	No.	Per Cent			Acres Or No.	Prod.	Hrs.	Per Cent
Corn, for grain	56	70	19	24	65	81	Good	Good	Minus	Plus	14	10
Garden, home	33	41	—	—	80	100	Excellent	Excellent	Plus	Same	12	8
Garden, Market	2	3	4	5	5	6	Excellent	Very good	Plus	Plus	5	4
Hay, Alfalfa	11	14	21	26	45	56	Very good	Very good	Plus	Plus	6	4
Hay, mixed	32	40	27	34	75	94	Excellent	Excellent	Minus	Plus	7	5
Pasture	0	0	8	10	79	99	Excellent	Excellent	Minus	Plus	16	11
Potatoes, Irish	9	11	1	0	78	97	Fair	Fair	Minus	Plus	—	—
Potatoes, sweet	2	3	0	0	50	63	Good	Good	Minus	Plus	—	—
Small grain	3	4	5	6	48	60	Good	Very Good	Minus	Plus	—	—
Strawberries	19	24	12	15	28	35	Excellent	Excellent	Plus	Plus	12	8
Tobacco, burley	65	81	63	80	77	96	Excellent	Excellent	Same	Plus	20	14
Livestock												
Bees, hives	3	4	0	—	15	19	Good	Very Good	—	—	—	—
Cattle, beef	21	26	25	31	36	45	Very Good	Very Good	Plus	Plus	11	8
Cattle, dairy	37	46	34	43	70	87	Excellent	Very Good	Same	Plus	20	14
Ponies	1	1	0	—	3	4	Good	Very Good	—	—	—	—
Poultry	6	8	8	10	70	87	Good	Good	Minus	Minus	9	6
Sheep	1	1	1	1	5	6	Good	Very Good	Plus	Plus	—	—
Swine	35	44	12	15	70	87	Good	Fair	Minus	Minus	12	8

CHAPTER III

DEVELOPING A COURSE OF STUDY

Review of Related Information

An extended review of related literature indicated that several studies have been made on developing courses of study and several books and magazine articles have been published.

The psychological basis for building an educational program upon the needs of individuals and groups was given by Aderhold.[1] He states that learning is characterized by the application of intelligence in the meeting of needs and that teachers should understand and help meet the needs of the individual in such a way as to make life richer and more meaningful. The fact that teachers should study all aspects of the farm and community living to discover the needs was stressed in his writings.

Hammonds[2] emphasized the need and use of a course of study for vocational agriculture teachers. He said that deciding what to teach is the most baffling problem in agricultural education. He indicated that the first requirement for constructing a course of study is to have a clear conception of the purpose of the course. A course should enable the teacher to accomplish his aim or purpose, which is to train

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[1] O. C. Aderhold, "A Philosophy of Vocational Education in Agriculture," Agriculture Educational Magazine, 12:164, March, 1940.

[2] Carsie Hammonds, Teaching Vocational Agriculture (New York: McGraw-Hill Book Company, Inc., 1950), pp. 63-95.

present or prospective farmers for proficiency in farming. The course builder should know as much as possible about the farming that is carried on in the community or area in which the course is to be used. Some of the questions asked were concerned with what crops and animal enterprises are common and what is their relative economic importance. The use of students' farming programs was also used in planning the course calendars.

Estep[3] found that it was difficult to determine the jobs to be taught until the teacher knew the practices being carried out on the student's home farm. After the teacher knew the practices being carried out on the home farm and the desires of the student, certain jobs to be taught could be set up. He also indicated a need for teaching jobs that were not being done successfully in the community.

Garris[4] pointed out that each teacher of vocational agriculture must design a course of study for his particular community and the student needs for instruction. In order to be able to prepare the course of study well, a teacher must be acquainted with local farming facts, conditions and situations. The teacher may secure a great deal of usable information by following these procedures:

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[3]Tipton C. Estep, "Relationship Between Course Content and Community Types of Farming (Non-thesis study, Department of Agricultural Education, University of Tennessee, 1949).

[4]E. W. Garris, Teaching Vocational Agriculture (New York: McGraw-Hill Book Company, Inc., 1954), pp. 115-139

1. Contacting various agencies and representatives
    a. The county agricultural agent
    b. The supervisor of the Farmer's Home Administration
    c. Soil-conservation agents
    d. Local farm organizations
    e. Local markets
    f. Local chamber of commerce
    g. Federal and local credit organizations
    h. County assessor
2. Obtaining copies of studies and reports
    a. Federal census (farm)
    b. State Census (farm)
    c. Land use
    d. Farm management
3. Making surveys and contacting farmers in the community
    a. Home-improvement surveys
    b. Enterprise surveys
    c. Inventory surveys
    d. Farm-mechanics surveys
    e. Visits to leading farmers

In addition to the above methods for securing local farming data, Garris emphasized the use of an advisory council, composed of farmers and businessmen, to review the facts as summarized.

From the local facts obtained, a teacher should be able to determine the following:

1. The types of farming in the community
2. The relative importance of the various agricultural enterprises in making a contribution to the income
3. The most important and urgent farm problems
4. The factors associated with successful farming
5. General farming conditions, such as drainage, soil fertility, markets and home conveniences
6. Long-time trends in land use, water use, changes in types of farming and rural living

The first year, in Garris' opinion, is the time to place major emphasis on the student's launching his long-time supervised farming program, leading toward establishment in farming at the earliest possible date. In the first year, therefore, the teacher must provide units of instruction that will acquaint the student with his task and assist him in making the necessary beginning plans. A few of the suggested units (jobs) are as follows:

1. Determine the importance of agriculture in the community
2. Exploring the occupational opportunities in agriculture
3. Getting more familiar with the training needs of people who plan to farm
4. Getting better acquainted with the facilities of the local training program
5. Deciding what type of farming to follow
6. Selecting the enterprises for a type of farming
7. Choosing the productive enterprises, improvement projects and supplementary skills for each year

Garris concludes that all enterprises and certain general subjects, like farm management and farm shop, should be analyzed into jobs. The jobs may be taught to the class or a group within the class or studied by individuals. A "farm job," used as a teaching unit, may be defined as a complete unit of work in the production and marketing of a farm enterprise. One job may be distinguished from another by the place where the work is performed, by the purpose of the work, and by the equipment used, if any.

Phipps[5] set up a method of how a teacher should plan a course of study:

1. Make a list of enterprises and units to be included in each year's program
2. Determine the number of days to allot to each enterprise by years
3. Divide enterprises and units into problem areas to be taught
4. Estimate the number of days to devote to each problem area
5. Decide on the year and month to teach each problem area
6. Prepare a monthly layout of problem areas

Richards[6] devoted an entire bulletin to crop and livestock enterprises and other teaching areas included in vocational

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[5]Lloyd J. Phipps and Glenn C. Cook, A Handbook for Teaching Vocational Agriculture (Danville, Illinois: The Interstate Printers and Publishers, 1952), pp. 176-198

[6]C. E. Richards, et al., "Suggested Units in Vocational Agriculture," Agricultural Education Bulletin No. 17, Department of Vocational Education, Virginia Polytechnic Institute, Revised edition, 1952.

agriculture. He broke these enterprises and areas down into jobs and listed things to consider in studying each job.

Estep,[7] in a special problem, indicated that the enterprise in which the majority of projects occur in the boys' supervised farming programs should be given the most time on a yearly teaching plan. He also stated that it is difficult to teach all the jobs in the field of agriculture; therefore, they must be selected on the basis of importance in meeting the needs of the students. Estep said that jobs taught on a seasonal basis were more stimulating to students; therefore, more interest is created in developing and carrying out the job.

Wiegers,[8] in instructing teachers to plan a curriculum for vocational agriculture, set up specific steps in making courses of study in vocational agriculture:

1. Study enrollees and local situation to determine needs, interests and wants
2. Translate needs, interests and wants into objectives of courses
3. Decide on productive enterprises, instructional areas and other major units to include in courses
4. Set up a four-year layout for each enterprise, instructional area and other course area

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[7]Tipton C. Estep, "Building the Course of Study Around Individual Supervised Farm Program," (Non-thesis study, Department of Agricultural Education, University of Tennessee, 1949)

[8]George W. Wiegers, Jr., Head, Department of Agricultural Education, University of Tennessee, "Guide for Curriculum Planning in Vocational Agriculture," A committee report, July, 1956.

Instructional Areas

General

In determining the major enterprises, instructional areas and other major units to include in the Rogersville High School vocational agriculture courses, the investigator interviewed local vocational agriculture teachers and agricultural workers, reviewed studies and course calendars of the writer. Much information was derived from 1950 and 1954 farm census data.

Presentation of Findings

Table VII shows crop enterprises that were carried out in students' supervised farming programs for 1956. It also shows crop enterprises reported in 1954 census of agriculture. It shows that the crop enterprises of major proportion to the students of vocational agriculture were as follows: tobacco, corn, pasture, home garden, hay and strawberries. It shows that the crop enterprises of major proportion on farms of Hawkins County were as follows: home garden, hay, pasture, tobacco, Irish potatoes, woodland, corn and small grain.

In Table VIII it is seen that the major livestock enterprises for the vocational agriculture students of the Rogersville High School and on farms in Hawkins County were as follows: dairy cattle, beef cattle, swine, poultry and sheep. Poultry includes egg production, broilers and a small number of capons, turkeys and geese.

Table IX shows the sources providing the greatest returns from products sold to be tobacco, livestock and livestock products (cattle,

TABLE VII

KIND AND SCOPE OF CROP ENTERPRISES REPORTED BY ROGERSVILLE VOCATIONAL AGRICULTURE STUDENTS 1956 AND BY 1954 CENSUS OF AGRICULTURE HAWKINS COUNTY FARMS

	Students			Farm Census		
Enterprise	Number Students Reporting[a]	Total Number Acres	Per Cent Students Reporting	Number Farms Reporting[b]	Total Number Acres	Per Cent Farms Reporting
Corn	56	133.7	70	2317	14686	63.6
Garden, home	33	21.6	41	3249	—	89.0
Garden, market	2	8.0	3	36	67	1.0
Hay, alfalfa	11	36.0	14	509	2816	14.0
Hay, mixed	32	153.0	40	3116	25303	85.0
Pasture	48	786.0	60	2791	109376*	77.0
Potatoes, Irish	9	4.7	11	2540	83**	69.0
Potatoes, sweet	2	1.6	3	1376	38**	28.0
Tobacco, burley	65	35.4	80	2757	2990	76.0
Small grain	3	17.0	4	1243	8695***	34.0
Strawberries	19	7.5	24	32	8	0.9
Woodland	2	62.0	3	2392	79141	66.0

[a] In 1956 total vocational agriculture students for the school were 79.

[b] In 1954 total farms for the county were 3,646.

* Includes all hay cut, less alfalfa.

** For 1954 does not include acreage for farms with less than twenty bushels harvest.

*** Includes grains grown together: wheat, oats, barley and rye.

TABLE VIII

KIND AND NUMBER OF LIVESTOCK AND POULTRY ENTERPRISES REPORTED BY ROGERSVILLE VOCATIONAL AGRICULTURE STUDENTS 1956 AND IN 1954 CENSUS OF AGRICULTURE HAWKINS COUNTY FARMS

	Students			Farm Census		
Enterprise	Number Students Reporting[a]	Total Number Animals	Per Cent Students Reporting	Number Farms Reporting[b]	Total Number Animals	Per Cent Farms Reporting
Beef cattle	21	32	26	2897	15458	79
Dairy cattle	37	93	46	2739	10231	75
Poultry	6	1575	8	2961	130587	81
Sheep	1	12	1	27	1270	08
Swine	35	56	44	2419	9059	66

[a]In 1956 total vocational agriculture students for the school were 79.

[b]In 1954 total farms for the county were 3,646.

TABLE IX

THE VALUE OF FARM PRODUCTS SOLD BY SOURCE
HAWKINS COUNTY 1954[a]

Source	Value (Dollars)	Per Cent Total Sales
Dairy products	520,384	12.6
Forest products	46,424	01.1
Fruit and nuts	16,209	0.4
Livestock and livestock products	804,362	19.5
Other field crops	590,682	14.3
Poultry and poultry products	140,156	3.4
Tobacco	1,992,792	48.3
Vegetables	15,657	0.39

[a]The value of all farm products sold 1954 was $4,126,666.

hogs, sheep and work stock), dairy products, field crops (other than tobacco), and fruit and nuts.

Table X shows the facilities and equipment employed on the farms of Hawkins County. One of the most significant facts shown is that 92 per cent of the farms reported in the census all had electricity. This table also shows the importance of farm machinery and equipment used by farmers of the county.

Four-Year Course Area

The investigator selected ten productive enterprises and nine major units which appeared to be the most important to include in the Rogersville High School vocational agriculture instructional course. These productive enterprises are as follows: corn, home and marketing garden, hay, pastures, tobacco, strawberries, beef cattle, dairy cattle, poultry and swine. The instructional areas are as follows: orientation, Future Farmers of America, supervised farming program, animal improvement and nutrition, controlling insects, diseases and parasites, crop and soil science, agricultural economics and farm management and farm mechanics.

Table XI sets up a four-year course area layout including the productive enterprises and other major units included in the course of instruction. It also shows the amount of time allotted by year, as well as the total time, for teaching each unit. Approximately 28 per cent of total teaching time is to be used for instruction in farm mechanics, while 14 per cent will be used for instruction in the

TABLE X

KIND AND NUMBER OF SPECIFIED FACILITIES AND EQUIPMENT
REPORTED IN 1956 CENSUS OF AGRICULTURE
HAWKINS COUNTY FARM CHARACTERISTICS

Facilities and Equipment	Number Farms Reporting[a]	Total Number Farms	Per Cent Farms Reporting
Artificial ponds and reservoirs	476	838	13
Automobiles	1837	2013	51
Corn pickers	51	56	01
Electricity	3325	3325	92
Field forage harvesters	13	13	04
Grain combines	102	102	03
Home freezers	482	482	13
Milking machines	61	61	02
Motortrucks	968	1019	27
Pick-up hay balers	148	148	04
Piped running water	1608	1608	45
Power feed grinders	182	182	05
Telephones	733	733	20
Tractors	1054	1238	29

[a]In 1954 estimated number of farms for the county was 3,604.

TABLE XI

FOUR YEAR COURSE AREA LAYOUT FOR ROGERSVILLE HIGH SCHOOL VOCATIONAL AGRICULTURE

Course Area	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Orientation	5	1	1	1	8
Future Farmers of America	15	10	10	10	45
Supervised Farming Program	38	25	20	15	98
Corn	10	4			14
Home and marketing garden	11	6			17
Hays	7	6			13
Pastures		6	10		16
Tobacco	12	6	2		20
Strawberries	7	3	2		12
Beef cattle	4	5	2		11
Dairy cattle	7	10	3		20
Poultry		7	2		9
Swine	6	6			12
Animal improvement and nutrition			20	5	25
Controlling insects, diseases and parasites		8	8	8	24
Crop and soil science			14	24	38
Agricultural economics and farm management			9	40	49
Farm mechanics	35	54	54	54	197
Miscellaneous	18	18	18	18	72
Total	175	175	175	175	700

supervised farming program. The managerial areas of animal improvement and nutrition, controlling insects, diseases and parasites, crop and soil science and agricultural economics and farm management consumed 136 hours, or approximately 20 per cent. Seventy-two hours, or 10 per cent of the time, was allotted as miscellaneous. This would take care of tests, individual study, conferences, time lost during the school year for programs and the like. This leaves a total of 144 hours, or 21 per cent of time for teaching productive enterprises. The productive enterprises receiving the most hours of instruction were dairy cattle and tobacco, the chief sources of farm income.

Four-Year Job Layout

The writer has analyzed each course area into teachable jobs. It was decided in what year (Agriculture I, II, III and IV) each job might be taught or done. The writer has anticipated the average amount of time needed for teaching each job. Jobs of lesser importance were eliminated or were taught on small group or individual basis.

Table XII presents the job breakdown of the course area, "orientation," the time allotted and the year the jobs are to be taught.

In Table XIII it is seen that the major portion of the time allotted to the jobs of instructing in Future Farmers of America is used in program planning and parliamentary procedure.

Table XIV shows the relative amount of time allotted to the jobs selected by the writer in setting up and teaching the supervised farming program.

TABLE XII

FOUR YEAR JOB LAYOUT IN THE
AREA OF ORIENTATION

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Registering students	1	1	1	1	4
Acquainting students with vocational agriculture	1				1
Discussing the advantages and disadvantages of farming and rural life	1				1
Discussing characteristics of successful farmers	1				1
Discussing the outlook in farming and related occupations	1				1
Total	5	1	1	1	8

TABLE XIII

FOUR YEAR JOB LAYOUT IN THE AREA
OF FUTURE FARMERS OF AMERICA

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Orienting and introducing	2				2
Studying parliamentary procedure	8	4	2	2	16
Planning and conducting Future Farmers of America meetings	2	2	1	1	6
Planning program of work	1	3	6	6	16
Determining Future Farmers of America contest to enter	2	1	1	1	5
Total	15	10	10	10	45

TABLE XIV

FOUR YEAR JOB LAYOUT IN THE AREA
OF SUPERVISED FARMING PROGRAM

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining purpose and value of supervised farming program	2	1			3
Deciding on characteristics of good supervised farming program	2	1			3
Exploring resources on which to build a good supervised farming program	4	1	1	1	7
Determining enterprises possible	9	3	2	1	15
Selecting a type of farming	2				2
Setting up annual and long-time supervised farming program	3	2	2	1	8
Estimating the budget of expenses and credits for each enterprise	5	3	3	2	13
Making a business agreement and developing plans of financing the program	2	2	2	1	7
Preparing individual job calendars	2	2	1	1	6
Keeping records	5	5	5	4	19
Making job plans	2	1	1	1	5
Summarizing records		4	3	3	10
Total	38	25	20	15	98

TABLE XV

FOUR YEAR JOB LAYOUT FOR CORN

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Locating the field site	1				1
Selecting the variety and procuring the seed	2				2
Preparing the seed bed	2				2
Fertilizing	2				2
Planting	1				1
Controlling weeds	1				1
Controlling insects and diseases	1				1
Harvesting and storing		2			2
Utilizing		1			1
Handling soil between crops		1			1
Total	10	4			14

TABLE XVI

FOUR YEAR JOB LAYOUT FOR
HOME AND MARKETING GARDEN

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining kind and amount of vegetables needed	2				2
Planning the garden to meet the needs	2	1			3
Selecting varieties	2				2
Securing seed and plants	1				1
Fertilizing and manuring	1				1
Planting seed and setting plants	1				1
Controlling insects and diseases	2	1			3
Harvesting and storing and preserving		2			2
Grading and marketing		2			2
Total	11	6			17

The time allotted for the job "determining enterprises possible" will be used for determining the possibility of each enterprise; therefore, this job will not appear under the productive enterprises.

The writer believed that most of the jobs selected for teaching the corn enterprise should be selected the first year. As indicated in Table XV, all jobs were taught in Agriculture I except three.

Table XVI shows only nine jobs selected for teaching the home and marketing garden enterprise. It was the intention of the writer that the jobs not listed would be taught on individual basis or knowledge gained by students in the study of some other enterprise would be applicable.

Table XVII shows that the jobs for teaching the enterprise hay would be taught the first year. This was done in order that the student would have knowledge of a feed crop enterprise, thus making for a more balanced farming program.

As seen in Table XVIII, six hours of instruction are to be spent in teaching Agriculture II and ten hours in teaching Agriculture III students the production of pasture.

The most number of hours spent in a productive crop enterprise was in teaching tobacco. An investigation showed that tobacco was the most important cash crop to the students of vocational agriculture at Rogersville High School and the farmers of Hawkins County. Table XIX shows the job breakdown and time spent in teaching each job of the tobacco enterprise.

From Table XX it is leanred that six jobs were taught to Agriculture I students on strawberries. The writer believed that this would enable students on small farms to produce a cash crop.

TABLE XVII

FOUR YEAR JOB LAYOUT FOR HAY

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining the place, kind and acreage	2				2
Selecting the variety and procuring seed	2				2
Preparing the seedbed	1	1			2
Fertilizing, inoculating and seeding	2	2			4
Maintaining the crops		1			1
Harvesting and storing		2			2
Total	7	6			13

TABLE XVIII

FOUR YEAR JOB LAYOUT FOR PASTURE

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining place, kind and acreage		2	1		3
Preparing the seed bed		1	1		2
Fertilizing and liming		2	1		3
Seeding		1	1		2
Managing, grazing and clipping			2		2
Providing supplementary grazing			2		2
Maintaining the productivity			2		2
Total		6	10		16

TABLE XIX

FOUR YEAR JOB LAYOUT FOR TOBACCO

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Locating the field site	1				1
Selecting variety and procuring the seed	1				1
Preparing the plant bed and seeding	2				2
Managing the plant bed	2				2
Preparing the field site	1				1
Fertilizing and transplanting	2				2
Controlling weeds, diseases and insects	2				2
Topping and suckering	1				1
Harvesting		1			1
Housing and curing		2			2
Stripping, grading and bulking		2	1		3
Marketing		1	1		2
Total	12	6	2		20

TABLE XX

FOUR YEAR JOB LAYOUT FOR STRAWBERRIES

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Selecting variety and procuring plants	1				1
Selecting land and preparing field site	2				2
Fertilizing and transplanting	2				2
Controlling weeds	1				1
Thinning	1				1
Mulching		1			1
Harvesting, grading and marketing		1	1		2
Renovating		1	1		2
Total	7	3	2		12

Table XXI shows the jobs selected and hours of instruction that were given in conducting the beef cattle enterprise. Jobs that are not listed were taught in connection with the dairy enterprise, Table XXII, or were taught on small group or individual basis.

In Table XXIII it will be seen that all jobs except one for conducting the poultry enterprise were taught in Agriculture II. The time allotted for teaching the poultry enterprise was nine hours.

A "pig chain" was conducted by the Rogersville Chapter Future Farmers of America. Students in Agriculture I were given gilts through this "pig chain." In Table XXIV it will be seen that four jobs were selected for instruction in the first year and four jobs the second year.

The writer believed that students of Vocational Agriculture should have a clear understanding of animal breeding and feeding. Table XXV shows the jobs selected and the number of hours scheduled for teaching the course area of animal improvement and nutrition.

In Table XXVI it is seen that a course area was selected for teaching insect, disease and parasite control. Insects and insect control were taught in Agriculture II, whereas the jobs of parasites and their control were taught in Agriculture III. In Agriculture IV the jobs were in the field of animal and plant diseases.

The author believed that special emphasis should be given in the area of crops and soils. Table XXVII shows the jobs selected and the number of hours spent in studying the area of crop and soil science.

It is seen in Table XXVIII the value and importance the writer placed in the area of agricultural economics and farm management. Forty-nine hours were spend in studying the twenty listed jobs.

The author believed that the major objective of a farm mechanics

TABLE XXI

FOUR YEAR JOB LAYOUT FOR BEEF CATTLE ENTERPRISE

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Selecting and procuring the breeding stock	2				2
Feeding and housing	2	2			4
Castrating and dehorning		2			2
Selecting and procuring feeder stock		1	1		2
Fitting, showing and marketing			1		1
Total	4	5	2		11

TABLE XXII

FOUR YEAR JOB LAYOUT FOR DAIRY CATTLE ENTERPRISE

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Selecting and procuring the animal	2				2
Feeding	2	2			4
Housing	1				1
Controlling diseases and parasites	1	2			3
Breeding	1				1
Caring for cow and calf at calving time		2			2
Milking and caring for milk		1	2		3
Raising dairy calves		2			2
Fitting and showing		1	1		2
Total	7	10	3		20

TABLE XXIII

FOUR YEAR JOB LAYOUT FOR THE POULTRY ENTERPRISE

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Choosing the breed and procuring chicks		2			2
Brooding and housing		2			2
Controlling diseases and parasites		1			1
Feeding broilers, pullets and layers		2			2
Marketing poultry and eggs			2		2
Total		7	2		9

TABLE XXIV

FOUR YEAR JOB LAYOUT FOR THE SWINE ENTERPRISE

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Selecting and procuring the breed	2				2
Feeding and housing	2				2
Controlling diseases and parasites	1				1
Breeding sows and gilts	1				1
Feeding and caring for sow and litter		2			2
Castrating		1			1
Butchering and preserving pork		2			2
Marketing		1			1
Total	6	6			12

TABLE XXV

FOUR YEAR JOB LAYOUT FOR COURSE AREA
"ANIMAL IMPROVEMENT AND NUTRITION"

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining the needs and possibilities of improving livestock			2		2
Studying principles of animal breeding and selecting for improvement			2		2
Planning a breeding program for the farm			2		2
Determining the necessary nutrients, their uses and sources			3		3
Studying the digestion and assimilation of feeds			2		2
Measuring the usefulness of feeds			2		2
Determining the feeding standards of livestock			3		3
Balancing economical rations for various farm animals			4	5	9
Total			20	5	25

TABLE XXVI

FOUR YEAR JOB LAYOUT FOR COURSE AREA "CONTROLLING INSECTS, DISEASES AND PARASITES"

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Classifying nature of diseases				3	3
Classifying nature of parasites			3		3
Classifying nature of insects		4			4
Studying causes, symptoms and controls of plant and animal diseases				5	5
Studying causes, symptoms and controls of animal parasites			5		5
Studying nature of injury and controls of insects		4			4
Total		8	8	8	24

TABLE XXVII

FOUR YEAR JOB LAYOUT FOR COURSE AREA
"CROP AND SOIL SCIENCE"

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Determining origin and development of soils			2		2
Determining soil properties and characteristics			2		2
Studying soil profiles			2		2
Classifying soils as to series and types			2	2	4
Studying and making soil maps			2	4	6
Determining crop requirements			2	3	5
Matching crops to the soil on farm			2	3	5
Studying the nutrition requirements of plants				4	4
Determining conservation practices to apply on farm				4	4
Selecting, mixing and applying fertilizers				4	4
Total			14	24	38

TABLE XXVIII

FOUR YEAR JOB LAYOUT FOR COURSE AREA "AGRICULTURE ECONOMICS AND FARM MANAGEMENT"

Jobs	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Studying farming as an occupation			2		2
Determining possibilities in re-organizing the farm business			2		2
Inventorying the resources on a farm			1		1
Planning a cropping system and field arrangement			2		2
Estimating crop expenses			2		2
Planning a livestock program				2	2
Estimating livestock expenses and feed balance				2	2
Determining the power and equipment needs				2	2
Determining the labor needs and distribution				2	2
Summarizing the capital investment				1	1
Preparing a financial summary for farm plans				1	1
Setting up alternate plan or plans				4	4
Changing from present to accepted plan				2	2
Determining the kinds of records to keep				1	1
Beautifying and improving the farmstead				5	5
Calculating farm income and social security				4	4
Studying farm insurance				2	2
Studying farm credit				4	4
Studying farm capital and appraisal				4	4
Marketing and purchasing				4	4
Total			9	40	49

course was to develop in students understanding, appreciation and ideals toward and abilities to do the unspecialized mechanical work that should and can be done economically on the farm and in the home.

Through the Rogersville Vocational Agriculture Department the writer provided instruction in farm mechanics for all-day students, young farmers and adult farmers (who need it, want it and can profit from it).

In Table XXIX it is seen that the instructional areas for teaching farm mechanics were sixteen. Seven hours were allotted to each instructional area in order that the class might be divided into groups. Each group would work in each area for a period of seven days before being moved to the next area. Students would learn to develop skills and learn to do the unspecialized mechanical jobs that can be done economically on the farm.

TABLE XXIX

FOUR YEAR INSTRUCTIONAL AREAS
LAYOUT FOR FARM MECHANICS

Instructional Area	Number of Scheduled Hours				
	Agr. I	Agr. II	Agr. III	Agr. IV	Total
Demonstration and study	5	5	5	5	20
Sketching and reading blueprints	2				2
Wood working	7	7	7	7	28
Tool fitting	7	7			14
Cold metal and forge work		7			7
Rope	7				7
Painting and glazing	7				7
Soldering and sheet metal		7			7
Welding (arc and gas)		7	7	7	21
Electricity		7	7		14
Pipe fitting and plumbing		7			7
Farm machinery			7	14	21
Farm power			7	7	14
Farm masonry			7	7	14
Farm fencing			7		7
Farm shop (home)				7	7
Total	35	54	54	54	197

CHAPTER IV

SUGGESTED VOCATIONAL AGRICULTURE BUILDING AT ROGERSVILLE

The teaching facilities provided by the school have a definite influence on the extent and quality of instruction in vocational agriculture. Too often the error is made in the employing of a competent instructor and then placing him in a situation where he is not able to develop a complete functional program of vocational agriculture. This is a loss to the taxpayers and community and often develops discontent in the instructor.

If the primary aim of a vocational agriculture teaching program is to train for proficiency in farming, and if the student is to reach a high degree of this proficiency, then he must acquire desirable experience in a wide variety of activities. A building providing desirable rooms and equipment where the student may participate in classroom and farm mechanics shop activities is necessary for a complete program of instruction. A successful program requires complete integration of classroom farm mechanics and field activities.[1]

In developing this chapter the writer made an extensive study of related literature concerning ideas and recommendations of structures for housing departments of vocational agriculture. Ten existing vocational agriculture departments in upper East Tennessee were studied and examined.

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[1] V. J. Moreford, Professor, Department of Agricultural Engineering, Iowa State College, Ames, Iowa, Methods of Teaching Farm Mechanics, Third Edition, Burgess Publishing Company, Minneapolis 15, Minnesota, 1956, pp. 35-63.

The Rogersville vocational agriculture department was examined and evaluated. Through this evaluation it was found that the present building and facilities were most inadequate to meet the needs of the students enrolled. Then, too, it is a very dilapidated old building that offers little opportunity for improvement.

Planning the Building Program

General

Hartzog[2] suggested that in the building of a vocarional agriculture program we keep in mind a program of activities and experiences that fits in with and supplements the agricultural practices found in the local communities. The vocational agriculture program has much in common with other phases of secondary education with regard to housing needs, but there are a number of important differences necessitating special consideration. For example, the complete program in vocational agriculture includes classroom instruction, agricultural science, and participating experience in farm shop work. The supervised farming program of each student to develop individual skills in production and management is an integral part, as in the Future Farmer chapters, to provide training for rural leadership and citizenship. Part-time and evening classes for young farmers and adults would be enrolled in classes of vocational agriculture.

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[2]David Hartzog, Planned Housing for Vocational Agriculture (Published by State Board for Vocational Education in cooperation with State College at Washington, December, 1951).

According to Hartzog,[3] the satisfactory conduct of such a broad program would require the use of a classroom, an office-conference room, a shop, and adequate storage space. Since a teacher of vocational agriculture often needs to supervise student activities in the classroom and in the farm shop at the same time, it is necessary that the two rooms adjoin. A centrally located office-conference room aids materially in conducting the supervision and carrying out a complete teaching program.

Wiegers[4] emphasized that the objectives of vocational agriculture in the local school and community be considered before facilities and space allocation are determined. Planning the building program should be developed through the cooperation of administrators, teacher of vocational agriculture, lay people, supervisor and the architect. In order that the agricultural facilities be adequate for the community, several activities must be carried out by these planners. Some of these considerations are as follows: (1) develop the major purposes of the program, (2) estimate the anticipated enrollment by groups, (3) determine the areas of instruction to include in the program, (4) develop an instructional outline, (5) plan facilities to be installed, and (6) determine the space needed.

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[3] Ibid.

[4] George W. Wiegers, Jr., Head, Department of Agricultural Education, University of Tennessee, "Guide for Curriculum Planning in Vocational Agriculture," A committee report, July, 1956.

Suggestions on Planning Facilities for Vocational Agriculture

According to Wiegers[5] the vocational agriculture building ought to be designed and equipped to meet the agricultural educational needs of rural people in the community now and for some time to come.

The writer found that the following suggestions were most valuable in planning the vocational agriculture building at Rogersville.

General Features

Unit Building

A vocational agriculture building usually includes a classroom, farm mechanics shop, office-conference room, storage rooms, locker room and a toilet. All should be in one unit.

Site and Location

The unit may be a separate building, a wing of the main building, or a separate building attached to the main building by a covered walk. Thus it would not be an isolated building.

The building ought to be located in such a way that it is accessible to the road, but far enough away (approximately 150 feet) for safety, parking and storage. All rooms of the unit should be on the ground floor level, six to twelve inches above ground level.

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[5] Ibid.

Shape of Building

Three building shapes were recommended: the L-shaped, the T-shaped and the rectangular. The rectangular-shaped building is most preferred because space can be provided more economically.

Size of Building

It was recommended that the overall size of the building should be not less than four thousand square feet. However, this would vary according to the type of program planned and number of students anticipated in the largest class.

Location of Rooms in Building

In order that the classroom may be made as soundproof as possible, it was suggested that the office, storage rooms, locker rooms and toilet be located between it and the shop. Emphasis was placed on locating the office between the shop and classroom to facilitate the instructor in supervising students in either area.

Construction Material

The material used for the construction of a vocational agriculture building should be of the same type used for the main buildings. This usually is a concrete block faced with brick. The use of concrete blocks makes possible the fastening of tool cabinets, benches and other facilities to the inside walls. Pilasters used to support the walls and roof should be avoided on interior walls as they interfere with the wall storage cabinets and work benches. Even though they may detract from the appearance of the building, it was suggested that the pilasters

be placed on the outside walls.

Cast-in-place concrete floors on the ground were recommended, providing they be properly constructed and insulated. The floor should be four to six inches in thickness. It should be laid on a coarse granular fill with membrane damp-proofing between the fill and the concrete. The floor should be cold-proofed by laying a continuous water-proofed rigid insulation around the entire perimeter of the building. It should be at least one inch in thickness and extend under the floor from eighteen to twenty-four inches. Metal reinforcement of number six, six by six inch wire should be placed in the concrete about one and one-half inches from the surface. Smoothly troweled concrete gives good service in the shop, storage rooms and locker rooms, but a good floor covering should be placed on the floors of the office, toilet, classroom and halls.

Roof

The design of the roof would depend upon the kind of materials used in constructing the building. The trend is toward a rather flat roof on buildings of masonry types. The roof would be supported by either wood or steel trussels without support on the inside. These trussels would rest on the pilasters or wall supports. The roof decking would be nailed directly to the trussels that were spaced about two feet apart.

Heating

It is usually best to use the heating plant of the central school building. However, because of many evening activities, provision should

be made by use of a cut-off valve so that heat could be supplied to the vocational agriculture rooms when the rest of the building is not in use. Radiator heaters should be used in the classroom and office; however, unit heaters with fans would be desirable for the shop. Regardless of the kind or source of heat used, it should be thermostatically controlled.

Interior Painting

The interior surfaces of the classroom, shop, and office should be painted with colors that reflect as much natural light as possible and yet be free from brightness, light and shade difference and glare. In selecting the colors of paint, one should consider the reflection factors needed. Ceilings should reflect at least 80 per cent, upper walls 60 per cent, lower walls 40 to 60 per cent, and the floors 20 to 25 per cent of the light. The approximate per cent reflection of common colors follows: white 85 per cent; ivory 75 per cent; pink and yellow 65 per cent; apricot, tan and medium gray 60 per cent; light gray and light blue 55 per cent; dark brown, olive green and dark blue 10 per cent.

Concrete floors should be painted for two reasons: they are, to increase light reflection and to facilitate cleaning. A colored metallic hardener would be used on the floor to eliminate the dust and to reflect light. The color most preferred is gray or a darker color than the color of the walls.

Classroom

The classroom should be planned so that it may be quickly adapted

to a wide variety of activities. It is the place for holding day classes, adult and young farmer classes and Future Farmers of America meetings. The classroom ought to be located in close proximity to the farm mechanic shop. Students should be able to enter the classroom without going through the office or farm shop. A combination classroom and laboratory usually proves to be most satisfactory.

Size

At least thirty to thirty-five square feet of floor area should be provided per student in the largest anticipated class. Minimum size should be not less than seven hundred and fifty square feet.

Shape

A classroom approximately thirty by thirty feet is required if the tables are arranged in an open U for the conference method of teaching.

Floors

The classroom floor should be resilient, light-colored, durable and easily cleaned. These qualifications were met by use of asphalt or rubber tile over concrete.

Walls

The masonry walls should be built so as to have a dead air space between the outside walls and the interior finish. A very satisfactory finish would be a painted cinder-block wall with a tile wainscot.

Ceiling

The height of the ceiling should be not less than nine feet nor

more than twelve feet. It should be acoustically treated. This could be done by using perforated acoustical board at least one-half-inch in thickness.

Windows

Windows should be placed approximately six inches from the ceiling and at least forty-two inches from the floor. For best results, windows are usually placed along one side of the room. The glass area of the windows should be from 60 to 70 per cent of the floor area. If projection windows are used, they should project to the outside so that venetian blinds and blackout shades or draperies may be drawn.

Doors

A three by seven foot panel door equipped with panic bolt should be used. All hinged doors throughout the vocational agriculture building should swing out.

Electric Service

Natural lighting must be supplemented with artificial lights that provide at least twenty-five to thirty foot candles of light on the working area. Either incandescent lamps or fluorescent bulbs are used. However, fluorescent lighting is usually preferred.

At least eight 110-volt duplex convenience outlets should be provided. These should be located two on each wall.

Farm Mechanics Shop

The farm mechanics shop is a place for the teaching of mechanical

skills and judgments and their application to real farm situations. It should be a room designed for and used exclusively by the vocational agriculture department to carry out the activities that contribute to the development of farm mechanic ability needed for proficiency in farming and home conveniences by present and prospective farmers.

Size and Shape

At least one hundred square feet of work area per student in the largest class should be provided. The minimum size for a shop is twenty-four hundred square feet. It should be from thirty-six to forty-four feet wide with the width-to-length ratio not greater than one and one-half to two. This saves steps and makes tools and equipment located along the walls more accessible to the central work area.

Floor

Floors should be made of reinforced concrete four to six inches thick and painted with metallic hardener. Top of finished floor should be six to twelve inches above outside surface. Means for draining the floor should be provided by placing a drainage pipe about ten feet in front of the service door. The floor should slope slightly toward the drainage pipe. A paved ramp should be provided in front of the large service door.

Ceiling

If the building has a flat roof, ceiling is of little importance. However, a one-half inch perforated acoustical board on the ceiling is very helpful in eliminating noise and dust, saves on heat and contributes to better lighting. The ceiling should be at least twelve feet in height.

Windows

The window area should be from 16 to 20 per cent of the floor area. The sills should be forty-two or more inches high and sloped at a relatively sharp angle to prevent them being used as shelves. It also makes for easier cleaning.

In order to provide wall space for tools or wall cabinets, it is most desirable to leave a space of at least three feet between each window, or set of two windows. The windows should be located on two sides.

Factory type steel or aluminum frame windows with pivoted or hinged ventilating sections were recommended. The bottom window section should open inward, the middle window pivot on center, and the top ventilating section open outward.

Doors

A large service door is needed to permit moving farm power and machinery in and out of the shop. This door should be from twelve to fourteen feet in width and from ten to twelve feet high. The preferred placing of this door is near one end of the shop and on the South or East side, and approximately ten feet from adjacent wall or corner. An overhead door takes up no wall space and can easily be handled by use of one or more springs.

An entrance door should be provided so as to eliminate opening of the service door each time one wishes to enter or leave the shop. This door should be a three by seven foot panel door. Another door of like size should be provided in the passage to the classroom.

Electric Service

A farm mechanics shop is dependent upon electric service. It is necessary for lighting, running power equipment and sometimes used in the heating system. It is essential that lighting fixtures, outlets and switches be conveniently located throughout the shop.

Lights: thirty to forty foot candles of light should be provided for each work area. The new improved fluorescent lights are recommended. A "rule of thumb" that is used in determining the location of light units is: (1) the maximum distance between light units should not exceed the height of the ceiling, (2) the maximum distance between the wall and first row of lights should not exceed one-third the height of the ceiling.

Outlets: both 115-volt and 230-volt single-phase and 230-volt three-phase electrical service should be provided. Operation of the arc welder requires 230-volt single-phase current, and 230-volt three-phase current gives the most economical and efficient service for motors of one-half horsepower and larger. Two or more 230-volt single-phase receptacles should be installed in the welding area of the shop. Another receptacle near the large service door is convenient for welding in the outside work area.

Duplex convenience outlets should be installed along the wall about ten feet apart and about six inches above the bench tops. Avoid placing outlets near the wash basins or water outlets.

For power equipment that must be located away from the wall, it was suggested that either retractable convenience outlets installed overhead or water-proof outlets in the floor be used.

A power panel, controlling all equipment, should be conveniently

located in the shop near a doorway. Each piece of power equipment should be individually fused and provided with a switch. The master switch (of the magnetic type) should be conveniently located in order that all equipment could be stopped in case of an emergency. A lock should be provided to fasten the master switch in the "off" position in order that the equipment may not be used when the instructor is not in the shop.

Auxiliary Rooms

An adequate vocational agriculture unit includes, in addition to classroom and shop, space for storage, office and toilet.

Class Storage Rooms

A room should be provided to store teaching materials and supplies, visual aid equipment and many other items not in use. This room should be located adjacent to the classroom. At least sixty-five square feet should be provided. Suggested dimensions were six to ten feet in width and eight to fourteen feet in length,

Farm Mechanics Storage

Storage must be provided for extra tools, teaching supplies, student projects and school owned equipment. At least one hundred and fifty square feet of floor space ought to be allotted to this room. Recommended dimensions of this storage room are eight to ten feet wide and sixteen to twenty-four feet or more long. The shop storage room should be located adjacent to the shop.

Office

The vocational agriculture teaching program involves the teacher in activities not normally experienced by other high school teachers. Close working relationships between the teacher, students and parents require many conferences. The adult and young farmer programs also necessitate frequent individual and small group discussions.

The office ought to be provided to permit the teacher to hold these private conferences and group discussions. The office should be located near the main entrance, between the classroom and the shop. Double glass should be installed so that the instructor could see the greater part of the classroom and shop from the office with a minimum amount of noise. An outside window is desirable for providing light and ventilation. Two 110-volt duplex convenience outlets should be located on the walls.

The recommended dimensions for the office were eight to twelve feet wide and twelve to sixteen feet long, with a minimum space of eighty square feet.

Toilet

Space must be provided for students to use toilet facilities. At least fifty square feet is needed for the toilet facilities. A room six by nine feet is considered a minimum size. Toilets are usually placed between the classroom and the shop with entrance made from the shop classroom passageway.

The toilet must be well ventilated. An outside window is desirable, but if this is not possible, provision should be made for

forced ventilation. A drainage in the floor ought to be installed.

Locker Room

Locker space is needed to store clothing and small projects. This room should be so situated that it may be entered directly from the farm mechanics shop or from the classroom. At least eighty square feet ought to be provided. A room eight by ten feet will meet most students' storage needs.

Proposed Floor Plan for Department of Vocational Agriculture at Rogersville

Based on the factors discussed in the previous section, the author has drawn a floor plan for the department of vocational agriculture at Rogersville. In developing this plan the following two major important considerations were decided: (1) the kind and number of different educational groups enrolled (all-day students, young farmers and adult farmers), (2) the kind of educational program which the department planned to provide for the students enrolled in the various classes.

After determining these two basic factors, the writer was in the position to specifically plan the department to meet these needs. Each unit of the department of vocational agriculture was planned unit by unit and then coordinated into an integrated departmental unit as shown in Figure I. All recommendations for each unit as previously outlined were met in the plan designed by the author.

In coordinating each unit into a departmental unit, the writer made an intensive study of existing departments and plans recommended by

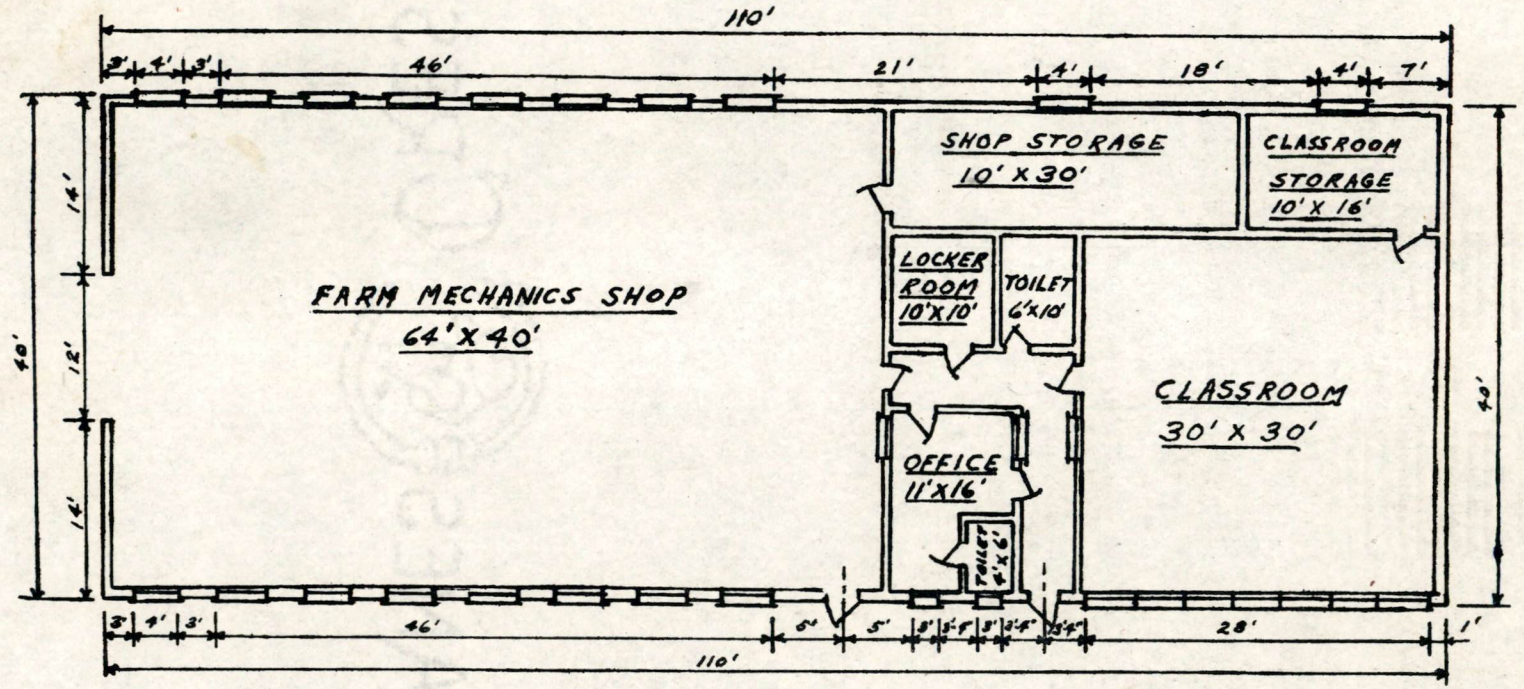

FIG. 1 SUGGESTED FLOOR PLAN - VOCATIONAL AGRICULTURE BUILDING
ROGERSVILLE HIGH SCHOOL

the following: (1) University of Tennessee, Agricultural Education Department, (2) University of Georgia College of Education, Department of Agriculture Education, (3) University of Missouri Agricultural Education Department, and (4) University of Iowa Department of Engineering.

Recommendations for the various units of the vocational agricultural department at Rogersville are seen in Table XXX. The building is to be constructed of concrete block faced with brick to blend in well with the existing main building. The concrete blocks on the inside of the building are to be smoothed, making a neat appearance when they are painted. The thirty by thirty classroom was needed to accommodate the anticipated enrollment and to allow for the arranging of tables in the recommended U shape.

The office was made eleven by fifteen feet; however, a space of four by six feet was used to install a toilet. This was done because it was felt that a private toilet was needed for the instructor and visitors.

A forty by sixty-four foot farm mechanics shop was provided to meet the needs of all students enrolled. The floors were made of concrete. They are to be painted with a concrete paint of battleship gray coloring except the classroom and office, which would be covered with rubber tile.

In order to blend in with present buildings, an oval or flat roof was designed.

Heat would be furnished from the main building and radiators would be installed in all areas except the shop, which would have forced air heat through ceiling heaters.

The interior paint selected would reflect the amount of light

TABLE XXX

RECOMMENDATIONS FOR VARIOUS UNITS OF THE DEPARTMENT OF VOCATIONAL AGRICULTURE AT ROGERSVILLE

Item	Classroom	Office	Class Storage	Shop Storage	Locker and Toilet	Farm Machine Shop
Construction material	Concrete blocks, brick facing, plaster	Plaster	Painted block	Block	Block	Block
Size	30 x 30	11 x 15	10 x 16	10 x 30	10 x 16	40 x 64
Floor	Rubber tile	Rubber tile	Rubber tile	Painted	—	—
Roof	Flat	—	—	—	—	—
Heating	From main building	Radiators	Radiator	Radiator	Radiator	Fans
Interior Painting:						
Ceiling	Cream	Cream	Cream	Cream	Cream	—
Walls (upper)	Light green	Light green	Light green	Light green	Light green	Light green
Walls (lower)	Pine frost green	Pine frost green	Pine frost green	Pine frost green	Pine frost green	Pine frost green
Floor	Gray	Gray	Battleship gray	Gray	Gray	Gray
Windows:	Steel	Steel	Steel	Steel	—	Steel
Size	4 x 6	3 x 6	4 x 6	4 x 6	—	4 x 8
Number	7	2	1	1	—	16
Ceiling	Acoustical board	Acoustical board	None	None	Acoustical board	None
Doors	1: 3 x 7	2: 3 x 7	1: 3 x 7	1: 3 x 7	2: 2½ x 7	2: 3 x 7 1: 12 x 12
Lights:						
Kind	Fluorescent	Fluorescent	Fluorescent	Fluorescent	Fluorescent	Fluorescent
Number	16	2	4	6	3	28
Outlets	8	2	1	2	—	3: 230-volt 10: 115-volt 10: 230-volt, 3-phase

recommended.

The number of windows installed would provide the recommended lighting conditions. Windows were placed only on one side of the classroom. In the farm mechanics shop windows were placed on each side with a three-foot space between each to allow room for tool cabinets.

The roof would be flat, or nearly so, therefore, a ceiling would not be necessary for the shop and storage rooms; however, an acoustical-board type ceiling would be needed for the classroom and office.

A large twelve by ten foot door for the farm mechanics shop was planned. The other doors throughout the building would be three by seven feet with the exception of the toilets. Most of the doors opened outward.

The kind and number of electrical outlets is most important, especially for the shop. The plan, as designed by the writer, calls for 115-volt and 230-volt single-phase and 230-volt three-phase electric current. The table shows the number recommended. For lighting the classroom and shop fluorescent lighting was used. In the classroom the lights would be installed in four rows of four lights each on eight foot centers three feet from the wall. In the shop there would be four rows of lights on ten foot six inch centers four feet from the wall with seven lights to the row nine feet six inches apart and three and one-half feet from the end of the wall. Adequate lighting was provided throughout the rest of the building.

CHAPTER V

EQUIPPING THE DEPARTMENT OF VOCATIONAL EDUCATION AT ROGERSVILLE, TENNESSEE

The major aim of vocational education in agriculture has been previously discussed as related to the kinds of groups to be served, jobs to be taught and the kind of training the individuals would receive. Its implications should be reviewed here as they affect the kind of instruction, facilities and equipment needed. If that aim is to train individuals to think and to act intelligently with regard to their farm problems, then the school must accept the responsibility for providing the necessary facilities needed to carry out that training program.

If the vocational agriculture department is not adequately equipped with the necessary facilities related to the needs of the students, the instruction offered would probably be academically and vocationally ineffective. A good teacher of vocational agriculture strives to combine classroom study, laboratory training and farm mechanics practices in the right proportions to achieve his educational objectives.

If an effective program is to be realized, it must be based on local farming conditions and the facilities needed must be in keeping with the types of farm problems found on local farms, says O'Kelley.[1]

In order that the writer might prepare an intelligent list of

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[1] G. L. O'Kelley, Jr., Providing Facilities for Departments of Vocational Agriculture in Georgia, University of Georgia, Athens, Georgia, Professional Series, April, 1954, Bulletin 2, pp. 1-8.

facilities and equipment needed for the department of vocational agriculture at Rogersville, an intensive study of related literature was made.

Wiegers,[2] Moreford,[3] Missouri State Department of Education,[4] Phipps,[5] Georgia Department of Agricultural Education,[6] and O'Kelley[7] each discussed the facilities and equipment needs for classroom, office, auxiliary rooms and farm mechanics shop of a vocational educational department in agriculture. The recommendations made by these were carefully studied and a master list was made. Some items were deleted, while others were added, depending upon the writer's judgment of how they would contribute to the vocational agriculture teaching program which he had planned.

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[2] G. W. Wiegers, Jr., Head, Department of Vocational Education, University of Tennessee, "Building Facilities, Equipment and Supplies for Vocational Education" (Unpublished data).

[3] V. J. Moreford, Professor, Department of Agricultural Engineering, Iowa State College, Ames, Iowa, "Methods of Teaching Farm Mechanics," Third Edition, Burgess Publishing Company, Minneapolis 15, Minnesota, 1956, pp. 35-63.

[4] Missouri State Department of Education, Vocational Agricultural Section, Jefferson City, Missouri, University of Missouri Agricultural Education Department, Columbia, Missouri, "Planning Facilities for Vocational Agricultural Departments," March 1957.

[5] Lloyd J. Phipps, Handbook on Teaching Vocational Agriculture (Sixth edition; Danville, Illinois: The Interstate, 1952) pp. 803-857.

[6] Vocational Education in Agriculture, "Constructing and Equipping Tool Cabinets for School Farm Shop" (Prepared by the Division of Agricultural Education, College of Education, University of Georgia, Athens, Georgia, Vol. XXXII, No. 5, January, 1951.

[7] G. L. O'Kelley, Jr., Op. cit.

Providing Facilities

Classroom Facilities

In determining the kind and amount of classroom facilities needed, careful consideration was given to the instructional program to be offered, the size of the classroom and the number of students in the largest class.

Table XXXI indicates the facilities needed for the Rogersville vocational agriculture classroom. The largest class anticipated was twenty-seven students; therefore, fourteen tables sixty inches long, at two students per table, would be needed. The rest of the facilities shown in the table seem to be the standard kind and amount needed in any vocational agriculture classroom.

Office Facilities

The office is the teacher's workshop. The teacher needs a desk with a minimum working area of fifteen square feet. This, and other facilities needed in the office, is shown in Table XXXII.

Farm Mechanics Shop

In determining the kind and amount of facilities needed in the farm mechanics shop, careful consideration was given to the kind of instructional program planned and the probable size of the various groups. The students in the farm mechanics classes were divided into groups of from two to four in each group. Seven areas of instruction were to be offered to each student annually. These activities need to be carried out on work benches distributed throughout the shop. The

TABLE XXXI

NUMBER, SIZE AND DESCRIPTION
OF CLASSROOM FACILITIES

Item	Number Needed	Size	Description
Table	14	24"x60"x30"	Library type, hardwood
Chairs	30	16"x18"	Steel frames, wood bottom, back rest
Teacher desk	1	30"x48"	
Sink	1	28"x20"x5"	
Filing cabinets	2	Legal	4-drawer, ball-bearing
Bookcases	60-100 lineal feet	2½"x10"x12"	"Built-in" if possible
Notebook rack	4 rows of 20 shelves each	2½'x10"x12"	"Horizontal" type with vertical rows
Magazine rack	7 compartments	4'x22"	Inclining shelves
Chalkboard	2	36"x10'	Green
Bulletin board	1	3½"x10'	Light cork
Picture molding	1	120'x 3"	Harmonize with walls
Shades	5	4'x 6'	Translucent (double hung)
Shades	5	4'x 6'	Blackout
Cabinets	4	18"x36"x 6'	Exhibit and display

TABLE XXXII

NUMBER, SIZE AND DESCRIPTION
OF OFFICE FACILITIES

Item	Number Needed	Size	Description
Conference desk	1	36" x 60"	Three drawers
Chair, side	3		Classroom type
Bookshelves or cases	1		
Storage cabinet	1	18" x 36" x 6'	
Filing cabinets	2	1: Legal size 2: Letter size	Four drawers Four drawers

work benches were located along the shop wall. Table XXXIII shows the number and size of work benches needed. The nine cabinets shown in Table XXXIII are for the storage of a sufficient number of tools needed to provide instruction and practice of two to four students in each work area. The cabinets were located between the windows and above the work bench designated for a specific shop area. Strong doors are provided so that tools may be hung on them also.

Tables specifically designated for both arc and gas welding need to be provided.

Many times more effective instruction can be given in the shop when students can be comfortably seated. Bleacher seats, or benches, should be provided as seen in Table XXXIII. Five benches, ten feet long, twelve inches wide and sixteen inches high, were recommended for the farm mechanics class at Rogersville. Other facilities needed are seen in the table.

Storage Room Facilities

Both vertical and horizontal space should be utilized to store the many items used in vocational agriculture instruction. In order to use the space provided for classroom storage efficiently, open shelves, cabinets and drawers should be built.

In the space set aside for farm mechanics storage, lumber racks should be erected. Three methods of storing lumber are used: vertical, horizontal and on a dolly. The horizontal stacking usually holds longer boards and preserves the shape of the lumber better than the vertical rack. A vertical type metal rack ought to be installed in one

TABLE XXXIII

NUMBER, SIZE AND DESCRIPTION
OF SHOP FACILITIES

Item	Number	Size	Description
Work benches	8	22"x12'x31"	Legless, supported by angle iron along wall
Work bench	1	4'x 8'x31"	On casters, metal covered
Cabinets	9	3'x 4½'	Double doors 2" deep
Arc welding table and booth	1	3½'x3½'x30"	Cast or steel grating supported on metal legs
Ocy-acetylene table	1	2'x 2'x 2'	Top made with fire brick
Bleacher seats or benches	5	10'x12"x16"	With casters
Bulletin board	1	4'x 6'	Cork
Fire extinguisher	1	#15	Carbon dioxide
First aid kit	1	—	Authorized type
Wash fountain	1	—	Half round wash-up with soap dispenser
Drinking fountain	1	—	Automatic in passageway

corner of this storage room. Use six or more stalls, eight to twelve inches wide and eight feet long. Pulling of the bottom of rack sixteen to eighteen inches from wall with top resting on the wall facilitates metal staying in place. Store sheet metal on its edge behind the rack.

Shelves and bins need to be provided to store shop supplies and surplus tools. These shelves and bins should be eighteen inches deep, one to two feet long and one foot high.

Toilet and Locker Room Facilities

A toilet should be provided in order to accommodate all-day students, part-time and evening class members. A bowl, one urinal and a lavoratory were provided.

Students need to wear suitable clothing for doing various kinds of farm mechanics work; therefore, lockers are needed to store this clothing. They may also be used to store small projects. Twenty, two-tier steel lockers, twelve by twelve by thirty-six inches, should be provided.

Providing Equipment

Adequate equipment for a vocational agriculture program that is designed to meet the needs of a community is costly. Before purchasing equipment, numerous facts should be considered: (1) purpose and objectives of vocational agriculture, (2) needs of the students, (3) ability and skills to be employed, (4) present and anticipated size of groups receiving instruction, (5) size and design of rooms in the building, (6) types of class organizations used, (7) cost of equipment and funds available, and (8) the ability of the instructor.

Most of the equipment used in the department will have to be purchased as only a few can be made. Too often the equipment purchased for a farm mechanics shop is too small to do the heavier type work that is necessary. Therefore, in the long run, it would be more economical to purchase equipment large enough to do the job.

Oftentimes funds are not available to provide all the equipment needed in the farm mechanics shop. If this be the situation, it was suggested that one instructional area be adequately equipped at a time, rather than buy a few pieces for several areas.

In setting up the list of equipment needed for the program of agricultural education at Rogersville, the writer kept in mind the factors presented in the foregoing discussion.

Classroom and Office Equipment

In selecting the equipment suggested for the classroom, office and laboratory, the writer made an intensive study of the program planned for the Rogersville Department of Vocational Agriculture and studied all available recommendations for equipment designed to meet the needs of students enrolled. Table XXXIV shows an itemized list of equipment desired and the number needed for the vocational agriculture classroom and office at Rogersville.

Laboratory Equipment

Seen in Table XXXV is a list of equipment needed for teaching enterprises of crops, soil and water management.

To effectively teach the dairy, poultry and livestock enterprises, a large amount of different equipment is needed. The amount

TABLE XXXIV

GENERAL EQUIPMENT NEEDS FOR
CLASSROOM AND OFFICE

Item	Number Needed	Description
Camera	1	35mm
Clipboard	16	Wood
Paper cutter	1	16"
Lens	2-4	Tripod magnifier
Microscope*	1	100-500 power
Mimeograph machine	1	Manual operation
Chalkboard pointer	1	—
Projector*	1	Filmstrip and 35mm slides
Projector*	1	Opaque
Projector*	1	16mm soundfilm
Paper punch	1	3-hole
Scale	1 ea.	Counter and platform
Scissors	1	6"
Screen	1	Portable 60" x 60"
Pencil sharpener	1	—
Rubber stamp	1	Date
Rubber stamp	1	Department name
Stamp pad	2	Black ink
Stapler	1	8 1/2", heavy duty
Typewriter	1	12" carriage
Yardstick	1	—

*May be shared jointly with another department.

TABLE XXXV

LABORATORY EQUIPMENT AND NEEDS FOR
INSTRUCTION IN SOILS AND CROPS

Item	Number Needed
Auger and soil sampling kit	1
Compass, hand	1
Duster, rotary	1
Flats for seed germination	10
Hoe, garden	1
Rake, garden	1
Pruner, 12-foot pole	1
Saw, curved pruning	1
Shears, pruning, hand	6
Shears, lopper	2
Spade, flat back	1
Sprayer, hand	3
Stick, tree scale	1
Trowel, plant	1
Surveyor's chain, 66", divided into tenths	1
Level, farm, tripod legs	1
Level, handsighting, pocket type	2
Rod and target, 9' adjustable	1
Tape, steel, 100'	1

and kind of equipment suggested by the writer is seen in Table XXXVI.

Farm Carpentry (Woodwork) Equipment

It was found that one of the most important areas of farm mechanics was in the area of farm carpentry.

Table XXXVII shows a list of equipment, number needed, and the size and description of each selected for teaching the skills of farm carpentry at Rogersville. To provide the needed equipment for this area would cost very little as compared with some other areas of farm mechanics.

Tool Fitting

Tools are designed and sharpened so as to give the maximum amount of service and usefulness possible. A person who uses them expects them to do efficient work. Unless he keeps them in proper working condition, he will not get the full value of service from them. The importance of properly fitting tools cannot be over-emphasized. The writer selected the area of tool fitting because he felt that teaching students the skill of keeping tools in good condition was time well spent. As seen in Table XXXVIII, very little equipment is needed and it is easily and cheaply obtained.

Arc Welding

The electric arc welder has become an important piece of equipment in most school farm mechanics shops. Most students can learn to perform the simpler welding jobs in a relatively short time. Students need to learn the skill of arc welding in order that they may repair many pieces of farm machinery and construct many farm labor-saving

TABLE XXXVI

LABORATORY EQUIPMENT NEEDS FOR INSTRUCTION IN DAIRY AND LIVESTOCK

Item	Number Needed	Description
Applicator	1	Ear tag
Babcock tester	1	12-bottle (complete with bottles and pipetts)
Brushes	4	For cleaning milk testing equipment
Clippers	1	Electric
Cup	1	Milk stripping
Dehorner	1	Electric with rubber bands
Dividers	1	Milk testing
Emasculatome	1	Clamp and bands
Graduate	1	Graduated in oz. and cc
Gun	1	Drench
Injector	1	Stilbestrol
Notcher	1	Ear
Rasp	1	Hoof, 14"
Ringer	1	Hog
Saw	1	Meat
Scales	1	Milk
Syringe	1 ea.	Heavy duty, 10cc and 40cc
Thermometer	1 ea.	Dairy, veterinary
Trocar	1 ea.	---

TABLE XXXVII

NUMBER, SIZE AND DESCRIPTION OF FARM CARPENTRY (WOODWORKING) HAND TOOLS

Item	Number Needed	Description
Bar, wrecking	2	5/8" x 18"; 3/4" x 30"
Bits, expansive	1	7/8" - 3"
Bits, auger	1 set	4 - 16
Bits, countersink	2	1/2"; 5/8" (Rose)
Bits, drill	1 set	1/8" - 1/4" straight shank
Bits, extension	1	18"
Brace, bit	2	10" ratchet; 12" sweep
Brush, bench	1	2 1/4 trim, 8" length
Cabinet, wall	1	3' x 3' x 8 1/2"
Chisels, wood	1 set	1/4", 3/8", 1/2", 1", 1 1/2"
Clamps, bar	2	4'
Clamps, "C"	4	6"
Divider	1	6" wing
Drill, hand	1	1/4" capacity
Drills	1 set	Bit stock, 1/8" - 1/2"
Gauge, depth	1	---
Hammer	4	Two: 12-oz. curved claw Two: 12-oz. straight claw
Hatchet, broad	2	4 1/2" broad; 3 1/8" half
Horse, saw	4	---
Knife, draw	1	10"
Level, wood	1	24"
Mallet, rawhide	2	2 1.2" x 3" diam. x 5" long
Plane	1 ea.	6" block; 9" smooth; 14" jack
Rasp, wood	4	Half-round 12" - 14"
Rule	2 ea.	2' fourfold; 6' pull & push or folding
Saw	1 ea.	12" compass; 8" coping; 24", 5 1/2 pt. hand rip
Saw	2 ea	24", 10 pt.; 24", 8 pt.
Screwdriver	1 set	4", 5", 6", 8" blade
Screwdriver, bit	1 set	1/4", 3/8", 1/2" tip
Sets, nail	4	2/32, 3/32, 4/32, 5/32
Square	2 ea	(1) Carp. steel 16"x24"x 1/12" (2) Carp. steel 16"x24"x 1/12" (3) Combination 12" (4) Try 8" (5) T-bevel 6"
Vise, woodworking	2	7" jaw, rapid acting with dog in front jaw

TABLE XXXVIII

NUMBER, SIZE AND DESCRIPTION OF
TOOL FITTING EQUIPMENT

Item	Number Needed	Description
Anvil guard and sickle	1	—
Anvil, saw	1	—
Bits, twist drill	1 set	High speed, 1/16",1/8",3/16",1/4"
Bits, twist drill	1 set	Power wood, 1/8" - 1"
Brush, bench	1	Trim 2 1/4" x 8"
Brush, wire	1	—
Can, oil	1	—
Clamp, saw	1	—
Dresser, grinding wheel	1 ea.	#0, #1, #2
Drill, portable	1	Heavy duty, 1/4" chuck
File, auger bit	1	—
File, cord	1	—
File, half round wood	2	12"
File, mill bastard	3	Single cut, 8", 10", 12"
File, goggles	1 pr.	Clear
Grinder, bench	1	6" - 8", 1/2 HP, 60-80 grit
Grinder, bench	1	Sickle and wire wheel, 1/3 HP
Hammer, ballpein	1	12 oz.
Handle, file	12	—
Jointer, saw	1	—
Oil stone, bath	1	3 carborundum stones
Rasp, wood	2	14"
Rule, folding	1	6'
Saw, hack	1	Adjustable frame
Square, try	1	6"
Stone, whet	1	Hand, one side honing
Template	3	For chisels and bits
Vise	1	4" opening (swivel base)

devices. Table XXXIX lists the kind and amount of equipment needed for teaching arc welding.

Oxy-Acetylene Welding

Table XL shows the needed equipment for instruction in gas welding which was selected by the writer as an area of farm mechanics in conjunction with arc welding.

Farm Electricity

Each year finds an increasing number of farm homes which have installed electricity. Farmers are realizing more and more the importance of this electricity on their farms. Many uses are being made of it around the home and on the farm. Because of its importance, farm electricity was selected as an area of instruction in the farm mechanics shop at Rogersville. A list of equipment, kind and amount, is shown in Table XLI.

Farm Power and Machinery

Thirty-five hours were allotted to the area of farm power and machinery. This was the greatest amount of time allotted to an area in farm mechanics. The large and expensive list of equipment needed in this area is shown in Table XLII.

Painting and Glazing

A knowledge of paints and painting is very important since paint is used for decorating and protecting such surfaces as wood, metal and masonry.

Glazing is an important subject since windows of farm buildings

TABLE XXXIX

NUMBER, SIZE AND DESCRIPTION OF
ARC WELDING EQUIPMENT

Item	Number Needed	Description
Brush, wire	1	Long handle
Bucket and sand	1	---
Chain, sash	1	3', light weight
Clamp, "C"	2	6"
Gloves	2 pr.	Leather palms
Hammer, Chipper	2	---
Helmet	4	#10, flip-up shields
Holder, electrode	1	---
Pliers	2 pr.	#10
Shield, hand	1	#10
Table and booth	1	3 1/2' x 3 1/2' x 30"
Welder, electric	1	180 amp. AC 220v

TABLE XL

NUMBER, SIZE AND DESCRIPTION OF
OXY-ACETYLENE WELDING EQUIPMENT

Item	Number Needed	Description
Attachment, cutting	1	—
Brick, fire	8	—
Bucket and sand	1	—
Cart with chain	1	Portable (7' long)
Cleaners, tip	1 set	—
Goggles	5 pr.	Shade 5
Igniter, spark	2	—
Pliers	2 pr.	—
Regulator and hose	1	Acetylene, single stage
Regulator and hose	1	Oxygen, single stage
Shield, plastic	2	Shade 5
Table, welding	1	2' x 2' x 30" high
Tank	1 es.	Acetylene; oxygen
Tips, cutting	2	#2 and #4
Torch and tips	5	#1, 3, 4, 5 and 8

TABLE XLI

NUMBER, SIZE AND DESCRIPTION OF
FARM ELECTRICITY EQUIPMENT

Item	Number Needed	Description
Bench, brush	1	Trim 2 1/4" x 8"
Continuity tester	1	(Made from flash light)
Gauge, wire	1	American standard 0-36
Knife, paring	2	—
Pliers, diagonal cutters	1 pr.	6"
Pliers, round-nosed	1 pr.	5"
Pliers, side cutters	2 pr.	6"
Screwdriver, electrician's	6	2 each: 5" x 1/4" 4" x 1/4" 4" x 1/8"
Soldering gun	1	150 watt
Stripper cable	2	—
Test light	1	All purpose, neon

TABLE XLII

NUMBER, SIZE AND DESCRIPTION OF FARM POWER AND MACHINERY EQUIPMENT

Item	Number Needed	Description
Can, oil	1	Piston type, 1/2 pint
Extensions	3	2",6" and 10" for 1/2" drive
Gauges	1 ea.	Spark gap, thickness, tire and vacuum
Gun, grease	1	Lever, #1 capacity
Hammer, machinist's	1	#1 1/2
Handle	1 ea.	Square 1/2" hinge speed, socket, T-type
Hoist, chain	1	1 ton
Hydrometer	1	Battery
Indicator	1	Speed
Jack, auto	1	Floor type hydraulic, 2 1/2 t.
Lamp, trouble	1	20' weatherproof cord
Mechanical finger	1	—
Oiler	1	3/4 pt. welded seam
Pliers	1 ea.	Cotter key, slip joint, water pump
Puller, wheel and gear	1	Med. duty, jaws interchangeable
Punch	3 ea.	Long taper, machinist and pin
Screwdriver, clutch	1 set	4 sizes
Screwdriver, Phillips	1 set	4 sizes
Screwdriver, slotted	1 set	4 sizes
Screwdriver, spark testing	1	Neon tube in handle
Socket	2 sets	1/2" drive
Socket	1 set	Screwdriver, 1/2" drive
Tester, compression	1	—
Timing light	1	Neon
Voltmeter	1	—
Wrenches, Allen	1 set	3/16" - 3/4"
Wrenches, box end	1 set	12 sizes, 5/16" - 1"
Wrenches, monkey	1	18"
Wrenches, adjustable end	4 ea.	6", 8", 10", 12", 15"
Wrenches, socket	2 sets	12 sizes, 7/16 - 1 3/4 by 16th
Wrenches, socket	1 set	8 sizes, 1/2" - 1"
Wrenches, spark plug socket	1	1/2" - 1", 1/2" drive
Wrenches, open end	1 set	6 offset, 3/8" - 1"
Wrenches, vise grip	2	7" and 10"

need replacing quite frequently.

Equipment needed for painting and glazing is shown in Table XLIII.

Soldering and Sheet Metal

Table XLIV shows the number and description of the equipment needed for the useful mechanical job of soldering and using sheet metal.

Forge and Cold Metal

There are many farm repair jobs in forge work which can be done by the average farmer with a little knowledge and practice. If farmers did these jobs, they could save a great deal of time and money. There are very few blacksmiths in the Rogersville area, thus students need to learn the unspecialized skills of blacksmithing. Table XLV itemizes the number and kind of equipment that should be provided in the farm mechanics shop.

Concrete and Masonry

Within recent years concrete has become one of the most extensively used materials in the construction of buildings and semi-permanent equipment on the farm. Table XLVI shows the kind of equipment needed for teaching the area of farm masonry. Due to the increased use of masonry on the farms of the Rogersville High School area, the writer selected it as one of the areas of farm mechanics that he would teach.

Fencing

The area of fencing was selected by the writer to include in farm mechanics because methods used by farmers in building fences has been

TABLE XLIII

NUMBER, SIZE AND DESCRIPTION OF
PAINTING AND GLAZING EQUIPMENT

Item	Number Needed	Description
Brush, bench	1	Trim 2 1/4", length 8"
Brush, paint	1 ea.	4", 3", 2", 1", 1/2"
Brush, stencil	1 ea.	1", 1 3/8"
Brush, wire	2	---
Can	6	For washing brushes and mixing paint
Can opener	1	Wall type
Chisel, wood	1	1" (for setting glazier points)
Cutter, glass	2	Single wheel
Knife, putty	2	1 1/2", flexible blade
Paddles, stirring	2	---
Pencil, wax	2	---
Scraper, paint	2	1 1/2" and 2" blade
Screen	2	(To screen paint)
Spray gun and compressor	1	13 1/2 gals., 1/2 HP
Stencils, letter	1 set	1"
Stencils, number	1 set	1"

TABLE XLIV

NUMBER, SIZE AND DESCRIPTION OF
SHEETMETAL EQUIPMENT

Item	Number Needed	Description
Anvil, hardie	1	2-6 lbs.
Awl, scratch	2	3 1/2" blade
Blowtorch, gasoline	2	1 qt. capacity
Brush, bench	1	Trim 2 1/4 x 8"
Brush, wire	2	Long handle
Clamp, "C"	2	1"
Copper, soldering	4	#1 1/2
File, mill bastard	2	10"
Hammer, riveting	2	12 oz.
Pliers, slip joint	4	8"
Punches, center	1	3/8" x 5"
Punch, drift	1	5/32 x 5"
Screwdriver	2	3", 6" blade
Set, rivet	2	3/16 x 1/8
Snips, tinner's	2	2 1/2" cut, straight and circle
Soldering iron	2	Electric, 130 watts
Square, try	2	6"

TABLE XLV

NUMBER, SIZE AND DESCRIPTION OF
FORGE AND COLD METAL EQUIPMENT

Item	Number Needed	Description
Anvil	2	Tool steel faced #100 or #150
Caliper rule	1	8" inside
Caliper rule	1	8" outside
Can, oil	1	Pint size
Chisel, cape	1 ea.	3/16", 1/2"
Chisel, cold	1 ea.	3/8", 1/2", 3/4", 1"
Clamp, "C"	1 ea.	4", 6", 8"
Cutter, bolt	1	30", 1/2" capacity
Divider, wing	1	8"
Drill bits	1 set	5/16" - 1/2"
Drill bits	1 set	5/16" - 1/2" high speed
Drill bits, post	1 ea	5/8", 3/4", 7/8", 1"
Extractor, screw	1 set	5" set
File, half round	1	Double cut 10"
File, mill	4	Single, 2 ea. 8" and 10"
File, mill	1	Single, smooth, 12"
File, round	3	Second cut, 6"-10"-12"
File, square	1	Second cut, 10"
Fire poker	1	--
Forge	1	Elec. blower 24"x30"x 5 1/2"
Hammer, ball pin	2	1 1/4 - 1 1/2; #2
Hammer, blacksmith	2	#1 1/2
Hardie, anvil	1	2" bit width
Pliers, combination	2	6 1/2"; 8"
Post drill	1	12"
Punch, aligning	3	5/32", 3/16", 1/4"
Punch, center	1	5"
Punch, pin	1 set (9)	1/16"- 5/16" by 32nd
Saw, hack	1	Adjustable 10"
Shovel	1	--
Sledge, crosspein	1	6-8 lbs.
Square, combination	1	12"
Square, try	1	8"
Tap and die	1 set	1/4" - 3/4"
Tongs, bolt	2	3/8" x 18", 1/2" x 20"
Tongs, general purpose	2	18" x 20"
Tongs, straight lip	2	18", 20"
Vise, machinist's	2	2", 4 1/2" (6" opening)
Vise, machinist's leg	1	4 1/2" jaw
Wrench, open end	3 sets	8"-3/8"-1/2";10"-5/8"-3/4"; 14"-7/8"-1"

TABLE XLVI

NUMBER, SIZE AND DESCRIPTION OF
CONCRETE AND MASONRY EQUIPMENT

Item	Number Needed	Description
Box, measuring	1	12" x 12" x 12" (cu. ft.)
Brush, bench	1	Trim 2 1/4", length 8"
Bucket	2	1/2 gal., 3 gal. capacity
Chalk line	1	Cotton ball, 100'
Drills, star	1 set	1/8" - 1"
Float, wood	1	3/4" x 5" x 12"
Hammers, brick	2	24 oz. and engineer's
Jar	4	2 pt., 2 qt. (for silt test)
Level, mason's	1	48"
Mixing box	1	—
Plumb bob	1	—
Screen, gravel	1	1/4"
Shovel or hoe	2	D handle, square nose
Tamper	1	--
Trowel, brick	1	10 1/2
Trowel, concrete	2	5 1/2" x 12"
Trowel, edging	1	2 3/4" x 6"
Trowel, grooving	1	3" x 6"
Trowel, pointing	1	6" blade
Wheelbarrow	1	Rubber tired

proven inadequate to construct and maintain fences over a long period of years. Then too, the new materials used need improved methods of installation. A list of equipment needed is shown in Table XLVII.

Pipe Fitting

Table XLVIII shows the kind and amount of equipment needed to teach the skills of pipe fitting and plumbing.

Power Equipment

The power equipment shown in Table XLIX was needed for the farm mechanics shop at the Rogersville High School. The writer proposed only those machines he believed necessary to perform the jobs and skills in teaching farm mechanics.

If the amount of money is not available for the purchase of all the power equipment listed, the writer proposes the following order of purchase: drill press, tilting arbor saw, tool grinder, portable electric one-half-inch drill, jointer, heavy duty grinder, planer, portable electric one-fourth-inch drill, air compressor, portable electric saw and woodcutting handsaw.

TABLE XLVII

NUMBER, SIZE AND DESCRIPTION OF
FENCING EQUIPMENT

Item	Number Needed	Description
Digger, post hole	1	Long handle
Jack, post	1	—
Pliers, combination	4 pr.	10"
Puller, staple	1	—
Shovel	2	Long handle, round point
Stretcher, barbed	1	Block-and-tackle type
Stretcher, woven wire	1	Ratchet type
Tamper, post	1	—
Tightener, fence	1	—

TABLE XLVIII

NUMBER, SIZE AND DESCRIPTION OF
PIPE FITTING EQUIPMENT

Item	Number Needed	Description
Brush, bench	1	Trim 2 1/4" x 8"
Can, oil	1	1 qt. with spout
Caulking tools	1 set	—
Cutter, copper tube	1	1/8" - 1"
Cutter, pipe	1	1/8" - 2" (2-roller)
Die stock and dies	2 sets	1/8", 3/8", 1/2", 3/4"; 1", 1/4", 1 1/2", 2"
Fire pot	1	—
Ladle	1	—
Melting pot	1	—
Reamer, pipe	1	Jr. ratchet, 1/8" - 2"
Rope	1	Asbestos
Saw, hack	1	Adjustable frame, 8" - 12"
Vise, pipe	2	1/8" - 2"; 1/8" - 3 1/2"
Wrench, pipe	4	6", 14", 18", 24"

TABLE XLIX

NUMBER, SIZE AND DESCRIPTION
OF POWER EQUIPMENT

Item	Number Needed	Size	Description
Tilting arbor saw	1	10" blade	2 HP motor with accessories
Drill press	1	14"	Floor model, slow speed 400-2000 RPM, 1/2 HP motor, 1/2" key chuck
Portable electric drill	1	1/4"	1700 RPM
Portable electric drill	1	1/2"	Standard duty with 3" jaw key chuck, ball-bearing, 400 RPM
Tool grinder	1	7" x 1" wheel	1/3 HP, 3450 RPM with eye shields
Tool grinder, heavy duty	1	7/8 spindle 10" x 1 1/4" wheel	1 HP, 1750 RPM with eye shields
Portable electric saw	1	6"	Heavy duty, adjustable 0"-2"
Air compressor	1	100# pressure 30-gal. tank	1/2 HP motor complete
Woodcutting band saw	1	14"	With accessories
Planer	1	16"	5 HP motor
Jointer	1	8"	1 HP motor

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