

**FARM MECHANICS PRACTICES AND INTERESTS OF HIGH
SCHOOL VO-AG STUDENTS**

by

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A SPECIAL PROBLEM

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FARM MECHANICS PRACTICES AND INTERESTS OF HIGH
SCHOOL VO-AG STUDENTS

Purpose of the Study

The purpose of this study is to find out the farm mechanics practices and interests of high school Vocational Agriculture students. This is a follow-up study of one made by Don Freebury on experience of Vo-Ag teachers and farm machinery dealers in working with students and farmers in farm mechanics. ^{1/}

Method of the Study

This study was conducted through the use of a questionnaire completed by 75 high school Vo-Ag students in four Gallatin County, Montana high schools. High schools and their Vo-Ag teachers include Bozeman - Everett Frazer; Belgrade - John VanDaveer; Manhattan - Ralph Mowery; Three Forks - William Kober.

The questionnaire was designed to include the following major areas of farm mechanics training:

- Area 1 Farm Shop Skills
- Area 2 Farm Buildings and Equipment
- Area 3 Farm Power and Machinery
- Area 4 Electricity on the Farm
- Area 5 Soil and Water Management

The author personally administered the questionnaire to 75 students. The group surveyed was limited to high school sophomores, juniors, and seniors in vocational agriculture. The group averaged 2.21 years of vocational agriculture study. The students were asked to report their farm mechanics experiences of the 1951-54 three year period.

^{1/} Freebury, Donald F., Difficulties in Securing Farm Machinery in Vocational Agriculture Shops, Montana State College, Library MSC, May, 1954

AREA I
FARM SHOP SKILLS AND PRACTICES OF HIGH SCHOOL
VO-AG STUDENTS

Under Area 1 detailed questions were asked the Vo-Ag student concerning farm shop skills performed at home and at school. These basic skills include (1) tool sharpening and repair, (2) welding, (3) plumbing, and (4) the care of tools.

Tool Sharpening

Figure 1 shows that students do a great deal of tool sharpening at both home and school. Knife sharpening is the biggest single experience item. Plane sharpening is mainly an at-school activity.

Welding Practices

Figure 2 indicates that welding is largely a school practice. Not all home shops have welders available. Not all of the students studied had yet had an opportunity to practice welding.

The students' attitude and interest in farm mechanics was asked. The question was not designed to evaluate the instructional program, but rather student interest. Seventy-eight percent of the students liked the farm mechanics program very well; 22 percent liked it fairly well and no student indicated a dislike.

The author noted that the high school Vo-Ag students exhibited keen interest in the inventory of their farm mechanics skills and experiences. The instructors and school administrators expressed a strong interest in the study and in the problems of instruction.

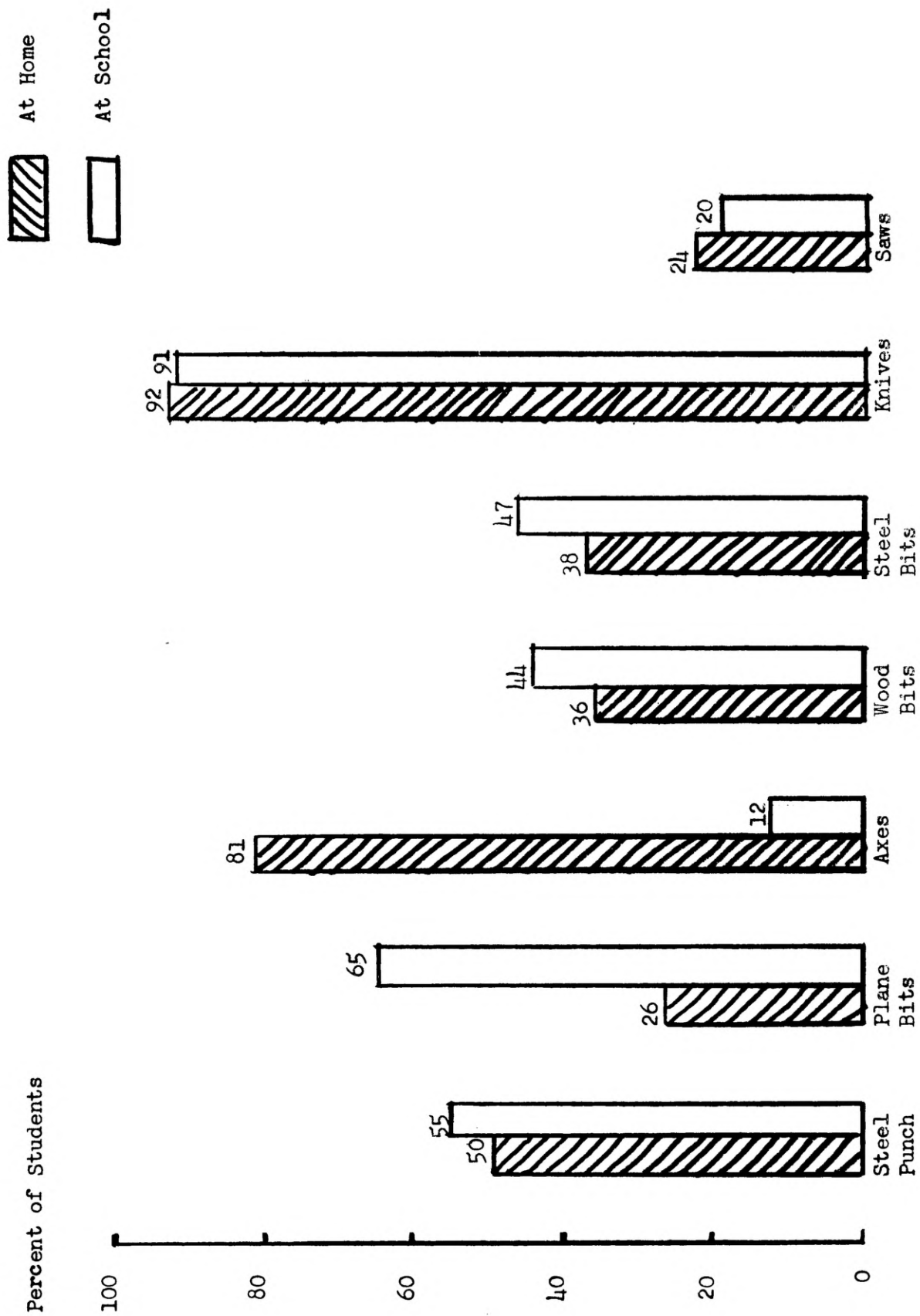


Figure 1: Degree to Which High School Vo-Ag Students Are Performing Farm Shop Skills

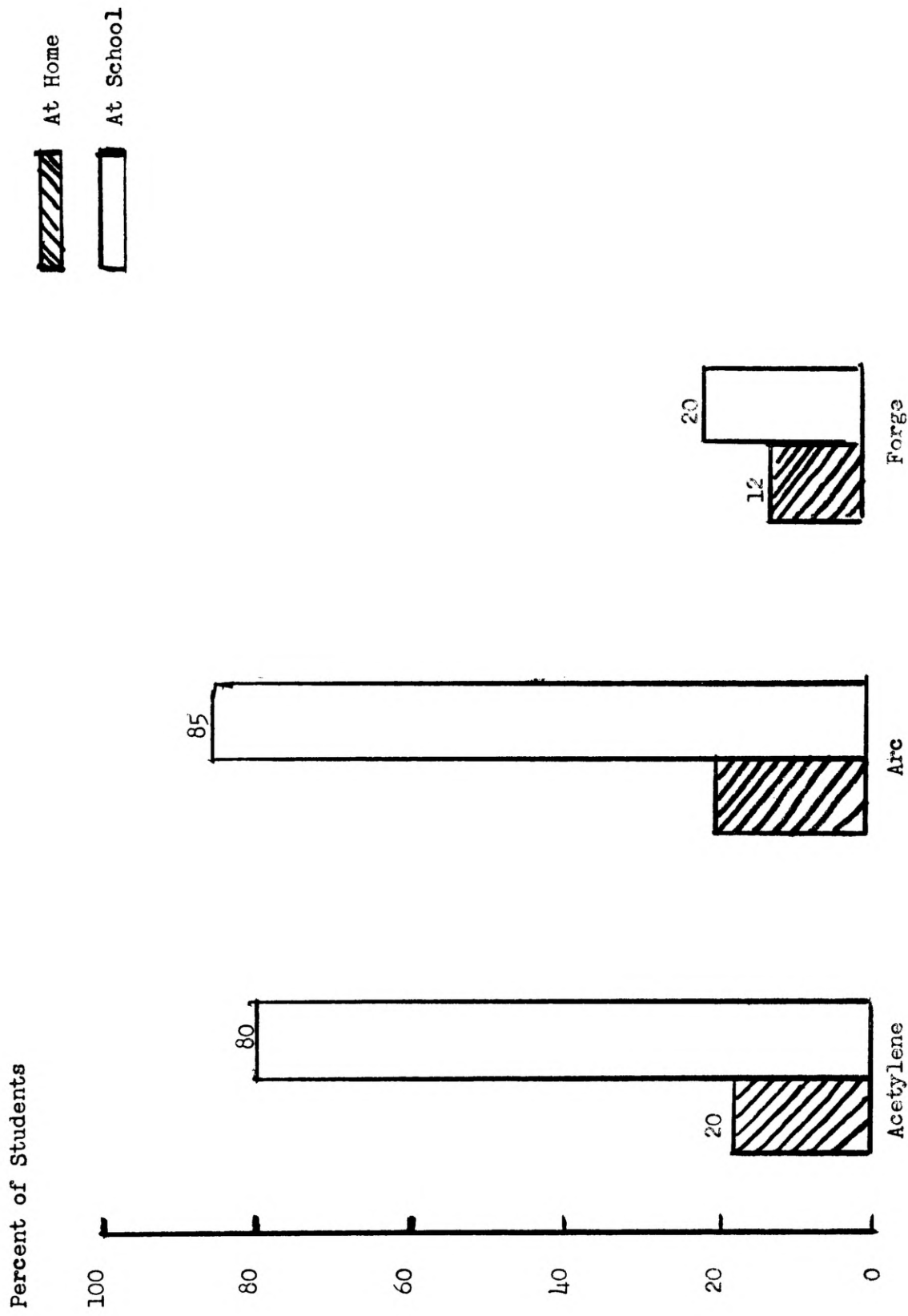


Figure 2: Degree to Which High School Vo-Ag Students Are Performing Welding Projects

Favorite Phases of Farm Mechanics

The favorite phases of farm mechanics indicated by the students approximate the following:

Percent of Student Preference

30%	Welding
20%	Engine overhaul
15%	Farm implement overhaul
10%	Woodwork
8%	Auto mechanics
7%	Metal work
5%	Maintenance - all types
4%	All phases of farm mechanics
1%	Electrical work
100%	

Student interest indicates a desire to stress welding, farm motors and tractors, and machinery repair and maintenance.

AREA II

FARM BUILDINGS AND EQUIPMENT INTERESTS AND PRACTICES OF HIGH SCHOOL VO-AG STUDENTS

This area includes work on farm structures of all types and work on related skills such as glazing.

Figure 3 shows extensive student participation in construction projects on the home farm. The degree of student participation in building projects should be determined. A factor in school that may cause more projects to be carried out at home is the limited space and size of building projects. Figure 4 shows that students had considerable experience with building plans.

Construction Skills

Construction skills include such work as cutting rafters, painting, plumbing and tool fitting.

Students do a variety of construction skills at home. In some cases a student has yet to perform the same skills at school. Figure 4 shows that students at school do considerable painting, tool fitting, repair work and glazing.

Percent of Students

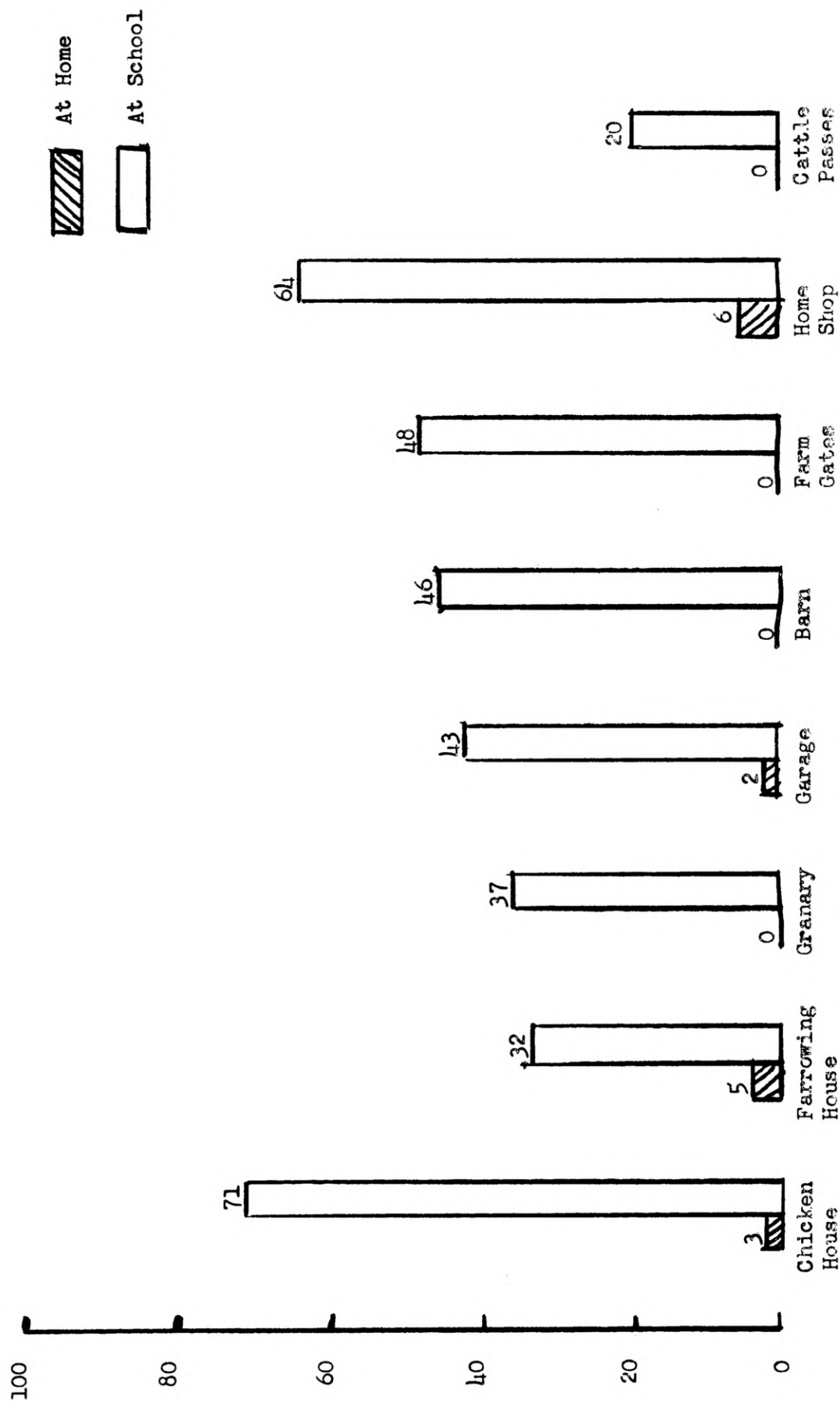


Figure 3: Degree to Which High School Vo-Ag Students Worked On Farm Building and Equipment

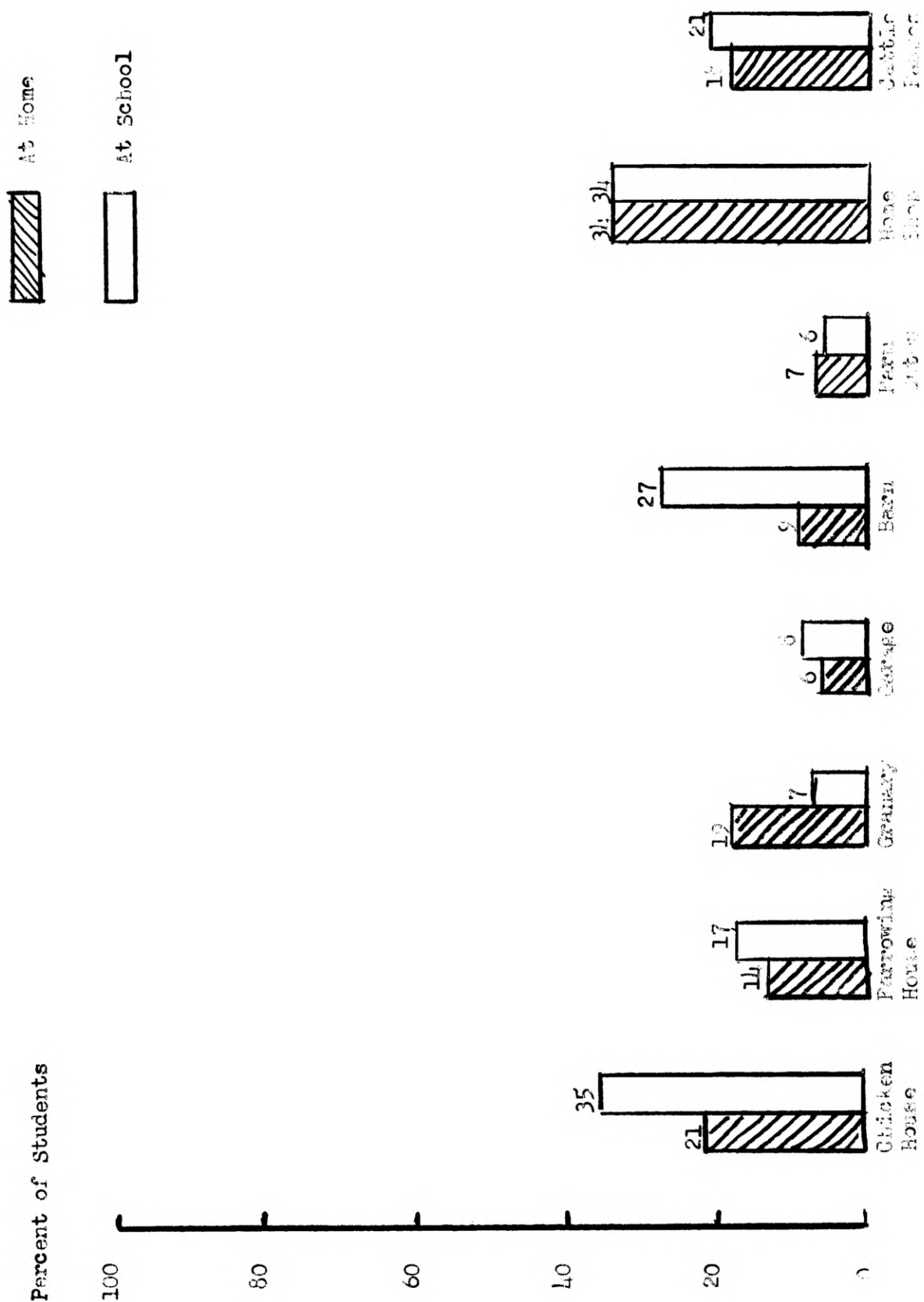


Figure 4: Degree to Which High School Vo-Ag Students Make Plans For Farm Building and Equipment

AREA III

FARM MACHINERY MAINTENANCE AND REPAIR INTERESTS AND PRACTICES OF HIGH SCHOOL VO-AG STUDENTS

This discussion includes the following:

1. Student attitude and practices concerning bringing machinery into the school farm shop from the farm.
2. Student practices concerning (a) machinery maintenance and (b) machinery repair both at school and home.
3. Parent, hired man, and commercial services used in machinery maintenance and repair work.

Student Attitude

Eighty-eight percent of the students stated that they would like to bring farm machinery from home into the school farm shop for maintenance and repairs. This appears to be a significant finding in view of the observation by Vo-Ag teachers and supervisors that they would like to have more (at school) farm machinery repair and maintenance projects. Twenty-six percent of the students had had school farm shop machinery maintenance and repair projects.

Parental attitude is considered a factor toward bringing in farm machines to the school farm shop. Forty-six percent of the students indicated that they thought their parents would permit them to bring in farm machines to the school farm shop.

In response to a specific question on which farm machines students thought parents would consent to having brought in are the following:

Equipment

46%	Other non powered machines
45%	Mower
45%	Plow
44%	Tractor
14%	Bailer

Remarks Concerning Repair and Maintenance Practices

Seventy-two percent of the students stated that their parents felt that commercial shops should do the repair work - or that the machinery should be sold when badly worn.

Figure 5 shows that high school Vo-Ag students do considerable farm machinery maintenance at home and a considerably smaller amount in the school farm shop. Students have considerably more opportunity to do farm mechanics at home than at school.

The study previously mentioned by Freebury shows that very little custom work is being done on farmer owned farm machines in commercial shops. ^{1/} This is borne out by the statement that farmers sell machines when worn rather than have them repaired.

Farm machinery maintenance is generally done by the farmer, his family, and the hired man at home. Automotive mechanics was the most common school machinery project carried on in the school shop.

Student Preference

Maintenance jobs that the student stated they would like to do at home or at school are listed below:

Percent of Students	Equipment Item
65%	Tractors
25%	Autos and combines
4%	Combine
3%	Mower
2%	Plow
1%	Grain drill
<u>100</u>	

Percent of Students

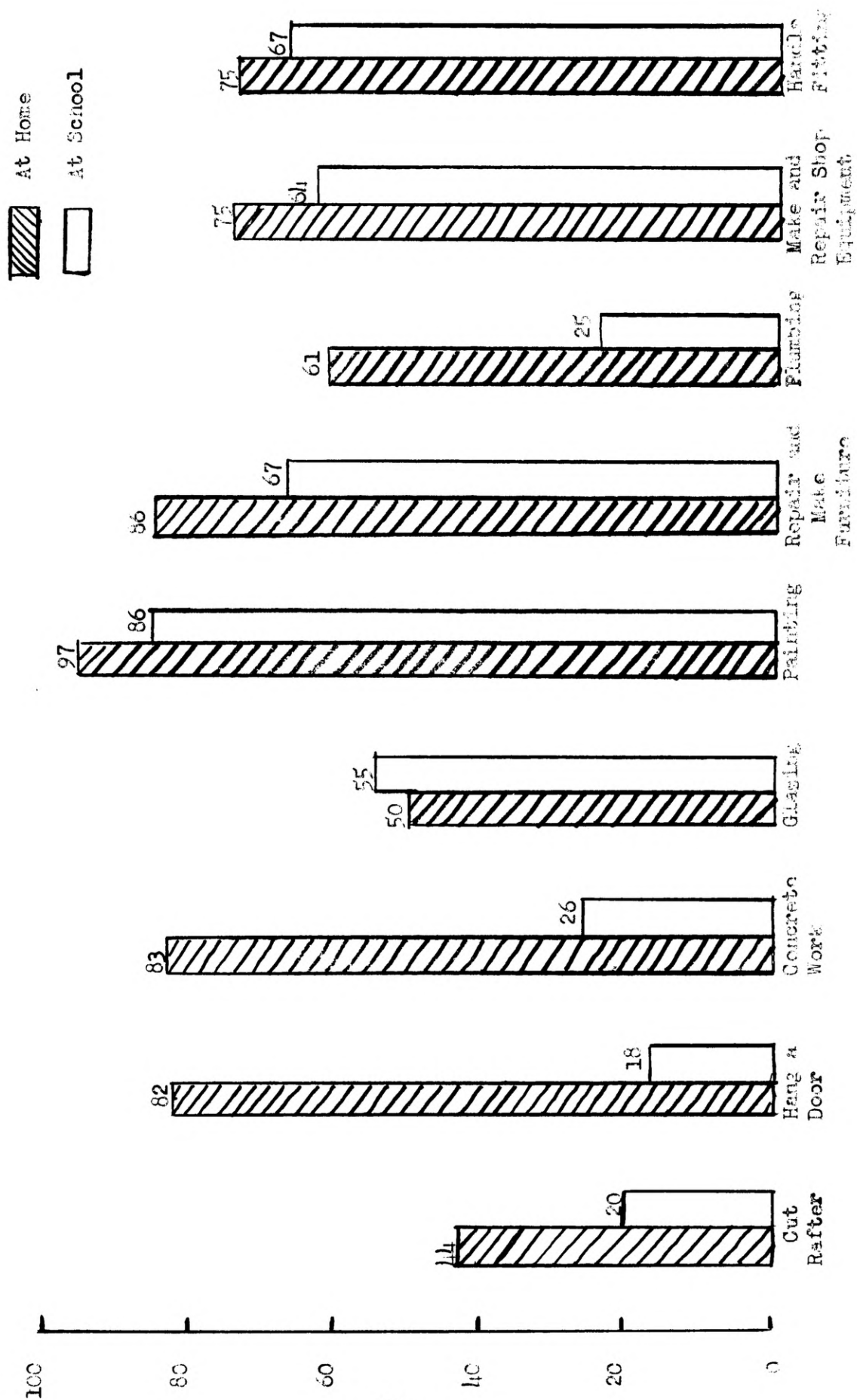


Figure 6: Degree to Which High School Voc-Ag Students Performed Certain Farm Mechanical Skills at Home and at School

Farm Machinery Repair

Figure 6 shows that during the 1951-54 three year period, repair work was done at home on 30 percent of the farm machines compared with 31 percent done by commercial shops. There is a difference in the amount of repair work done at school and at home and this can possibly be explained in part by the student opinions of the parent attitude toward bringing into the school farm shop the machinery from the farm. Very little farm machinery repair school projects were reported. Students were asked to report their farm mechanics experiences at home and at school during the 1951-54 three year period.

Student Preference

Machinery repair jobs students stated they would like to do at home or at school are listed below:

Percent of Students	Equipment Item
47%	Tractors
23%	Auto and truck
15%	Mower
10%	Disk
5%	Combine
100%	

AREA IV

ELECTRICITY ON THE FARM AND HIGH SCHOOL VO-AG STUDENT EXPERIENCES WITH ELECTRICAL WORK

Electrification

Over one half of the students helped install electrical units on their home farm. Figure 7 and Figure 8 indicate that the high school Vo-Ag student has taken it upon himself to do electrical work without special training at school. Figure 9 shows that students home-farm experience in major electrical skills were concerned with light switches, light fixtures and fuses.

Percent of Students

100

80

60

40

20

0

- 12 -

1. At Home
2. At School
3. Parent Did
4. Hired Man Did
5. Commercially Done

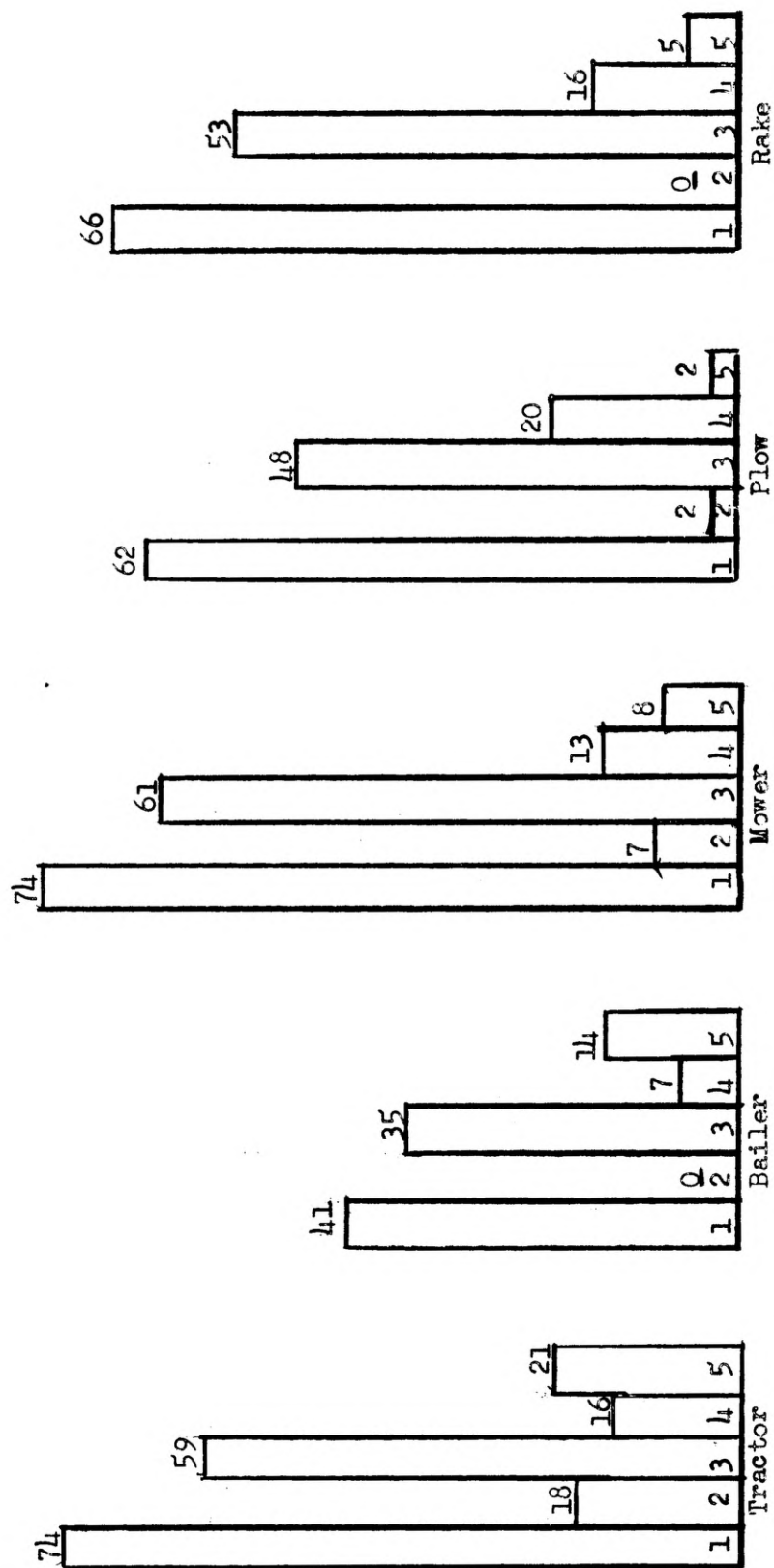


Figure 6: Degree to Which High School Vo-Ag Students Performed Certain Farm Mechanics Skills at Home and School and Degree to Which The Parent, Hired Man and Commercial Shops Performed These Skills

- Cont'd

1. At Home
2. At School
3. Parent Did
4. Hired Man Did
5. Commercially Done

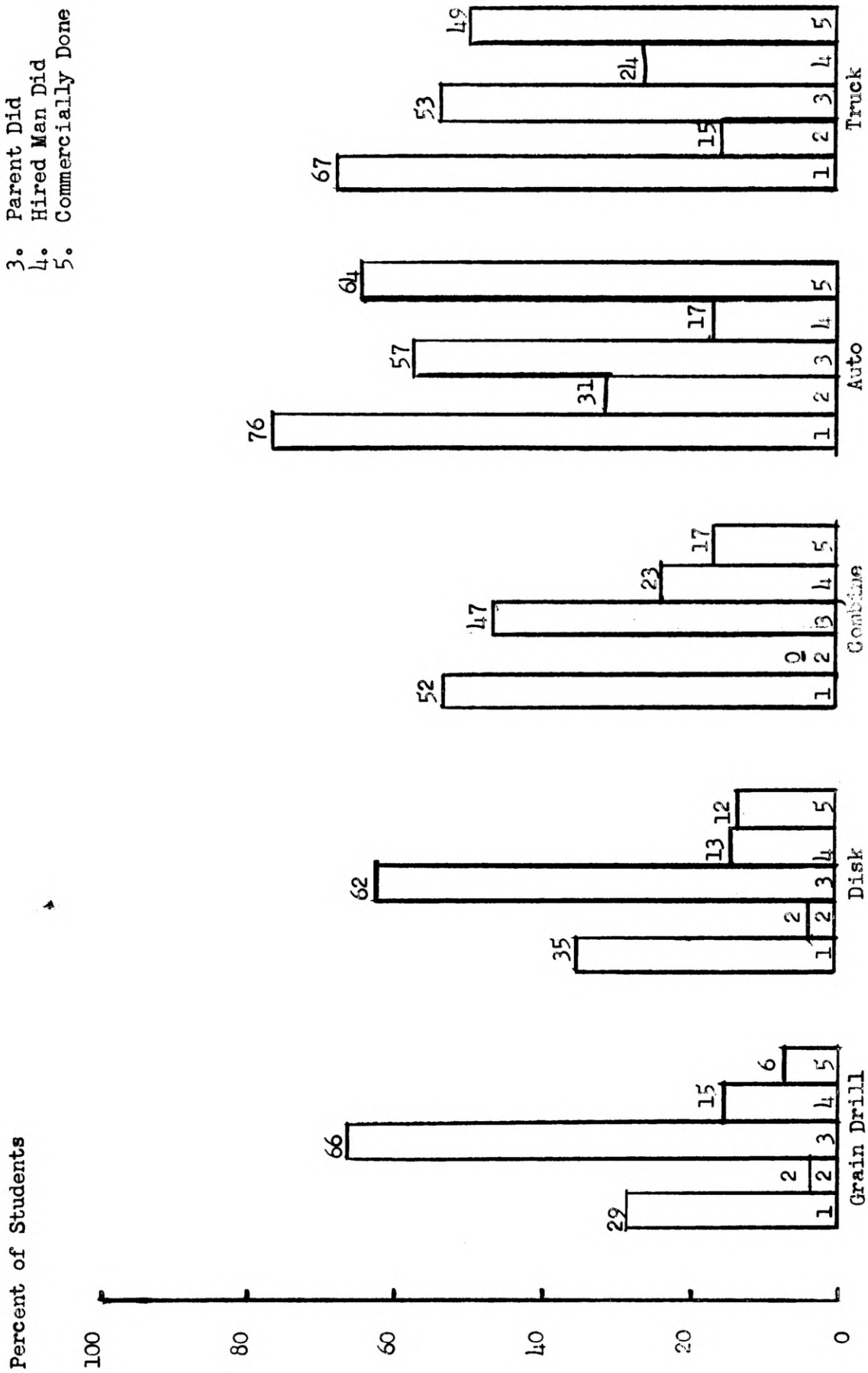


Figure 6 - Cont'd : Degree to Which High School Vo-Ag Students Performed Certain Farm Mechanics Skills at Home and School and Degree to Which The Parent, Hired Man and Commercial Shops Performed These Skills

1. At Home
2. At School
3. Parent Did
4. Hired Man Did
5. Commercially Done

Percent of Students

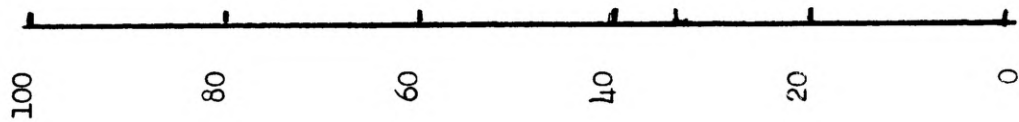


Figure 7: Degree to Which High School Vo-Ag Students Performed Maintenance Skills at Home and at School and Degree to Which The Parent, The Hired Man and The Commercial Shops Performed These Skills

- Cont'd

Percent of Students

1. At Home
2. At School
3. Parent Did
4. Hired Man Did
5. Commercially Done

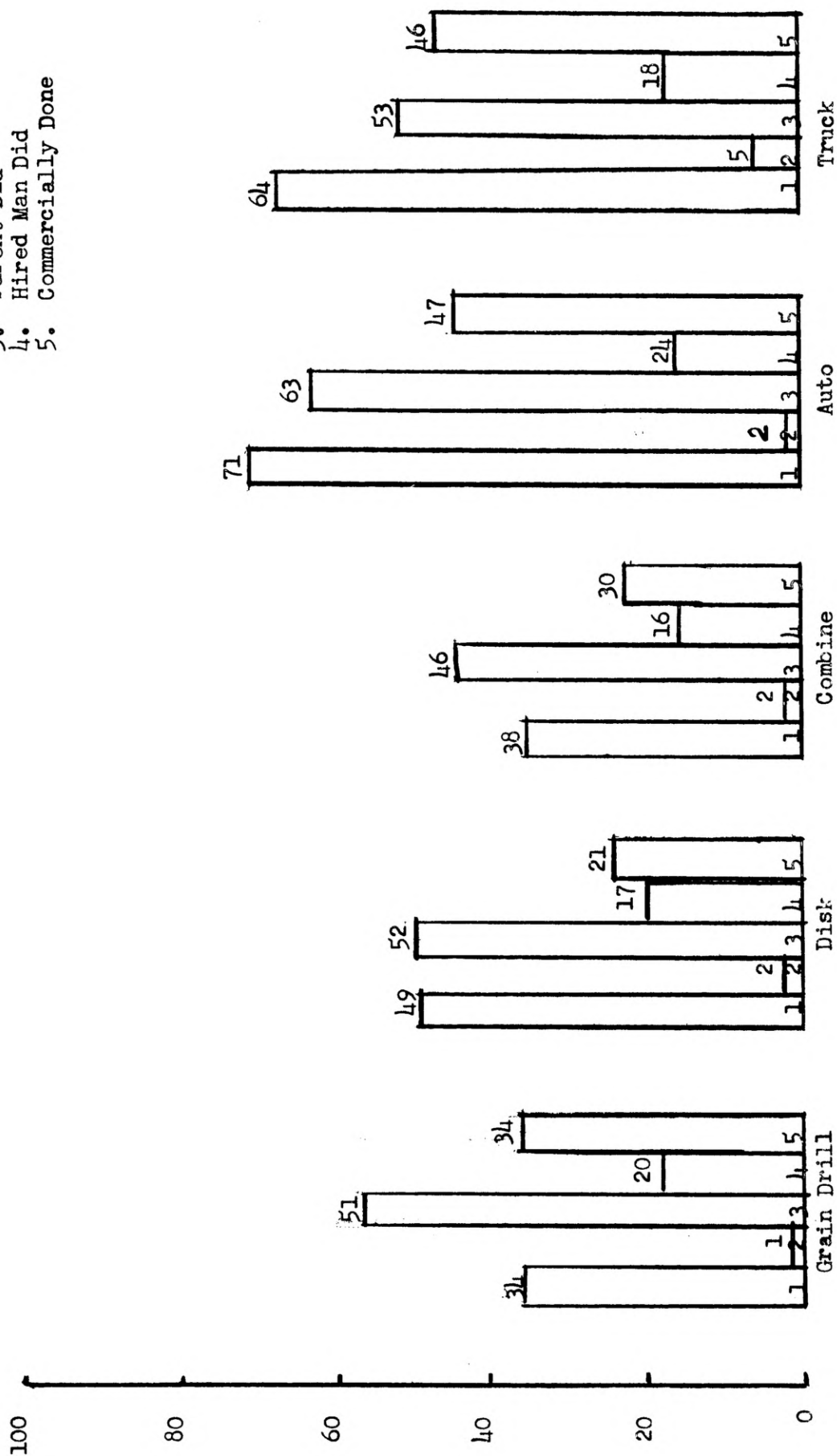


Figure 7 - Cont'd: Degree to Which High School Vo-Ag Students Performed Maintenance Skills at Home and at School and Degree to Which The Parent, The Hired Man and The Commercial Shops Performed These Skills

Percent of Students

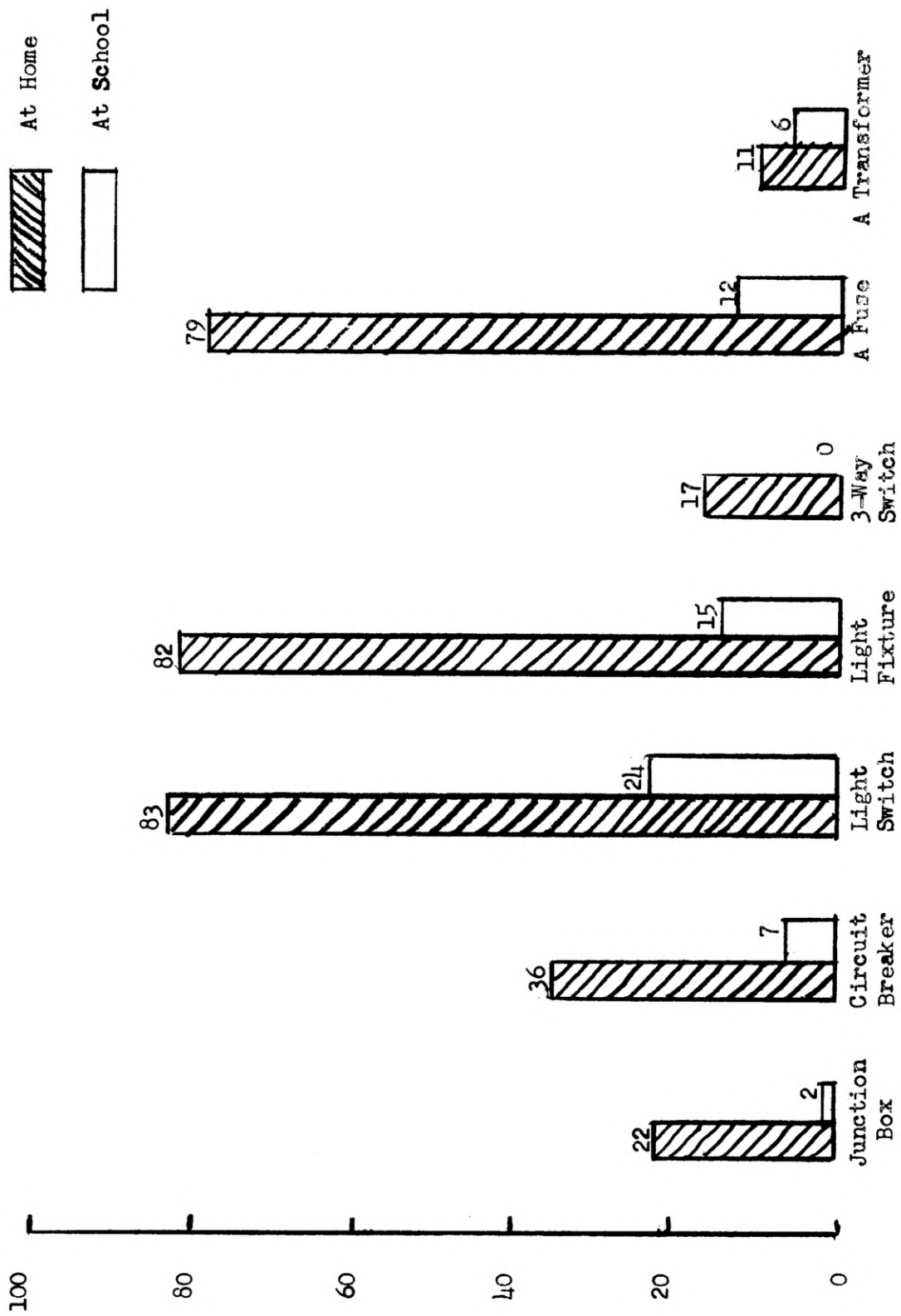


Figure 8: Degree to Which High School Vo-Ag Students Performed Certain Electrical Skills

Percent of Students

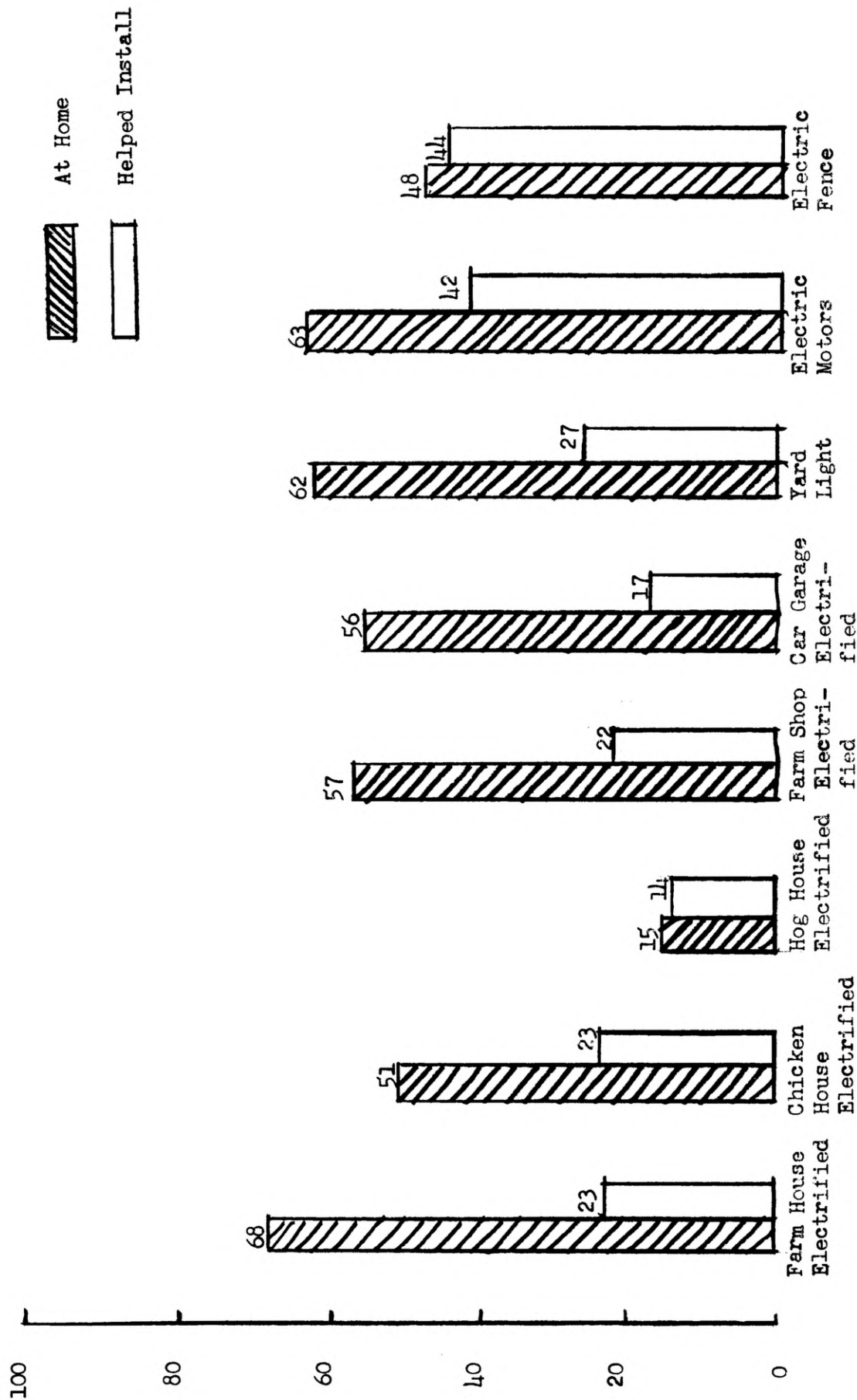


Figure 9: Degree to Which High School Vo-Ag Students Have Electricity at Home and Have Helped Install

Of the electrification projects that the student would like to do at home or at school, the following ranked the highest: (Based on those answering)

Items	Percent of Students Interested in Doing
Wiring of a building	73%
Installing motors	17%
Rebuilding electrical motors	<u>10%</u>
	100%

AREA V

SOIL AND WATER MANAGEMENT PRACTICES ON FARMS OF HIGH SCHOOL VO-AG STUDENTS

High school Vo-Ag students do considerable work in soil and water management at home. The following indicates soil and water management activities done at home by the student or his family:

Specific Questions on Soil and Water Management	Percent of Students Answering Yes
1. Had a soil analysis made	32%
2. Farm in a soil conservation district	72%
3. Have soil conservation plan	35%
By a conservationist - 14% In School - 1%	
4. Have irrigated land	56%
5. Have land leveled	51%
6. Used grass waterways	38%
7. Have water reservoirs	19%
8. Have a wind-break	50%
9. Made contour survey of farm land	14%
10. Have a sprinkler system	13%
11. Have built a fence cornerpost	83%
12. Have worked with an electric fence	63%
13. Have used a level	34%

AREA VI

VO-AG STUDENT FARM MECHANICS PROJECTS AND PRACTICES

This part of the questionnaire was designed to find out the farm mechanics projects carried out by the students in five areas of farm mechanics.

The following is a list of farm mechanics projects and practices carried on by students at home and at school.

AREA I - FARM SHOP SKILLS

	<u>Percent of Students</u>
1. Built home furniture	13%
2. Built a trailer	3%
3. Built a hayrack	3%
4. No answer	<u>81%</u>
	100%

AREA II - FARM BUILDINGS AND STRUCTURES

1. Built a feeder	10%
2. Built a livestock shelter	8%
3. Built a poultry house	8%
4. Built bridges	4%
5. Roof a building	2%
6. Built a granary	1%
7. Built a dog house	1%
8. Built a stock rack	1%
9. Built a magpie trap	1%
10. No answer	<u>64%</u>
	100%

AREA III - FARM POWER AND MACHINERY

1. Painted tractor	14%
2. Repaired silage chopper	1%
3. Repaired cultivator	1%
4. Repaired binder	1%
5. Repaired a stacker	1%
6. Built a bullrake	1%
7. Worked on a diesel engine	1%
8. No answer	<u>80%</u>
	100%

Percent of Students

AREA IV - ELECTRICITY ON THE FARM

1. Set up an electric fence	13%
2. Wired a farrowing house	8%
3. Wired a farm shop	5%
4. No answer	<u>74%</u>
	100%

AREA V - SOIL AND WATER MANAGEMENT

1. Built a ditch	23%
2. Built a head gate	22%
3. Built a flume	15%
4. Irrigated	15%
5. Built fences	15%
6. Built a drain pipe	8%
7. Worked on a reservoir	4%
8. Used a sprinkler system	2%
9. Made a soil test	<u>1%</u>
	100%

SUMMARY AND INTERPRETATIONS

The following points are high lighted in this study:

1. High school vocational agriculture students show a strong interest in farm mechanics.
2. Students are performing several times more farm mechanics skills and practices at home than at school.
3. In all areas of farm mechanics the students are very active in home practice and experience.
4. Students are doing machinery repair work at home but the pattern of the repair work varies a great deal and may be largely maintenance work.
5. Students showed a strong interest in welding and work with engines.
6. Slightly less than 50 percent of the students thought their parents would consent to their bringing in farm machines to the school farm shop. Eighty-eight percent of the students indicated a personal desire to bring farm machines from home to the school farm shop.

7. Farmers use commercial services relatively little for farm machinery repair and prefer to sell the machinery that they consider "worn out".
8. Students show a vital interest in electricity and do a large amount of electrical work at home on projects.

The above information indicates the following:

1. Students favor auto mechanics.
2. Electricity is a weak point at school.
3. Plumbing is a weak point at school and home.
4. Soil and water management should be stressed more.
5. More maintenance and repair work could be done by Vo-Ag students, the farm family and commercial services.

A personal opinion of the author:

In farm machinery and maintenance, Vo-Ag teachers appear to prefer having students get experience and training only with tractor engines. There is no reason why a tractor engine should be considered an entirely different and divorced subject from the automobile engine. Basically the same skills will be developed working on any type of internal combustion engines. Therefore, criticism cannot justly be leveled at the school farm shop that does allow a few autos and trucks to come in for repair or maintenance.

Possible Areas of Further Study

1. Parent attitude toward bringing equipment to the school farm shop.
2. The amount and nature of repair work being done at home by students.

I. How well do you like Farm Mechanics? (Check)

—1. very well —2. fairly well —3. dislike

J. What phase of farm mechanics do you like best?

K. Remarks:

4.2. FARM BUILDINGS AND STRUCTURES

A. Farm Buildings and Equipment (Check Correct Column)

Building and Equipment	Worked on These				Made Plan For			
	In School		At Home		In School		At Home	
	Yes	No	Yes	No	Yes	No	Yes	No
1. chicken house								
2. farrowing house								
3. granary								
4. garage								
5. barn								
6. farm gates - wooden								
7. home shop								
8. cattle passes								

B. List some farm building projects you would like to work on at home or at school.

At Home

At School

_____	_____
_____	_____
_____	_____
_____	_____

B. Farm Mechanics Skills: Have you done the following? (Check correct column)

	Work Done			
	At Home		At School	
	Yes	No	Yes	No
1. <u>cut rafters</u>				
2. <u>hang a door</u>				
3. <u>concrete work</u>				
4. <u>glazing</u>				
5. <u>painting</u>				
6. <u>repair furniture and make furniture</u>				
7. <u>plumbing</u>				
8. <u>make and repair equipment for shop use</u>				
9. <u>handle fitting</u>				

List some projects involving above skills you would like to do at home or at school.

At Home

At School

_____	_____
_____	_____
_____	_____
_____	_____

III. FARM MACHINERY

- A. Have you ever brought in a piece of farm machinery for repair at the school shop? Yes No (Circle one)
- B. Would you like to bring in a machine for repair and maintenance? Yes No (Circle one)
- C. Is your father in favor of your bringing in his machinery to the school shop? Yes No (Circle one)
- D. Would he permit you to bring in the following pieces of equipment? (Check correct column).

	Yes	No
1. <u>tractor</u>		
2. <u>baler</u>		
3. <u>plow</u>		
4. <u>mower</u>		
5. <u>other non-powered machinery</u>		

E. Remarks:

6. Maintenance: Who does it? (Check correct column)

	Have you done this				Someone else did				Commercially done
	At Home		At School		Parent did		Hired Man did		
	Yes	No	Yes	No	Yes	No	Yes	No	
1. tractor									
2. baler									
3. mower									
4. plow									
5. rake									
6. grain drill - calibration									
7. disk									
8. combine									
9. auto - family									
10. truck									

List some maintenance job you would like to do at home or at school.

At Home

At School

_____	_____
_____	_____
_____	_____
_____	_____

H. Farm Machinery and repair practices. Have you done the following? (Check the correct column)

Kinds of equipment	Have you done this				Someone else did				
	At Home		At School		Parent did		Hired Man did		Commercially done
	Yes	No	Yes	No	Yes	No	Yes	No	
1. tractor									
2. baler									
3. mower									
4. plow									
5. rake									
6. grain drill - new gears, etc.									
7. disk									
8. combine									
9. auto - family									
10. truck									

List some repair projects you would like to do at home or at school.

At Home

At School

IV. ELECTRICITY ON THE FARM

A. Have you done any wiring at home? Yes No (Circle One)

B. Electrical Skills: Training and Experience.

Items worked on	Check One At Home		Check One At School	
	Yes	No	Yes	No
1. <u>junction box</u>				
2. <u>circuit breaker</u>				
3. <u>light switch</u>				
4. <u>light fixture</u>				
5. <u>3-way switch</u>				
6. <u>a fuse</u>				
7. <u>a transformer</u>				

C. Electrification.

Farm Electrification of building and units	Check one Have at Home		Check one Helped Install	
	Yes	No	Yes	No
1. <u>farm house electrified</u>				
2. <u>chicken house electrified</u>				
3. <u>hog house electrified</u>				
4. <u>farm shop electrified</u>				
5. <u>car garage electrified</u>				
6. <u>yard light</u>				
7. <u>electric motors</u>				
8. <u>electric fence</u>				

List electrification project you would like to do at home or at school.

At Home

At School

V. SOIL AND WATER MANAGEMENT - Circle either "yes" or "no".

- A. Has a soil analysis been made of your farm soils? Yes No
- B. Is your farm in a soil conservation district? Yes No
- C. Has a soil conservation plan been made for your farm? Yes No
By a conservationist? Yes No In School? Yes No
- D. Is there irrigated land on your farm? Yes No
- E. Has land been leveled on your farm? Yes No
- F. On bare slopes and gullies have you tried to stop erosion by reseeding grass?
Yes No
- G. Are there water reservoirs on your home farm? Yes No
- H. Does your farm have a wind-break? Yes No
- I. Has a contour survey been made of your home farm land? Yes No
- J. Do you have a sprinkler system? Yes No
- K. Have you helped build a fence cornerpost? Yes No
- L. Have you worked with an electric fence? Yes No
- M. Have you used a level for running ditches? Yes No

VI. UNDER EACH OF THE HEADINGS BELOW, LIST FARM MECHANICS PROJECTS YOU HAVE DONE AT HOME AND SCHOOL BESIDES THE ONES ALREADY LISTED IN THE QUESTION.

(During the last three years)

I. FARM SHOP SKILLS

II. FARM BUILDINGS AND STRUCTURES

III. FARM POWER AND MACHINERY

IV. ELECTRICITY ON THE FARM

V. SOIL AND WATER MANAGEMENT

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