DETERMINATION OF EDUCATIONAL NEEDS OF SELECTED JOB TITLES IN FARM IMPLEMENT BUSINESSES IN OKLAHOMA

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CHAPTER I

INTRODUCTION

Through the years there have been many changes in agriculture, with the most recent years bringing about the greatest and most radical modifications. These alterations have had a great impact upon agriculture through technological improvements of the mechanical, biological, and chemical nature in the production of farm products and innovations in the organizational structure in the industry. These changes all set in motion forces that provided incentives to decrease the amount of labor used in relation to capital and land in the production of farm goods.[19]

The results of these technology innovations have been a decided factor in decreasing the percentage of our population actually engaged in farming. During the quarter century (1930-1955) the percentage of those engaged in farming decreased from 22 per cent to approximately 12 per cent.[11] During the same years there have been significant increases in the number and percentage of those engaged in the agricultural and other service occupations. During this time those engaged in service occupations increased from 47 per cent to 62 per cent.[12] Agriculture provides more jobs and careers in the city than on the farm and in the farm home of 40 or even 25 years ago. Most agricultural educators interpret these jobs as still being agricultural jobs.

Agriculture is still our largest single industry. Nearly 40

per cent of our entire population is engaged in farming, closely allied businesses, and agricultural services. In Oklahoma, with 40 per cent of the employed persons owing their jobs to agriculture, 174,000 people are required to manage and operate the state's 90,000 farms and ranches; 14,000 work to keep farmers supplied with production items; and approximately 200,000 full-time employees are engaged by the firms that market and process our farm products.[4]

There is other evidence that, although the number of farming opportunities are decreasing, career opportunities in agricultural occupations other than farming are on the increase. It is pointed out in Careers Ahead[10] that for every opportunity in farming today there are 3.75 opportunities in agricultural business. Farming and agricultural business are interrelated. They are inseparable. Without each other neither could exist. There is evidence from the trend in agricultural specialization to expect that they will become even more integrated in the future.

The changes brought about in agriculture have changed the manpower requirement for the industry. Technology has created a new relationship between man, his education, and his work, in which education becomes the bridge between man and his work. Who is to educate these people? There are many different types of institutions providing training programs for persons who are out of high school. Programs develop wherever an institution is in a position to meet the vocational education needs of post-high-school youth and adults. The needs of industry are far beyond the capacity of present programs. It is the expressed opinion of experienced educators that vocational educators with their area vocational schools and their broad experience can do a better job

than any other group in educating agricultural technicians. Recent changes in the laws governing vocational education make it possible.

The Vocational Education Act of 1963 forces the use of a part of the new appropriation into area vocational education schools. Thirty-three per cent of the state's allotment for any fiscal year ending prior to July 1, 1968 and at least 25 per cent of each state's allotment for any subsequent fiscal year will be used only for area vocational education schools.[42] The Vocational Education Act of 1963 provides for the construction of area vocational education schools, training for persons who have completed or left high school and who are available for full-time study in preparation for entering the labor market. It also provides training for persons who have entered the labor market and who need training or re-training to achieve stability or advancement in employment and training for individuals who have academic, socio-economic, or other handicaps that prevent them from succeeding in the regular vocational education programs.

The 1965 Oklahoma Legislature[29] made it possible to establish area school districts and allowed the school district to levy an annual five-mill additional property tax to assist in the cost of the area vocational school. There are five area schools in the process of being built in Oklahoma. Technically trained agricultural personnel are badly needed. If we are to train these people in our area schools for agricultural technician jobs, we must provide these schools with valid information for them to develop their curriculum.

GENERAL STATEMENT OF THE PROBLEM

The purpose of this study is to provide the educators in the area

vocational schools of Oklahoma with information significant for curriculum development on six job titles of the farm implement business that require a post-high-school level of education. This investigation was made to provide the area schools with the information they need to develop curriculums for the manager, the assistant manager, the salesman, the partsman, the shop foreman, and the mechanic for farm implement businesses. An analysis was made of the farm implement managers' responses to the data schedule to determine the level of competency among selected areas of vocational education.

THE NEED FOR THE STUDY

Modern developments in agricultural technology and rural-urban population movements are two major factors that have resulted in increased number of persons needed to service production agriculture. Research is badly needed to provide educators with the necessary curriculum information to educate agricultural technicians to service the agricultural industry.

The area schools will be attempting to develop the educational programs that are in most demand by employers. This study and other studies[35] will provide some much needed information to compare agricultural manpower needs to other industrial needs.

The results of a study on off-farm agricultural occupations in Oklahoma[35] indicated that farm implement businesses have the greatest need for personnel with post-high-school technical training. This study was to provide the area vocational schools with information for curriculum development for the six job titles mentioned above.

DEFINITION OF TERMS

Certain words and groups of words appear frequently throughout this study. The following definitions will clarify the meaning of the terms used.

A post-high-school provides training for those who have completed or left high school and who are available for full-time study in preparation for entering the labor market.[42]

A technician is a semi-professional, highly skilled worker who can be differentiated from both the professional person and the highly skilled worker. Many technicians work in direct, supportive capacity to professional persons and scientists. Many perform tasks which either were at one time, or still continue to be, within the range of the functions of professional personnel. A technician is located midway between the skilled person and the professional person in the development structure of jobs, in his work performance, and in his educational attainment. The jobs of most technicians may be traced to recent applications of scientific and technological knowledge in the production and distribution of goods and services. The success of a technician depends on his understanding of scientific principles and his ability to apply these scientific principles in solving problems of modern design, production, distribution, and service.[28]

An off-farm agricultural business is a firm that does a portion of its business with the farm business and requires some personnel with agricultural experience and training.

An agricultural technician is an individual who has less than a baccalaureate degree and who has had an extended period of specialized

training beyond high school. The training may include, but be limited to, courses in the physical sciences, biological sciences, and social sciences. The person should have acquired the skill and ability to make practical applications of theoretical knowledge in performing specific tasks in the production of goods and services in agriculture.[17]

An area vocational school is a public school or public institution that includes (1) a specialized high school used exclusively or principally for the provisions of vocational education to persons who are available for full-time study in preparation for entering the labor market, (2) the department of a high school exclusively or principally used for providing vocational education in no less than five different occupational fields to persons who are available for full-time study in preparation for entering the labor market, (3) the technical or vocational school used exclusively or principally for the provision of vocational education to persons who have completed or left high school and who are available for full-time study in preparation for entering the labor market, or (4) the department or division of a junior college or community college or university that, under the supervision of the state board of education, provides vocational education in no less than five different occupational fields leading to immediate employment but not leading to a baccalaureate degree.[2]

An occupational field is a group of recognized occupations having substantial similarities common to all occupations in the group. The occupations would have similarities in the work performance, in the abilities and knowledge required of the worker, and in the basic materials with which they work.[2]

CHAPTER II

REVIEW OF LITERATURE

More than three hundred studies have been conducted over the past thirty years on some phase of occupational guidance in agricultural education, according to Wagley.[43] Most of these studies were concerned with the number of vocational students who enter farming. In the past ten years the emphasis has shifted to studies concerning off-farm agricultural occupations.

The importance of off-farm agricultural occupations is clearly stated in the Report of the Panel of Consultants on Vocational Education:[15]

> Although jobs may change, a worker who has mastered the skill of a trade or occupation and who has kept himself abreast of new techniques and developments can reasonably expect to continue his trade throughout his working life. Pre-employment training of youth must therefore provide a solid occupational foundation. In addition the potential member of the labor force must be well aware of his responsibility for his own self-development if he is to continue to keep up to date in his occupation. Since more and more workers will need a program of lifelong learning, continuing educational opportunities must be provided to cope with occupational change. Vocational educators must train more broadly for career patterns for a lifelong sequence of employment opportunities.

Agricultural Technicians

It appears, by the research published, that California[38] recognized earlier than most states that its educational program needed

to be modified to fit the decrease in the number of farms and the increase in the number of off-farm agricultural occupations. A study of the types of jobs available and the training needed revealed that there were over fifty different types of public and private service positions for which graduates of post-high-school training would qualify. They also found that the present types of training for farm employment would not be suitable for technician training.

Many factors have contributed to the serious and growing shortage of adequately trained technicians for all industries that exist in California and the United States.

> Among those factors having the greatest effect on this shortage have been the many changes and the phenomenal expansion of industry, the many new applications of scientific development, the growing recognition of the technician as a very important person in the manpower team in industry, and the serious lack of adequate training facilities for technicians.[1]

Halterman's[17] study indicates that three out of four businesses studied identified technician needs within their firm.

> The agricultural related businesses were unable to understand why agriculture does not seem to be getting its share of qualified trainees and workers, particularly in the technical fields. Their only recourse at the present time is to use workers with professional degrees to do technician level work or to select skilled workers within the organization and train them. These businesses are concerned whether or not public agricultural education will assume the role in the future that properly should be assumed to maintain and improve the position attained through the years.

Donker's[14] study in California was an outgrowth and continuation of an original study by Halterman. The objective of the project was a field study of technicians in agriculture as they perform their job. The study supplied a substantial base of information on the nature of

the work done by those individuals who qualify as technicians in agriculture and the knowledge and skills necessary to improve proficiency on the job. Donker found:

> 1. Nearly three-fourths of those interviewed had some college training.
> 2. Eighty-four per cent felt that their major training for the job had been on the job. Less than one-fourth had been sent to special schools and only one-third served any official probationary or apprentice period on the job.
> 3. Eighty-one per cent credited their employer or immediate boss with providing the information to keep up-to-date on the job.
> 4. Of significance in the survey was the information that nearly two-thirds of the technicians reported some degree of responsibility for the supervision and training of personnel under them.
> 5. It can be stated with some certainty that the technician in agriculture does not ordinarily need extensive, specialized training in depth. Nevertheless, it was common to observe that within the agricultural areas relevant to his job, the technician had to know a "little bit about a lot of things" in order to function effectively.

In Donker's[14] study 74 per cent of the technicians had undergraduate training of some kind at the college level. Usually this was only a year or two, or in some cases it represented night school training of a general nature. The evidence indicates that with careful direction an acceptable level of job preparation can generally be done in one or two years.

In an attempt to analyze occupations in Illinois, the Bureau of Education Research found that there is no sharp dividing line between vocational education and technical education.[41] Technical occupations may require as many manipulative skills as some of the skilled occupations, and some positions might, therefore, tend to be filled by recruiting from the skilled ranks. Technical education is not essentially "built upon" education for the skilled occupations. On the other hand,

some occupations listed in the skilled group require a degree of technical proficiency. Certainly a large group of occupations near the dividing line should be categorized as semi-technical. For this reason the whole program in Illinois in technical education at the post-high-school level is divided into technical curricula and semi-technical curricula.

Studies in Illinois indicate a large need for workers in technical and semi-technical trained areas. In a study by McLure[26] in 1960 it was predicted that Illinois could use 20,000 technical school graduates and 44,000 semi-technical graduates by the mid 1960's. Warmbrod[44] estimated that for each 100 agricultural workers employed in a 14-county region in Illinois with population centers of less than 25,000, 10 were working as technicians, 50 were working in jobs which required post-high school technical education, 21 were working in jobs which required post-high school non-technical education, and 19 were working in jobs which required high school graduation only.

In the educators' concern about technicians there have been attempts made to determine the ratio of technicians to other workers. Sims[33] stated:

> Our present industrial economy, based to a great extent on technology, requires a heavy ratio of technicians to engineers. Some studies show the average requirement to be five technicians for every one professional engineer, although the ratio varies according to the industry.

In a speech Arnold[5] presented to the National Seminar on Agricultural Technical Training he stated:

> The ratio of technicians to scientists or engineers, at the present, is usually less than 1 to 1, but the trend seems to be toward 2 or more to each engineer or professional scientist.

Emerson[16] stated that:

> Present estimates are that an engineer or a scientist trained at a professional level requires the supplemental service of two to four trained technicians.

A government report of a survey made in 1961 indicates that there are approximately 5,500 technicians in the farm equipment industry and that this figures out to be 79 technicians for every 100 engineers and scientists in the industry.[32] Also, the report indicated a 5 per cent increase during the previous year.

The importance of an agricultural background or training to an agricultural technician has been verified by the work of several investigators. A study by Brown[8] indicates that there are job opportunities in businesses associated with agriculture. The training needs could be carried out by high school vocational agricultural classes and junior college grade for the unskilled, semi-skilled, and skilled for over two thirds of the sales group. The foundation training program in agriculture in high school was important to those in the consulting and supervisory-managerial group, where the majority needed a four-year college education. Because of the large demands all levels of agricultural education should be concerned with the construction of programs to train for positions in agricultural business.

A study in Alabama by Baker[6] indicates an expressed opinion of employers that approximately one fourth of the total persons employed in businesses, industries, and services associated with agriculture need an agricultural background or training. Morrison,[27] interviewing 152 farm based businesses, reported there were seven major occupational families that were categorized into nine levels of employment

and 225 job titles. A farm background was a desirable prerequisite for most of the job titles, and a high school education was required for all employees with the exception of a few semi-skilled and unskilled workers. Thompson[39] reported that 89 per cent of the employees in the 61 agricultural businesses needed training in both agriculture and distributive education. It was found that a wide variation existed in subject-matter areas content needed by employees in agricultural distributive businesses.

Sutherland and Thompson[37] studied the number and kinds of positions in agricultural businesses requiring agricultural training and attempted to determine the training requirements for workers in these positions in California. The findings of this study indicate that:

> 1. Businesses associated with agriculture provide many job opportunities for persons who have both agricultural and business training and that such opportunities are increasing at a rapid rate.
> 2. Vocational education can provide the training for these occupations and that training of less-than-college grade was found to be sufficient for over 95 per cent of the skilled and semi-skilled workers.
> 3. Vocational education was considered more valuable by employers than general education.
> 4. Sales and service organizations employ the largest number of persons trained in agriculture.
> 5. The need for farm experience was rated high by all the employers.

In determining what off-farm agricultural jobs should be considered in an occupational guidance program, Hoover[21] used the criterion that "the occupations are of such a nature that the employees are worth more to their employers because of their farm background, their knowledge of farming, and their understanding of rural folks." Hoover cites four criteria for concepts that aid in determining whether an occupation meets this criterion:

1. The occupation serves rather directly the farm enterprise through production materials and equipment or through distribution, processing or marketing of food and fiber.
2. The occupation requires some knowledge of farming and/or involves working with farm people.
3. The occupations, or the occupational steps leading to them, are only one step removed from an on-farm occupation.
4. The occupations are serving the farm enterprise and the farmers in a manner unique for the farm and not merely in the same way that they serve all other enterprises or persons.

Educators have found it important to determine the needs of various agricultural job titles and then cluster these needs for the various occupations to simplify the education program. Agan[3] found a need for people trained in non-farm agricultural occupations. Eighty-eight per cent of the employers interviewed thought employees hired could be adequately trained in area vocational schools. The study indicated that there were clusters of information that the various occupational groups needed that would be of value to those that planned training programs. Phipps[30] found a rapidly increasing need for technicians. The technicians employed in rural areas required a wide variety of technical abilities, and the businesses that employed them were multipurpose. They also found that technicians and other workers needing some technical education employed in rural areas may be clustered into groups in terms of their activities and knowledge areas. Thus curriculum may be designed to meet the needs of clusters of workers needing technical knowledge.

Little work has been done in giving direction to the location of area vocational schools. Phipps'[30] study gives some indication in that he found that more than 75 per cent of all workers currently employed as technicians in areas with population centers of less than

25,000 were obtained within a 25-mile radius of their present place of employment.

Farm Machinery Technicians

Research on off-farm agricultural industries indicate that the farm machinery industry has a great need for post-high-school trained personnel. Judge's[24] study of occupations in Massachusetts stated that the three largest occupational groups included in order of numbers were (1) horticultural services, (2) hardware and farm equipment, and (3) meat and fish markets. These three occupational groups account for more than one half of all employers in the thirteen occupational groups included in the study. Richardson[31] indicated in his study of 63 businesses in Oklahoma that farm machinery businesses expect a 42.8 per cent increase in the next five to ten years. A study in New York by Tom and others[40] indicates that the farm machinery and/or equipment salesman or fieldman had the largest number of employees and the largest number expected in five years of the occupations surveyed. Farm machinery and/or equipment repairman, mechanic, or partsman was ranked third according to job opportunity. Horner[22] found that nine out of ten of the employers want employees with a "general knowledge" background in agriculture. Three fourths want employees with a background in livestock production. The next largest group wants their employees to have farm machinery skills. In a recent survey in North Carolina, the State Department of Public Instruction found that over 400 specially trained new employees would be needed in 249 agricultural industry firms during the current year.[23] The farm machinery industry rated at the top of the list in a number of

new or replacement employees needed. Burton[9] reported in a New York study that each farm machinery business averaged about seven employees and that most are classified as skilled or technical employees. Wilson[45] states that replacement parts are big business for dealers in retail farm and power equipment. Veteran farm equipment dealers now consider it one of the most essential segments of a successful dealership. He also states that the industry has a real need for more good partsmen. There were 342 job titles named in Barwick's[7] Delaware study, of which 84 were in the farm supplies family and 82 in the agricultural service family. The study also revealed that there were approximately five persons employed in off-farm occupations requiring agricultural competencies for every seven persons engaged in farming. The occupational families that required the greatest percentage of employees needing agricultural competencies were Farm Machinery Sales and Service with 64.5 per cent. It was found that the Marketing and Distribution family will be hiring as many employees needing agricultural competencies as will all the other families combined. Kahler[25] reported that 45.5 per cent of the managers participating in his study had one or more years of college, whereas 15.1 per cent had less than twelve years of schooling. He estimated that by 1968, 598 employees will be needed to fill new job openings and that an additional 319 employees will be needed to replace retiring workers.

In a speech Merritt D. Hill,[20] President of J. I. Case and President of Farm Equipment Institute, stated:

> A survey recently indicated the need in the State of Iowa alone for 1000 additional dealer service technicians. If Iowa dealers can absorb that many, what about the rest of the country? And what about those needed by the many manufacturers in this business.

Some generalizations that were drawn from a summary of research from twenty-six states findings in off-farm agricultural occupations are:

> 1. Almost half the people employed in off-farm agriculture businesses need education or training in agriculture.
> 2. Employers expect about a 20 per cent increase in the number of employees needing agriculture competencies in the next five years.
> 3. Need for the greatest number of agriculture trained employees will be in agriculture supplies sales and service, agriculture machinery sales and service.
> 4. Agriculture competencies needed are mainly determined by the products handled by the business.
> 5. Salesmanship, human relation and business management are competencies needed by all employees, but in varying degrees.[36]

A study in Ohio by Halterman and Bender[18] indicated that 97 per cent of the persons responding in their study stated prior farm production training to be either a desirable or necessary requisite to job placement in agricultural engineering and mechanics for workers classified in the skilled level or above. A 39 per cent increase in placement opportunities for technicians is anticipated in 1964, and a 69 per cent increase is expected in 1969. Of the 1460 persons employed full-time by the 35 per cent of the agricultural engineering and mechanic firms of Ohio who responded to the survey, 728 persons were engaged in work in the technical (shop foreman and service manager) and skilled occupational levels. Halterman and Bender[18] also found that technicians, who need a wide variety of technical abilities, are employed in rural firms having relatively few employees but that technicians, possessing a high degree of technical preparation in a more limited field of engineering, are employed in firms of large scope.

Studies and investigations that have been made relating to the

off-farm agricultural technician phase of the post-high-school educational programs indicate the following:

1. There is a serious and growing shortage of adequately trained technicians, including agricultural technicians.

2. Educational programs for preparation of agricultural technicians are presently not adequate to fill the needs of the industry.

3. An agricultural background or training is a valuable asset to an agricultural technician.

4. Among off-farm agricultural industry, farm implement businesses presently have the largest number of employees and expect to employ the largest number in the near future.

5. Most farm implement business employees are classified as skilled or technicians.

6. There are clusters of information needed by various occupational groups that would be of value to those that plan educational programs.

7. Personnel trained in off-farm agricultural occupations need competencies in salesmanship, human relations, and business management, but in varying degrees.

CHAPTER III

DESIGN OF THE STUDY

Statement of the Problem

The purpose of this study is to secure significant information to be used by educators in area vocational schools in developing curriculum. More specifically, the information was centered on the six job titles of the farm implement businesses that were recognized as requiring a post high school level of education. The investigation was definitely aimed at identifying competencies needed by the manager, assistant manager, salesman, partsman, shop foreman, and mechanic. The specific objectives were:

1. To classify the data schedule items within each subject-matter area for various competency levels for the six job titles.
2. To classify the responses to each data schedule item by the distribution of variance among the six job titles.

Procedure of the Study

As the need for a study in the field of off-farm agricultural occupations became more apparent, the Department of Agricultural Education of Oklahoma State University and the State Board of Vocational Education combined efforts to carry out a state-wide study on off-farm

agricultural occupations in Oklahoma.[35] Results of this study indicated that farm implement businesses had the greatest need for personnel with post-high-school technical training, also with the highest percentages of present employees needing agriculture competencies.

The State Director of Vocational Education, Mr. J. B. Perky, received correspondence from Mr. Tom J. Crooks, Executive Secretary of the Oklahoma Farm Implement Dealers' Association, requesting vocational education's assistance in training much needed personnel for the farm implement businesses of Oklahoma. During this same time Oklahoma was developing an administrative structure for area vocational schools. The area vocational schools needed curriculum information to help develop agriculture-oriented occupational training programs.

In formulating the data schedule for this study as seen in Appendix A, the author used as a general outline the data schedule for "A Study of Employment Opportunities and Training Needs in Off-Farm Agriculture Occupations in Oklahoma."[35] Each of the original data schedule items was greatly expanded. Assistance was obtained from the State Supervisors of Distributive Education and Trades and Industry to be sure that the data schedule items in their subject-matter areas were adequate for the farm implement business.

There are approximately 320 farm implement businesses in Oklahoma. A sample of 30 of the larger farm implement businesses in Oklahoma were selected, and the manager or assistant manager was interviewed. The larger firms were selected because of the larger number of employees and the firm's need for more specialized employees. Mr. Tom J. Crooks, Executive Secretary of the Oklahoma Farm Implement Dealers' Association, has been with the Association for a number of years. He listed

the farm implement businesses by the volume of business. Mr. Crooks then selected 30 firms with the largest volume of business as the sample for this study. The findings of this study are limited to farm implement businesses with a volume of business comparable to the sample selected.

The data schedule was taken to two farm implement businesses to test the adequacy of the instrument. It was decided by the farm implement businesses interviewed, the major adviser, and the investigator that the data schedule was adequate.

The investigator wrote the managers of 30 farm implement businesses for appointments and personally interviewed the manager or assistant manager. The manager or assistant manager of the business gave his opinion of the degree of competency needed to start in the work for each of the six job titles: manager, assistant manager, salesman, partsman, shop foreman, and mechanic. The investigator marked each data schedule item as directed by the manager or assistant manager.

Treatment of the Data

Mean values of 1, 2, and 3 were assigned to none, some, and high competency ratings, respectively, in the data schedule. The information on the data schedules were coded and prepared for processing by the computer. The computer determined the mean for each data schedule item for each job title and the over-all means of each data schedule item for all job titles.

Using the analysis of variance method, the computer indicated the data schedule items whose means for the six job titles differed significantly at the 5 per cent level and those with no significant differences.

The data schedule items with job title means differing significantly at the .05 level were clustered by the Duncan's Multiple Range Test. The computer arranged the means in numerical order. It also printed the extent of the line or lines for each of the means. Any two means underscored by the same line are not significantly different.[34]

CHAPTER IV

PRESENTATION AND DISCUSSION OF THE DATA

Data concerning the training needs for the manager, assistant manager, salesman, partsman, shop foreman, and mechanic were obtained from the managers or assistant managers of 30 farm implement businesses in Oklahoma. The survey instrument used in the interviews for collecting the data needed in the study is shown in Appendix A.

This study has been carried out for the area vocational schools to use in developing their curriculum for selected job titles in the farm implement business. It will be the schools' responsibility to make their own selection of subject-matter areas and to determine the emphases in their curriculum. The construction of a curriculum for employees of farm implement businesses will depend on the schools' philosophy, the degree of competency the school expects, and the time the school will have the students available. The curriculum organization may depend upon the clustering of subject-matter for more than one job title in the farm business and/or how the curriculum may tie in with other educational programs.

Percentage of Data Schedule Items Within Each Subject Matter Area for Various Mean Ranges for Six Job Titles

Manager

Table I shows that the manager should have little to no training

in Animal Science competencies with all of the 40 data schedule items on Animal Science competencies with a mean of less than 1.29. Some data schedule items on Beef Cattle scored a little higher than other classes of livestock (Appendix B).

Communications competencies are important to a manager as all of the 30 data schedule items were within the mean range of 2.30 to 2.49. Some data schedule items on written communications scored the highest. The highest scoring data schedule item for managers in Communication competencies was "Preparing a business letter."

The 94 data schedule items in Plant Science competencies scored relatively low with 77.66 per cent with a mean score of less than 1.69 and with 48.94 per cent with a mean range of 1.30 to 1.49. The highest scoring data schedule item for managers in Plant Science competencies was "Implements used in preparation of seedbed." This data schedule item could have easily been placed in the Agricultural Mechanic competencies. "Correct preparation in increase yield," "Depth and timing of preparation," and "Some characteristics of a good seedbed" were the next three highest scoring data schedule items for managers in Plant Science competencies. The next highest scoring data schedule items were in the area of Haymaking.

Agricultural Business Management and Marketing competencies had 91.11 per cent of their data schedule items with means of less than 1.69 and with 60.00 per cent within a mean range of 1.30 to 1.49. The highest scoring data schedule item for the managers was "Credit" with a mean of 2.33. The next highest score in Agricultural Business Management and Marketing competencies for managers was "Partial budgeting." "Renting" and "Efficiency in use of Labor, power and equipment"

TABLE I

PERCENTAGE OF DATA SCHEDULE ITEMS WITHIN EACH SUBJECT MATTER AREA FOR THE MEAN RANGE FOR THE MANAGER

Mean Range	Agri. Plant Sci. N=94[a]	Agri. Animal Sci. N=40	Agri. Business Mgt. and Mkt. N=45	Agri. Mechanic N=63	Business and Distributive N=128	Trades and Industry N=90	Communication N=30
2.70 to 3.00					27.34		
2.50 to 2.69							
2.30 to 2.49			2.22	3.17	3.13	6.67	100.00
2.10 to 2.29	1.06		2.22	3.17	50.78	8.89	
1.90 to 2.09	7.45			7.94	4.69	1.11	
1.70 to 1.89	13.83		4.45	1.59	7.03	5.56	
1.50 to 1.69	17.02		28.89	4.76	3.12	3.33	
1.30 to 1.49	48.94		60.00	6.35	3.91	1.11	
1.00 to 1.29	11.70	100.00	2.22	73.02		73.33	

[a]N refers to number of data schedule items.

had a mean score of 2.13, 1.80 and 1.73 respectively.

Most of the data schedule items, 73.02 per cent, in Agricultural Mechanics competencies for the managers were in the mean range of 1.00 to 1.29. The managers apparently need to understand "Selecting power units and machines to types of farming considering size and number, hours of use, cost, etc." as this data schedule item has a mean of 2.40. The next highest scoring data schedule item was "Principles in machinery" with a mean of 2.37. The manager indicated that in general he needed to know about machinery and to operate the farm machinery but did not need to know so much about how to service, maintain, and repair.

The highest scoring data schedule items for managers were in Business and Distributive competencies with Human Relations, and Salesmanship and Customer Relations scoring the highest. There were 27.34 per cent of Business and Distributive competencies in the mean range of 2.70 to 3.00 with the data schedule items coming from the two areas just mentioned. There were 128 Business and Distributive data schedule items with 81.25 per cent above 2.10 mean score. There were no data schedule items scored in the lowest mean range, 1.00 to 1.29.

Most of the 90 data schedule items, 73.33 per cent, in the Trades and Industrial competencies scored in the lowest mean range. The highest scoring data schedule items in Trades and Industrial competencies were in the area of Supervision and Safety with each having a mean of 2.30. "Basic mathematics skills" had a mean of 2.27. The area of Time Study with data schedule items "Efficiency of movement," "Organization of the business," and "Flat rate manual" having a mean of 2.20, 2.10, and 2.07, respectively.

Assistant Manager

In comparing Table I and Table II, the investigator found that the manager and the assistant manager's training needs are very similar. The managers indicated that they needed a little more training in most subject matter areas than did the assistant managers.

As shown in Table II, 87.23 per cent of the 94 data schedule items for the assistant manager in Plant Science competencies had a mean of less than 1.69. The highest scoring data schedule items in Plant Science competencies were four data schedule items in the area of Preparation of Seedbed, one data schedule item in Haymaking and two data schedule items in Weeds, each with a mean of 1.82 (Appendix B).

All of the 40 data schedule items on Animal Science competencies had a mean of less than 1.29. The mean of Beef Cattle data schedule items were slightly higher than other classes of livestock.

Agricultural Business Management and Marketing competencies had 86.66 per cent of their 45 data schedule items with means of less than 1.69. The highest scoring data schedule item for the assistant manager in all fields of agriculture was "Credit" with a mean of 2.36. The next highest scoring data schedule item in Agricultural Business Management and Marketing competencies was "Partial Budgeting" with a mean of 1.91.

Most of the data schedule items, 74.60 per cent, in Agricultural Mechanics competencies for the assistant manager were in the mean range of 1.00 to 1.29. The assistant managers need to understand "Principles in machines" more than other data schedule items in Agricultural Mechanics competencies as this item had a mean of 2.18. The next highest mean

TABLE II

PERCENTAGE OF DATA SCHEDULE ITEMS WITH EACH SUBJECT MATTER AREA FOR EACH MEAN LEVEL FOR THE ASSISTANT MANAGER

Mean Range	Agri. Plant Sci. N=94[a]	Agri Animal Sci. N=40	Agri. Business Mgt. amd Mkt. N=45	Agri. Mechanic N=63	Business and Distributive N=128	Trades and Industry N=90	Communication N=30
2.70 to 3.00					27.34		
2.50 to 2.69							
2.30 to 2.49			2.22		7.03		13.33
2.10 to 2.29				1.59	40.63	18.89	86.67
1.90 to 2.09			6.67	11.12	14.06	3.33	
1.70 to 1.89	12.77		4.45	3.17	7.03	2.22	
1.50 to 1.69	35.11		26.67	4.76	.78	1.11	
1.30 to 1.49	30.85		31.10	4.76	3.13		
1.00 to 1.29	21.27	100.00	28.89	74.60		74.45	

[a] N refers to number of data schedule items.

was with data schedule item "Selecting power units and machines to types of farming considering size and number, hours of use, cost, etc." with a mean of 2.09. Other data schedule items with a relatively high score of 2.00 were "Operate field machinery including lubrication, etc.," "Plan and execute a program of preventive maintenance including protective shelter, rust protection, periodic inspection and adjustment," and "Select hand and power tools and shop equipment for shop including makes, models, size, qualities, and grades."

The highest scoring data schedule items for assistant managers was in the subject-matter area of Business and Distributive competencies with some data schedule items in Salesmanship and Customer Relations with a mean of 2.91 and some data schedule items in Human Relations with a mean of 2.73. There were 27.34 per cent of the 128 data schedule items in the mean range of 2.70 to 3.00. Also, 40.63 per cent were in the mean range of 2.10 to 2.29. It is important to note that 96.09 per cent of the data schedule items were in mean ranges above 1.70.

Most of the 90 data schedule items, 74.45 per cent, in the Trades and Industrial competencies were in the 1.00 to 1.29 mean range. There were 18.89 per cent of the data schedule items in the mean range of 2.10 to 2.29. These higher scoring data schedule items were "Basic mathematical skills," "Organization of business," "Flat rate manual," "Efficiency of movement," some data schedule items in the area of Supervision, all three of the data schedule items on Safety, and all three of the data schedule items on Manuals, Parts, and Service.

Communication competencies were very important to the assistant manager as all of the 30 data schedule tiems scored above the 2.10 mean level. There were 86.67 per cent of the data schedule items in the

2.10 to 2.29 mean level and 13.33 per cent of the data schedule items in the 2.30 to 2.49 mean range. The highest scoring data schedule items in communication competencies were in the area of written communication.

Salesman

In comparing Tables I and II to Table III, the investigator found that the salesman needs a little more training in Plant Science and Animal Science than does the manager and the assistant manager. The salesman has a wider distribution of the means in the data schedule items than does the manager and the assistant manager in Agricultural Business Management and Marketing competencies. In Communications competencies the salesman requires a little less training than the manager but more than the assistant manager. The manager, the assistant manager, and the salesman have the same data schedule items in the upper mean range, 2.70 to 3.00, but in other mean ranges the salesman requirements were less. In general, the Trades and Industrial competency requirements were less for the salesman than for the manager and the assistant manager.

In Table III, 60.64 per cent of the 94 data schedule items for the salesman in Plant Science competencies had a mean of less than 1.49. The highest scoring data schedule items were four items in the area of Preparation of the Seedbed and four items in the area of Haymaking (Appendix B). There were three data schedule items with relatively high means in the area of Economics of Crop Production. The highest scoring data schedule item in Plant Science was "Correct preparation increases yield."

TABLE III

PERCENTAGE OF DATA SCHEDULE ITEMS WITHIN EACH SUBJECT MATTER AREA FOR THE MEAN RANGE FOR THE SALESMAN

Mean Range	Agri. Plant Sci. N=94[a]	Agri. Animal Sci. N=40	Agri. Business Mgt. and Mkt. N=45	Agri. Mechanic N=63	Business and Distributive N=128	Trades and Industry N=90	Communication N=30
2.70 to 3.00					27.34		
2.50 to 2.69				1.59			
2.30 to 2.49			2.22			1.11	66.67
2.10 to 2.29	2.13		2.22	3.17	1.56	2.22	
1.90 to 2.09	7.45			6.35	7.03	1.11	3.33
1.70 to 1.89	8.51		4.45	1.59	15.63	1.11	
1.50 to 1.69	21.27		13.33	1.59	12.50	10.00	
1.30 to 1.49	30.85	57.50	68.89	3.17	15.63	10.00	
1.00 to 1.29	29.79	42.50	8.89	82.54	20.31	74.45	

[a] N refers to number of data schedule items.

The data schedule items for the salesman are higher in Animal Science than in other job titles. The data schedule items are higher in Beef Cattle, Dairy Cattle, and Horses than in other classes of livestock. All of the data schedule items in this subject-matter area are relatively low.

The highest data schedule item in Agricultural Business Management and Marketing for the salesman is "Credit." The second highest data schedule item was "Partial budgeting." These two data schedule items are shown in mean range 2.30 to 2.49 and 2.10 to 2.29 respectively. There are 77.78 per cent of the data schedule items in or below the mean range 1.30 to 1.49.

There were 1.59 per cent of the data schedule items in Agricultural Mechanics in the mean range of 2.50 to 2.69. This data schedule item was "Selecting power units and machines to types of farming considering size and number, hours of use, cost, etc." There were two data schedule items in the mean range of 2.10 to 2.29. They were "Principles in machines" and "Relationship of mechanism and systems to process and function." There were 82.54 per cent of the data schedule items in the 1.00 to 1.29 mean range and 85.71 per cent below the level of 1.49.

The Business and Distributive competencies had a much higher mean than other subject-matter areas for the salesman. There were 27.34 per cent of the data schedule items in the 2.70 to 3.00 mean range. The data schedule items included in this group are in the area of Salesmanship and Customer Relations and in Human Relations. The next highest mean range was 2.10 to 2.29, which were the data schedule items, "Applicants introduction, manners, expressing oneself, appearance, taking leave," and "Deciding on a price." There were 35.94 per cent

of the data schedule items in Business and Distributive competencies with a mean of less than 1.49.

There were 74.45 per cent of the Trades and Industrial competencies in the 1.00 to 1.25 mean range, with 84.45 per cent below the mean level of 1.49. There was only one data schedule item or 1.11 per cent in the Trades and Industrial competencies in the mean range of 2.30 to 2.49. It was "Basic mathematics skills." The next highest scoring data schedule items were the mean range of 2.10 to 2.29 and were in the area of Safety.

The Communication competencies for the salesman were relatively high in oral communication with 66.67 per cent in the 2.30 to 2.49 mean range. The 33.33 per cent in the 1.90 to 2.09 mean range are written communication competencies.

Partsman

In comparing Tables I, II, and III with Table IV, the investigator found that the partsman does not need so much training in Plant Science, Animal Science, Agricultural Business Management and Marketing, and Business and Distributive competencies as the manager, the assistant manager, and the salesman. The Agricultural Mechanic and Trades and Industrial competencies requirement for the partsman are about the same as those shown in Tables I, II, and III. The Communication competencies requirements are less for the partsman than for the manager, the assistant manager, and the salesman.

Table IV showed that 87.23 per cent of the Plant Science competencies are in mean range 1.00 to 1.29 and 100.00 per cent below the mean level of 1.49. The highest scoring data schedule items in this subject

TABLE IV

PERCENTAGE OF DATA SCHEDULE ITEMS WITHIN EACH SUBJECT MATTER AREA FOR THE MEAN RANGE FOR THE PARTSMAN

Mean Range	Agri. Plant Sci. N=94[a]	Agri. Animal Sci. N-40	Agri. Business Mgt. and Mkt. N=45	Agri. Mechanic N=63	Business and Distributive N=128	Trades and Industry N=90	Communication N=30
2.70 to 3.00					26.56		
2.50 to 2.69					.78	3.33	
2.30 to 2.49				1.59	2.35		
2.10 to 2.29				3.17		4.44	3.33
1.90 to 2.09				1.59	9.37	1.11	96.67
1.70 to 1.89				9.52	9.37	2.22	
1.50 to 1.69				9.52	10.16	11.11	
1.30 to 1.49	12.77		2.22	4.76	16.41	4.45	
1.00 to 1.29	87.23	100.00	97.78	69.85	25.00	73.34	

[a]N refers to the number of data schedule items.

matter area were in Preparation of the Seedbed (Appendix B).

The highest scoring data schedule item in Animal Science competencies was 1.09. All of the data schedule items in this subject-matter area were in the mean range of 1.00 to 1.29.

"Credit" was the highest scoring data schedule item in the Agriculture Business Management with relatively low mean of 1.30. There were 97.78 per cent of the Agricultural Business Management and Marketing data schedule items in the mean range of 1.00 to 1.29.

There was a relatively high degree of competency expected from the partsman in "Principles of machines" as this data schedule item had a mean of 2.35. The data schedule items "Relationship of mechanism and systems to process and function" and "Recognize dangers and hazards connected with use of tools and equipment and guard against them" had a mean of 2.17 and were in the mean range of 2.10 to 2.29. Even though the partsman's competencies, indicated by mean range, needed to be high in some areas of Agricultural Mechanics, 69.85 per cent of the data schedule items were in the mean range of 1.00 to 1.29.

The highest scoring data schedule items for partsman were in the subject-matter area of Business and Distributive competencies with data schedule items in Human Relations and Salesmanship and Customer Relations scoring the highest. There were 26.56 per cent of Business and Distributive competencies in the mean range of 2.70 to 3.00 with the data schedule items coming from the two areas just mentioned. There were 128 Business and Distributive data schedule items with 58.59 per cent above the mean level of 1.49.

There were 77.79 per cent of the data schedule items in Trades and Industrial competencies below the mean level of 1.49. The highest

scoring data schedule items, 3.33 per cent in the mean range of 2.50 to 2.69, were appropriate for the partsman in that they were "Parts nomenclature," "Exploded views," and "Parts organization." The mean range of 2.10 to 2.29 encompassed 4.44 per cent of the data schedule items in Trades and Industrial competencies. The data schedule items were "Basic math skills" and the three data schedule items under Safety.

There were 96.67 per cent of the data schedule items in the Communication competencies within mean range of 1.90 to 2.09. There were 3.33 per cent in the 2.10 to 2.29 mean range.

Shop Foreman

In comparing Tables I, II, III, and IV to Table V, in general, the investigator found that the Plant Science, Animal Science, Agricultural Business Management and Marketing competencies for the shop foreman is about like those of the partsman, but less competency needs than for the manager, the assistant manager, and the salesman. The Business and Distributive competencies means for the shop foreman even though they are comparatively high are lower than the means for the manager, the assistant manager, the salesman and the partsman. The Agricultural Mechanics and Trades and Industrial competencies means for the shop foreman are higher than any of those of the other job titles. The Communications competencies for the shop foreman are comparable to those of the partsman but lower than for the manager, the assistant manager, and the salesman. The Business and Distributive Competencies are lower for the shop foreman than for any job title discussed.

The highest scoring data schedule items in Plant Science competencies in Table V for the shop foreman were in the mean range 1.50

TABLE V

PERCENTAGE OF DATA SCHEDULE ITEMS WITHIN EACH SUBJECT MATTER AREA FOR THE MEAN RANGE FOR THE SHOP FOREMAN

Mean Range	Agri. Plant Sci. N=94[a]	Agri. Animal Sci. N=40	Agri. Busi- ness Mgt. and Mkt. N=45	Agri. Mechanic N=63	Business and Dis- tributive N=128	Trades and Industry N=90	Communi- cation N=30
2.70 to 3.00				26.97			
2.50 to 2.69				7.94	26.57	3.33	
2.30 to 2.49				4.76	.78	3.33	
2.10 to 2.29				4.76		27.78	3.33
1.90 to 2.09					3.12	3.33	96.67
1.70 to 1.89				1.59	.78	6.67	
1.50 to 1.69	2.13			3.17	20.31	2.22	
1.30 to 1.49	13.83			6.35	23.44	4.45	
1.00 to 1.29	84.04	100.00	100.00	44.44	25.00	48.89	

[a] N refers to the number of data schedule items.

to 1.69. The data schedule items were "Proper stage for harvesting" and "Essential facts about curing hay" with a mean of 1.58 (Appendix B). There were 97.87 per cent of the 94 data schedules items below the mean level of 1.49.

Both Animal Science and Agricultural Business Management and Marketing competencies had 100.00 per cent of their data schedule items in the mean range 1.00 to 1.29. There were 26.97 per cent of the 62 data schedule items in Agricultural Mechanics in the mean range of 2.70 to 3.00. Six of the data schedule items had a mean score of 3.00. The data schedule items that dealt directly with the farm implement business had a mean score of 2.10 and above. The mean score of 1.89 and below are those data schedule items that are related to agricultural mechanics businesses, although 44.44 per cent were scored in the 1.00 to 1.29 mean range. As indicated by the means of data schedule items on Construction and Maintenance, the manager expects the shop foreman to tell him the tools and equipment that are needed in the shop and also expects him to maintain and repair them.

The data schedule items in Business and Distributive competencies that have been scored in the 2.70 to 3.00 mean range for all job titles discussed were scored in the 2.50 to 2.69 mean range for the shop foreman. They are data schedule items in Salesmanship and Customer Relations, and Human Relations. There are 48.44 per cent of the data schedule items below the mean level of 1.49. Some of the data schedule items that had a relatively high mean for other job titles that were scored relatively low for the shop foreman are data schedule items in Preparing Goods for Resale, Window and Store Display, Bookkeeping, Buying, and Legal Relationships.

The Trades and Industrial competencies had a higher mean score for the shop foreman than for any other job title. There were 3.33 per cent of the data schedule items in the mean range of 2.50 to 2.69. These data schedule items were all in the area of Safety. The next highest scoring data schedule items were "Micrometers and measurements," "Flat rate manual," and "Efficiency of movement." There were 46.66 per cent of the data schedule items above 1.50.

There were 96.67 per cent of the data schedule items in Communications in the mean range of 1.90 to 2.09, with 3.33 per cent in the 2.10 to 2.29. The highest data schedule item was "Preparing reports."

Mechanics

In comparing the six tables, the investigator found that Table VI indicates that the mechanic has very similar training needs to the shop foreman. The shop foreman needed a little more training in most subject-matter areas than did the mechanic.

Table VI indicated a relatively low mean for the Plant Science, Animal Science, and Agricultural Business Management and Marketing competencies. The Plant Science competencies had 2.43 per cent in the 1.30 to 1.49, but all of the data schedule items were below the 1.49 mean level. The Animal Science and Agricultural Business Management and Marketing competencies had all of these data schedule items in the 1.00 to 1.29 mean range.

The means and distribution of the data schedule items in Agricultural Mechanics competencies for the mechanic and the shop foreman are very similar. They both have 26.97 per cent of the data schedule items in Agricultural Mechanics in the 2.70 to 3.00 mean range and

TABLE VI

PERCENTAGE OF DATA SCHEDULE ITEMS WITHIN EACH SUBJECT MATTER AREA FOR THE MEAN RANGE FOR THE MECHANIC

Mean Range	Agri. Plant Sci. N=94[a]	Agri. Animal Sci. N=40	Agri. Busi- ness Mgt. and Mkt. N=45	Agri. Mechanic N=63	Business and Dis- tributive N=128	Trades and Industry N=90	Communi- cation N=30
2.70 to 3.00				26.97			
2.50 to 2.69				6.35	14.84		
2.30 to 2.49				7.94		3.33	
2.10 to 2.29				3.17	11.72	18.89	
1.90 to 2.09					3.91	3.33	
1.70 to 1.89				1.59		4.45	76.67
1.50 to 1.69				4.76	.78	6.67	23.33
1.30 to 1.49	2.13			6.35	7.81	12.22	
1.00 to 1.29	97.87	100.00	100.00	42.85	60.94	51.11	

[a]N refers to the number of data schedule items.

they are the same data schedule items (Appendix B). As in the case of the shop foreman, the data schedule items that dealt directly with the farm implement business had a mean score of 2.10 or above. The mean score of 1.89 and below are those data schedule items related to agricultural mechanic businesses, but 49.20 per cent are below the 1.49 mean level.

The Business and Distributive data schedule items have the lowest means for the mechanic than any other job title. There are 68.75 per cent below the 1.49 mean level. The highest scoring data schedule items for the mechanic are some of the highest scoring data schedule items for other job titles, that is, Human Relations and Salesmanship, and Customer Relations.

The Trades and Industrial competencies have 63.33 per cent below the 1.49 mean level. The highest scoring data schedule items were the same as for the shop foreman, in the area of Safety. The next highest group of data schedule items, mean range of 2.10 to 2.29 was the data schedule item "Micrometer and measurements" and most of the data schedule items in Welding (arc and oxy-acetylene).

The Communication competencies were all above the mean level of 1.50. The oral communication data schedule items had a mean of little higher than the written communications. The exception was "Preparing reports" which have a mean of 1.77.

Percentage of Subject-Matter Areas Within Each Pattern Category

Utilizing analysis of variance, the computer determined the significance of the difference between means of the six job titles for

each of the 490 data schedule items. Most of the data schedule items, 361, indicated a significant difference at the 5 per cent level. See Appendix B. There were 129 data schedule items that indicated no significant difference in the means of the six job titles.

The data schedule items that had job title means which were significantly different were tested using Duncan's Multiple Range. The computer arranged the means in numerical order, beginning with the smallest number. It also printed the extent of the line or lines for each of the means. Any two means underscored by the same line are not significantly different.[34]

There are two groups of data schedule item pattern categories in Table VII. Group one includes patterns I, II, III, IV, V, VI, VII and VIII. Group two includes only pattern category IX. The data schedule items in the last category have no significant differences among the means of the six job titles.

Each pattern category indicated the high means which grouped together for each of the following job titles:

Pattern I - Shop foreman and mechanic

Pattern II - Manager and assistant manager

Pattern III - Manager, assistant manager and salesman

Pattern IV - Manager, assistant manager, salesman, partsman, and shop foreman

Pattern V - Manager, assistant manager, salesman and partsman

Pattern VI - Manager, assistant manager and shop foreman

Pattern VII - Manager, assistant manager, salesman and shop foreman

Pattern VIII - All Multiple Range Patterns that will not fit any of the above

Pattern IX - Data schedule items with no significant difference between the means of the job titles.

For the purpose of this paper the line connecting the job title with the largest means is of most importance. This will permit the clustering of data schedule items by subject matter for more than one job title. The largest means were considered most important by the farm implement managers.

Over half of the 490 data schedule items in Table VII were in two pattern categories, 128 were in III, and 129 were in IX. Pattern category II was next with 55, with pattern category I a close fourth with 51. The smallest pattern category was VI with 11.

Table VII shows that pattern category I had data schedule items in only two subject-matter areas with 56.86 per cent in Agricultural Mechanics competencies and 43.14 per cent in Trades and Industries. One would expect the shop foreman and the mechanic to have the highest mean score in Agricultural Mechanics competencies, but what competencies are important to this group in Trades and Industries competencies? Appendix B indicates that "Micrometer and measurements," all of the Arc and Oxy-acetylene welding skills, and "Layout and Planning" and "Cost" in sheet metal work were in pattern category I.

Pattern category II with 53 data schedule items all in the Business and Distributive competencies indicated a strong need for the manager and assistant manager to know more than the other job titles studied in this area. The 18 data schedule items in Bookkeeping were all in pattern category II with their mean in the range of 2.23 to 2.36. Developing and Utilizing Human Resources was also important to managers and assistant managers as five of the six data schedule items were in

TABLE VII

PERCENTAGE OF SUBJECT MATTER AREAS WITHIN EACH PATTERN CATEGORY

Pattern Category	Agri. Plant Sci.	Agri. Animal Sci.	Agri. Business Mgt. and Mkt.	Agri. Mechanic	Business and Distributive	Trades and Industry	Communication
I[a] N=51				56.86		43.14	
II N=55					100.00		
III N=128	49.22	11.72	28.13		7.81		3.12
IV N=47	19.15	2.13	2.13		34.04		42.55
V N=18	5.55		38.90		55.55		
VI N=11						100.00	
VII N=20	50.00			5.00	15.00		30.00
VIII[b] N=31	25.81			32.26	29.03	12.90	
IX[c] N=129	2.33	18.61	.78	17.82	19.38	41.08	

[a]Job titles grouped at .05 protection level by Duncan's Multiple Range.

[b]Group of "odd lots" that did not fit any of the above groups.

[c]Grouped by AOV, no significant difference at .05 level in means of job titles.

pattern category II. All but one of the eleven data schedule items in Basic Management Problems were in pattern category II with a mean range of 2.09 to 2.23. Promotion and Advertising, and Legal Relationship had all of their data schedule items in pattern category II with a mean range of 1.91 to 2.30.

Pattern category III had 49.22 per cent of its 128 data schedule items in the Plant Science competencies. The most important area in Plant Science was Preparation of the Seedbed with all four it its items in a mean range of 1.82 to 2.20. Haymaking was important to the manager, the assistant manager, and the salesman with its data schedule items in a mean range of 1.64 to 2.07. Other areas that appeared to be important to this group were: Economics of Crop Production, Adoption of Crops, Classification of Field Crops, The Value of Good Seed, Seeding Practice, Tillage, Harvesting and Storage of Grain Crops, and Weeds. There were 11.72 per cent of pattern category III in Animal Science competencies with the data schedule items in the mean range of 1.18 to 1.40. These items were in the area of Beef Cattle and Horses. Agricultural Business Management and Marketing competencies had 28.13 per cent in pattern category III. Some of the data schedule items with the highest mean were: "Partial budgeting," "Efficiency in the use of labor, power and equipment," "Efficiency in Crops and Livestock Production," "Credit," "Renting," "Reducing Risk," "Getting Started in Business," and "Taxes."

There were 7.81 per cent of the data schedule items in Business and Distributive competencies. The highest means was the data schedule item "Analyzing the Customer's Wants" with a mean range of 2.83 to 2.91. "Deciding on a Price," "Discounts," "Credits," and "The Buyer's Order" were important to this category and had means in the range of 1.67 to

2.30. There were four data schedule items in Communication competencies, 3.12 per cent in this category, and they were all in writing. They were: "Purpose, Secure Favorable Response," "Preparing a Business Letter," "Develop a Major Theme," and "The First Paragraph."

Pattern category IV, which includes all job titles except the mechanic, has the major part of its data schedule items in Communications and Business and Distributive competencies. This category had 42.55 per cent of its data schedule items in Communications competencies which included all of the oral communications items. The Business and Distributive competencies had 34.04 per cent of the data schedule items in pattern category IV. The items with the highest mean were in the area of Salesmanship and Customer Relations with the means in the range of 2.58 to 2.93. There were 19.15 per cent of this category in the Plant Science competencies with a relatively low means. The means were in a range of 1.03 to 1.73. The only data schedule item in Animal Science competencies was "Feeding Beef Cattle" with a mean range of 1.03 to 1.33. Agricultural Business Management and Marketing competencies had only one data schedule item in this category. The item was "Interpreting the Income Figures" with a mean range of 1.09 to 1.45.

Pattern category V includes all job titles except the shop foreman and the mechanic. This category had 55.55 per cent of its 18 data schedule items in Business and Distributive competencies. These items were "Marking the Goods," three data schedule items in Window and Store Display, and all six of the data schedule items in Buying. All of these items had relatively high means. There were 38.90 per cent of this pattern category in Agricultural Business Management and Marketing competencies. Three data schedule items were in Farm Management, two items

in Marketing, and two items in Agriculture Policy. The data schedule items had a mean range of 1.09 to 1.43. The only data schedule items in Plant Science competencies was "Seed Laws" with a mean range 1.13 to 1.33.

There were only eleven data schedule items in pattern category VI, and all of them were in Trades and Industrial competencies. This category includes the manager, the assistant manager, and the shop foreman. The data schedule items include "Organizations of the Business" in the Quality Control competencies, in the Time Study competencies "Organizations of the Business" and "Flat Rate Manuals," and all other data schedule items were in Supervision competencies. This category stressed subject-matter areas for the educational preparation of persons that direct others in the farm implement business.

Pattern category VII, which includes the manager, the assistant manager, the salesman, and the shop foreman had 50.00 per cent of the 20 data schedule items in Plant Science competencies. Most of these data schedule items were in the Soil Science competencies. The second largest subject matter group was Communication competencies with 30.00 per cent of pattern category VII. The only data schedule item in Agricultural Mechanic competencies in this pattern categroy was "Recognize good construction methods and standard building materials." The mean of this data schedule item was relatively low.

The pattern category VIII is made up of "odd lots" that do not fit any of the above patterns. The fact that 33.33 per cent of this pattern category were in Agricultural Mechanics competencies will not permit clustering of job titles for education purposes.

Pattern category IX is made up of the data schedule items that

indicated no significant difference in the means of the six job titles. These were 3 data schedule items in Plant Science competencies, 2.33 per cent, with an over-all mean of 1.13 and 1.14. There were 18.61 per cent of pattern category IX in Animal Science competencies with the over-all mean ranging from 1.13 to 1.15. The only Agricultural Business Management and Marketing data schedule item that was in pattern category IX was "Performance records" with an over-all mean of 1.15. There were 17.02 per cent of pattern category IX data schedule items in Agricultural Mechanics. These data schedule items were in the areas of Farm Buildings and Conveniences, Rural Electrification and Processing, and Soil Structures. The over-all mean ranged from 1.00 to 1.09. All of the above subject-matter areas mentioned had relatively low mean scores. Trades and Industrial competencies had 41.08 per cent of pattern category IX data schedule items, with 44 of 53 of the items having a relatively low mean score. The data schedule items with relatively low scores ranged from 1.00 to 1.15.

The data schedule items that were not significantly different in the means of the job titles and had relatively high score are of great importance to this study. These are the data schedule items that would need to be included in a curriculum for all six job titles. There were 8 data schedule items in Trade and Industrial competencies with relatively high means. They were "Fractions," "Decimals," "Basic mathematics skills," "Variables in quality control," "Standards" in Quality Control and all three of the data schedule items on Safety. The over-all mean ranged from 1.58 to 2.30. These data schedule items included all the items in Job Application and Interview, the data schedule items "Safety and labor regulations," and all of the 19 data schedule items in Human

Relations. The over-all mean ranged from 1.55 to 2.78.

CHAPTER V

SUMMARY AND CONCLUSIONS

Through the years there have been many changes in agriculture, with the most recent years bringing about the greatest and most radical changes. There has been a decided decrease in the percentage of our population actually engaged in farming. During this time there has been an increase in the number and percentage of people engaged in the agricultural occupations other than farming.

The changes brought about in agriculture have changed the manpower requirement for the industry. Technology has created a new relationship between man, his education, and his work, in which education becomes the bridge between man and his work. Recent changes in the laws governing vocational education make it possible to develop area vocational schools in which people could be trainied for off-farm agricultural jobs. The area schools need assistance in developing the curriculum for these technical agricultural jobs. There is a need for developing curricula for a large number of technical agricultural jobs, but farm implement businesses have one of the greatest needs for personnel with post-high-school technical training.

Statement of the Problem

The purpose of this study is to obtain data on six job titles of the farm implement business that require a post-high-school level of

education. This information would help an area vocational school develop a curriculum for the manager, the assistant manager, the salesman, the partsman, the shop foreman, and the mechanic. The purposes of the study are (1) to classify the data schedule items within each subject-matter area for various levels for the six job titles and (2) to group the job titles into curriculum patterns according to the responses to each of the data schedule items by its distribution of variance among the six job titles.

Procedure

This study is an outgrowth and continuation of "A Study of Employment Opportunities and Training Needs in Off-Farm Agriculture Occupations in Oklahoma,"[35] which was jointly sponsored by the State Board of Vocational Education and the Department of Agricultural Education of Oklahoma State University.

In formulating the data schedule, the investigator used as a general outline, the data schedule for the above study. Each of the original data schedule items was greatly expanded. Counsel and assistance were obtained from the State Supervisors of Vocational Education to be sure that the subject-matter areas were covered adequately.

A sample of 30 of the larger farm implement businesses was selected from the approximately 320 farm implement businesses in Oklahoma. The selection was made by the Executive Secretary of the Oklahoma Farm Implement Dealers. The data schedule was tested on two farm implement businesses.

The managers of the 30 selected farm implement businesses were

written to, and appointments were requested. All 30 of the original managers or assistant managers selected for the sample were personally interviewed by the investigator. The investigator marked each data schedule item as directed by the manager or assistant manager for the degree of competency necessary to begin the job for each of the six job titles the business employed.

Summary

The findings of the study indicate the following:

1. Business and Distributive competencies were relatively important to the job titles studied, but Animal Science competencies were relatively unimportant.

2. Some Business and Distributive competencies that had relatively high means for all job titles were data schedule items under Human Relations, Salesmanship and Customer Relations, and Job Application and Interviews.

3. Both written and oral communications were relatively important to all job titles.

4. The data schedules items on Safety, that were in Business and Distributive, and Trades and Industrial competencies, had relatively high means and important to all job titles.

5. "Basic mathematic skills" (add, subtract, multiply, divide), "Fractions," and "Decimals" were relatively important to all job titles studied.

6. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for

shop foreman and mechanics are:

Agricultural Mechanics Competencies

Farm Power and Machinery

Construction and Maintenance

Trades and Industrial Competencies

Mathematics

Welding (Arc and Oxy-acetylene)

7. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the manager and the assistant manager are:

Business and Distributive Competencies

Job Opportunities and Trends

Employee Welfare

Preparing Goods for Resale

Bookeeeping

Developing and Utilizing Human Resources

Basic Management Problems

8. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the managers, the assistant managers, and the salesman are:

Plant Science Competencies

Economics of Crop Production

Adaptation of Crops

Preparation of the Seedbed

Tillage

Harvesting and Storage of Grain Crops

Haymaking

Cause of Starvation of Plants

Agricultural Business Management and Marketing Competencies

Budgeting, Records and Analysis

Farm Financing

Business and Distributive Competencies

Employee Welfare

Preparing Goods for Resale

Communications Competencies

Writing

9. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the managers, the assistant managers, the salesman, the partsman, and the shop foreman are:

Business and Distributive Competencies

Salesmanship and Customer Relations

Communication Competencies

Preparing a Speech

Manner of Giving a Speech

10. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the manager, the assistant manager, the salesman, and the partsman are:

Business and Distributive Competencies

Window and Store Display

Buying

11. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the manager, assistant manager and the shop foreman are:

Trades and Industrial Competencies

Time Study

Supervision

12. Some of the subject-matter areas that had data schedule items with relatively high means that may be organized into a curriculum for the manager, the assistant manager, the salesman, and the shop foreman are:

Business and Distributive Competencies

Organizational Charts of Business

Communication Competencies

Writing

Conclusions and Implications

The findings of the study indicate the following:

1. The respondents reveal that certain employees of the farm implement business need agricultural training. A strongly suggested implication is that employees having major contact with the clientele should have agricultural background or training.

2. Competencies in Human Relations, Salesmanship and Customer Relations, Job Application and Interviews, Communications, Safety, and some competencies in Mathematics were indicated by the respondents as being highly important for employees of the farm implement business. Thus the apparent demand can be readily recognized--that the curriculum be designed to meet the needs of the various job titles for the farm implement businesses by clusters of information.

Recommendations

Recommendations which appear to be pertinent would include the following:

1. That curriculums be developed from this study.

2. That additional studies be conducted in other areas of agriculture that require technical post-high-school education.

3. That additional studies be conducted to determine the job titles that may have similar educational needs in agriculture and industry that require technical post-high-school education.

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APPENDIX A

COMPETENCIES ASSOCIATED WITH THE FARM MACHINERY BUSINESS BY JOB TITLES

Name and Address of Business_____

Job Title - Manager, Assistant Manager, Salesman, Partsman,
Shop Foreman, Mechanic

I. Agricultural Competencies	Check degree of competency necessary to enter this job as a beginning employee		
	NONE	SOME	HIGH
A. Plant Science			
1. Economics of Crop Production			
a. Relative importance of crops and other farm products.....	____	____	____
b. Influence of crop yields on community prosperity.....	____	____	____
c. The importance as a source of food.....	____	____	____
d. Factors influencing the price of crops.....	____	____	____
e. Relationship of general and individual high production to profit.....	____	____	____
f. Most productive methods are not necessarily the most profitable.....	____	____	____
2. Adaptation of Crops			
a. Factors determining the adaptation of crops.	____	____	____
b. Climatic requirements for certain crops.....	____	____	____
c. Choice of soil to suit crop needs.....	____	____	____
3. Classification of Field Crops			
a. Terminology Classification--Botanical.....	____	____	____
b. Special purpose.....	____	____	____
c. Importance of Field Crops.....	____	____	____
4. Germination and Growth			
a. Seed structure and composition.....	____	____	____
b. Qualities for germination.....	____	____	____
c. Conditions necessary for germination.....	____	____	____
d. Process of germination.....	____	____	____
e. Sources of elements required for growth.....	____	____	____
f. Parts of a plant.....	____	____	____
g. Root and its function.....	____	____	____

	NONE	SOME	HIGH
4. Germination and Growth (Continued)			
h. The leaf and its function	____	____	____
i. The stem and its function	____	____	____
j. Plant foods	____	____	____
k. Food storage	____	____	____
l. Respiration	____	____	____
m. Energy relations	____	____	____
n. Respiration and life	____	____	____
o. Reproduction	____	____	____
p. Pollination and fertilization	____	____	____
5. The Value and Use of Good Seed			
a. Value of good varieties	____	____	____
b. Value of good seed	____	____	____
c. Conditions which effect quality	____	____	____
d. Profits from the use of good seeds	____	____	____
e. Seed laws	____	____	____
6. Preparation of the Seedbed			
a. Correct preparation increases yield	____	____	____
b. Implements used in the preparation of seedbed	____	____	____
c. Depth and timing of preparation	____	____	____
d. Some characteristics of a good seedbed	____	____	____
7. Seeding Practices			
a. Relationship of seeding practices to kind of seed, vegetative parts, quality of seed, climate and season, and time of seeding	____	____	____
b. Relation of soil productivity to rate of seeding	____	____	____
c. Relation of soil moisture to method of seeding	____	____	____
d. Relation of topography and weeds to method of seeding	____	____	____
e. Relation of seeding practices to crop use	____	____	____
8. Tillage			
a. Classes of crops based on tillage	____	____	____
b. Development of tillage practices	____	____	____
c. Effects of tillage	____	____	____
d. Frequency, depth and time of cultivation	____	____	____
9. Harvesting and Storage of Grain Crops			
a. Losses from delayed or premature harvesting.	____	____	____

	NONE	SOME	HIGH
9. Harvesting and Storage of Grain Crops (Continued)			
b. Harvesting methods for different crops.....	____	____	____
c. Storage, shrinkage, and some storage insect pests.....	____	____	____
10. Haymaking			
a. Proper stage for harvesting.....	____	____	____
b. Essential facts about curing hay.....	____	____	____
c. Changes in plant material during the curing process.....	____	____	____
d. Market quality.....	____	____	____
11. Weeds			
a. Loss due to weeds.....	____	____	____
b. Classification.....	____	____	____
c. Control of weeds.....	____	____	____
12. Wheat			
a. Production in the world and the United States.....	____	____	____
b. Classification.....	____	____	____
c. Wheat regions.....	____	____	____
d. Varieties.....	____	____	____
e. Insects and diseases.....	____	____	____
13. Sorghums			
a. Production in the world and the United States.....	____	____	____
b. Classification.....	____	____	____
c. Distribution and varieties.....	____	____	____
d. Insects and diseases.....	____	____	____
14. Cotton			
a. Production in the world and the United States.....	____	____	____
b. Classification.....	____	____	____
c. Distribution and varieties.....	____	____	____
d. Insects and diseases.....	____	____	____
15. Soybeans			
a. Production in the world and the United States.....	____	____	____
b. Classification.....	____	____	____
c. Distribution and varieties.....	____	____	____
d. Insects and diseases.....	____	____	____

	NONE	SOME	HIGH
16. Causes of Starvation of Plants			
a. The plant nutrients; water, oxygen, carbon, nitrogen, potassium, phosphorus, sulphur, magnesium, calcium, iron, manganese, boron, zinc, copper, soil acidity.....	____	____	____
b. Read the hunger signs.....	____	____	____
c. How to gather soil samples.....	____	____	____
d. Fertilizers.....	____	____	____
B. Soil Science			
1. General Knowledge			
a. Physical characteristics of soil.....	____	____	____
b. Surface texture.....	____	____	____
c. Permeability.....	____	____	____
d. Depth of surface soil and subsoil.....	____	____	____
e. Slope.....	____	____	____
f. Erosion (wind and water).....	____	____	____
g. Surface drainage.....	____	____	____
h. Land capability classification.....	____	____	____
2. Land Management			
a. Erosion control.....	____	____	____
b. Acidity or alkalinity adjustment.....	____	____	____
c. Plant food addition.....	____	____	____
d. Organic matter replenishment.....	____	____	____
e. Crop rotation.....	____	____	____
f. Crop selection.....	____	____	____
g. Drainage.....	____	____	____
h. Tillage.....	____	____	____
i. Water conservation.....	____	____	____
C. Animal Science			
1. Beef Cattle			
a. History and development.....	____	____	____
b. Breeds of beef cattle.....	____	____	____
c. The beef carcass.....	____	____	____
d. Selection of breeding and market cattle.....	____	____	____
e. Feeding beef cattle (rations, cost).....	____	____	____
f. Health and sanitation.....	____	____	____
g. Equipment and facilities.....	____	____	____
h. Marketing beef cattle.....	____	____	____
2. Dairy Cattle			
a. History and development.....	____	____	____

	NONE	SOME	HIGH
2. Dairy Cattle (Continued)			
b. Breeds	____	____	____
c. Testing and production	____	____	____
d. Selection	____	____	____
e. Feeding (rations, cost)	____	____	____
f. Health and sanitation	____	____	____
g. Equipment and facilities	____	____	____
h. Marketing	____	____	____
3. Sheep			
a. History and development	____	____	____
b. Breeds of sheep	____	____	____
c. The carcass	____	____	____
d. Selection	____	____	____
e. Feeding (rations, cost)	____	____	____
f. Health and sanitation	____	____	____
g. Equipment and facilities	____	____	____
h. Marketing	____	____	____
4. Swine			
a. History and development	____	____	____
b. Breeds	____	____	____
c. The carcass	____	____	____
d. Selection	____	____	____
e. Feeding (rations, cost)	____	____	____
f. Health and sanitation	____	____	____
g. Equipment and facilities	____	____	____
h. Marketing	____	____	____
5. Horses			
a. History and development	____	____	____
b. Breeds	____	____	____
c. Purposes	____	____	____
d. Selection	____	____	____
e. Feeding (rations, cost)	____	____	____
f. Health and sanitation	____	____	____
g. Equipment and facilities	____	____	____
h. Marketing	____	____	____
D. Agricultural Business Management and Marketing			
1. Budgeting, Records and Analysis			
a. Importance of budgeting	____	____	____
b. Partial budgeting	____	____	____
c. Records of comparative inventory	____	____	____
d. Financial records	____	____	____
e. Performance records	____	____	____
f. Organization of financial accounts	____	____	____

		NONE	SOME	HIGH
1.	Budgeting, Records and Analysis (Continued)			
	g. Interpreting the income figures.....	____	____	____
	h. Financial efficiency (process of analysis)..	____	____	____
	i. Efficiency in use of labor, power and equipment.....	____	____	____
	j. Efficiency in crops and livestock production.....	____	____	____
2.	Farm Financing			
	a. Credit.....	____	____	____
	b. Renting.....	____	____	____
	c. Reducing risks.....	____	____	____
	d. Getting started in business.....	____	____	____
	e. Taxes.....	____	____	____
3.	Farm Management			
	a. Principle of diminishing returns.....	____	____	____
	b. Principle of maximum profit point.....	____	____	____
	c. Equi-Marginal principle.....	____	____	____
	d. The idea of risks.....	____	____	____
	e. The idea of fixed versus variable cost.....	____	____	____
	f. The principle of substitution.....	____	____	____
	g. The idea of complementarity and competition among products.....	____	____	____
	h. The idea of time and utility.....	____	____	____
	i. Factors of production-How to combine them...	____	____	____
	j. Size of business.....	____	____	____
	k. Crop and livestock production-How it effects farm income.....	____	____	____
	l. Farm ownership.....	____	____	____
	m. Field arrangement.....	____	____	____
	n. Farmstead arrangement.....	____	____	____
	o. Farm buildings.....	____	____	____
	p. Planning the farm business.....	____	____	____
4.	Marketing			
	a. Marketing the farm product.....	____	____	____
	b. Adjusting the farm business to prices.....	____	____	____
	c. How farm prices are made-The demand side....	____	____	____
	d. Cost of production and prices-The supply side.....	____	____	____
5.	Agricultural Policy			
	a. The effects of farm problems on the structure of agriculture.....	____	____	____
	b. Education (farm skills and retraining, employment information).....	____	____	____

	NONE	SOME	HIGH
5. Agricultural Policy (Continued)			
c. World agriculture and domestic farm policy..	____	____	____
d. International commodity agreements.....	____	____	____
e. The use of surpluses.....	____	____	____
f. Economic issues of foreign aid.....	____	____	____
g. Problems of adjustment to progress.....	____	____	____
h. The formulation of agriculture policy.....	____	____	____
i. Economic and policy decisions.....	____	____	____
j. Social values and policy decisions.....	____	____	____
E. Agricultural Mechanics			
1. Farm Power and Machinery			
a. Principles in machines.....	____	____	____
b. Relationship of mechanisms and systems to process and function.....	____	____	____
c. Selecting power units and machines to types of farming considering size and number, hours of use, cost, etc.....	____	____	____
d. Operate farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
e. Adjust farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
f. Service farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
g. Maintain farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
h. Repair farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
i. Overhaul farm tractor (spark-ignition and diesel type) and small internal combustion engines.....	____	____	____
j. Operate field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____
k. Adjust field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____

	NONE	SOME	HIGH
1. Farm Power and Machinery (Continued)			
l. Service field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____
m. Maintain field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____
n. Repair field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____
o. Overhaul field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment.....	____	____	____
p. Locate and remedy common operation troubles due to wear of parts, breakage, misalignment and other improper functions.....	____	____	____
q. Plan and execute a program of preventive maintenance including protection-shelter, rust prevention, periodic inspection and adjustment.....	____	____	____
2. Farm Buildings and Conveniences			
a. Lay out a farmstead and plan an integrated farm improvement program, evaluate existing buildings, analyze need for new or remodeled construction, plan new buildings and develop a maintenance and improvement program.....	____	____	____
b. Plan buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices).....	____	____	____
c. Determine cost of buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices).....	____	____	____

	NONE	SOME	HIGH
2. Farm Buildings and Conveniences (Continued)			
d. Build the buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices).....	____	____	____
e. Supervise the building for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices).....	____	____	____
f. Recognize and meet requirements of farm animals and poultry for environment and sanitation control, such as temperature, ventilation, light and mosture.....	____	____	____
g. Select suitable building materials and determine cost for specific uses, including durability, functional performance, strength, ease of application, availability, economy and appearance. Recognizing standard commercial units, grade, estimate quantities and determine construction cost..	____	____	____
h. Recognize good construction methods and standard building materials.....	____	____	____
3. Rural Electrification and Processing			
a. Plan wiring systems and rewiring for adequacy, convenience, safety, including determination of probable electric loads....	____	____	____
b. Supervise the wiring systems and rewiring for adequacy, convenience, and safety, including determination of probable electric loads.....	____	____	____
c. Skill to wire new wiring systems and rewiring for adequacy, convenience and safety, including determination of probable electric loads.....	____	____	____
d. Select lighting equipment and locate it in the yards, lots, building and work areas to provide adequate illumination.....	____	____	____
e. Select electrical home appliances and farm equipment including motors and controls.....	____	____	____
f. Adapt electricity to farm enterprises, coordinating the equipment with the size and arrangement of farm buildings.....	____	____	____
g. Operate electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____

	NONE	SOME	HIGH
3. Rural Electrification and Processing (Continued)			
h. Adjust electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
i. Service electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
j. Maintain electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
k. Repair electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
l. Overhaul electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
m. Install electrical equipment considering power transmission, equipment ventilation, servicing, safety, etc.....	____	____	____
4. Construction and Maintenance			
a. Select hand and power tools and shop equipment for shop including makes, models, size, quantities, and grades.....	____	____	____
b. Maintain hand and power tools and shop equipment for shop including makes, models, size, quantities, and grades.....	____	____	____
c. Repair hand and power tools and shop equipment for shop including makes, models, size, quantities, and grades.....	____	____	____
d. Overhaul hand and power tools and shop equipment for shop including makes, size, quantities, and grades.....	____	____	____
e. Sharpen, repair, maintain and safely use the common shop tools and equipment.....	____	____	____
f. Do electric arc welding.....	____	____	____
g. Do oxy-acetylene welding, cutting, bronze welding and hard surfacing.....	____	____	____
h. Do hot metal work, including bending, shaping and heat treating.....	____	____	____
i. Do cold metal work including cutting, drilling, filing, tapping, threading, riveting and bending.....	____	____	____
j. Do sheet metal work including cutting, bending and fastening.....	____	____	____
k. Do pipe and tubing work and make simple plumbing repairs.....	____	____	____
l. Select lumber, hardware and other building materials and calculate bills of material..	____	____	____
m. Supervise the construction and maintenance of smaller farm buildings and equipment....	____	____	____

	NONE	SOME	HIGH
4. Construction and Maintenance (Continued)			
n. Construct and maintain buildings and equipment.....	____	____	____
o. Do painting and glazing. Apply wood preservatives.....	____	____	____
p. Construct and maintain adequate farm fences.	____	____	____
q. Do concrete work including building forms, testing materials, preparing mixes, placing, finishing and curing; and laying concrete and masonry building units.....	____	____	____
r. Make the more important rope knots, hitches, splices, and halters.....	____	____	____
s. Recognize dangers and hazards connected with the use of tools and equipment and guard against them.....	____	____	____
5. Soil Structure			
a. Run levels and contours by using the farm level.....	____	____	____
b. Locate and place grade stakes, and make contour map.....	____	____	____
c. Plan terracing and simple farm drainage systems. Estimate costs of construction and maintenance.....	____	____	____
d. Plan and layout irrigation systems, considering the advantages and limitations of the various types and systems.....	____	____	____
e. Maintain irrigation and drainage systems....	____	____	____
f. Plan and layout farm reservoir including the choosing of the appropriate site; calculate the expected flow and capacity, determine the procedure for constructing the reservoir, construct adequate spillways, provide outlets and use practices that preserve earthen reservoirs and embankments.....	____	____	____

II. Business and Distributive Competencies

	Check degree of competency necessary to enter this job as a beginning employee		
	NONE	SOME	HIGH
A. Occupational Information and Regulations			
1. Job Opportunities and Trends			
a. Gross national product and its relation to population and jobs.....	____	____	____
b. Population growth.....	____	____	____
c. Age groups with population growth.....	____	____	____
d. Rate of industry growth or decline by areas of U.S.....	____	____	____
e. Employment by occupation.....	____	____	____
f. Change in employment by occupational group..	____	____	____
g. Importance of education and requirements to various occupations.....	____	____	____
h. National needs for various occupations.....	____	____	____
2. Job Application and Interviews			
a. How to apply for a job.....	____	____	____
b. Application forms (legibility, neatness, completeness).....	____	____	____
c. Applicants introduction manners, expressing oneself, appearance, taking leave.....	____	____	____
d. Personal data sheet.....	____	____	____
3. Employee Welfare			
a. Insurance.....	____	____	____
b. Retirement.....	____	____	____
c. Vacation.....	____	____	____
d. Employers policies.....	____	____	____
e. Working conditions.....	____	____	____
f. Compensation and benefits.....	____	____	____
g. Safety and labor regulations.....	____	____	____
h. Legal requirements of the job (Federal and State Labor Laws).....	____	____	____
B. Duties of Employees			
1. Preparing Goods for Resale			
a. Deciding on a price.....	____	____	____
b. Discounts.....	____	____	____
c. Credit.....	____	____	____

	NONE	SOME	HIGH
1. Preparing Goods for Resale (Continued)			
d. Shipping terms	____	____	____
e. Special buying arrangements	____	____	____
f. The buyer's order	____	____	____
g. Receiving the goods	____	____	____
h. Checking the goods	____	____	____
i. Marking the goods	____	____	____
j. Storing and arranging the goods	____	____	____
k. Invoice control; mechanization	____	____	____
2. Window and Store Display			
a. Psychology of display	____	____	____
b. Window display	____	____	____
c. Interior display	____	____	____
d. Color and design	____	____	____
e. Display and store budget	____	____	____
3. Salesmanship and Customer Relations			
a. The seller's personality-physical and mental characteristics	____	____	____
b. The seller's use of English	____	____	____
c. The seller's use of arithmetic	____	____	____
d. The technique of locating customers	____	____	____
e. Preparing to meet customers	____	____	____
f. Opening the sale	____	____	____
g. Analyzing the customer's wants	____	____	____
h. Presenting a planned sales story	____	____	____
i. Handling the customer's objections	____	____	____
j. Closing the sale	____	____	____
k. Trade up	____	____	____
l. Plus selling	____	____	____
m. Cash register operation	____	____	____
n. Wrapping packages	____	____	____
o. Telephone selling	____	____	____
p. Team play in selling	____	____	____
q. Problems on the selling floor	____	____	____
4. Bookkeeping			
a. Records of departments	____	____	____
b. Inventories	____	____	____
c. Valuation of principal assets	____	____	____
d. Depreciation	____	____	____
e. Accounts relative to organization	____	____	____
f. Assets and liabilities	____	____	____
g. Property tax	____	____	____
h. Income tax	____	____	____
i. Social Security and self-employment taxes	____	____	____
j. Profit and Loss Statement	____	____	____
k. Household expenses	____	____	____

	NONE	SOME	HIGH
4. Bookkeeping (Continued)			
l. Summary of receipts	____	____	____
m. Summary of expenses	____	____	____
n. Net income figures	____	____	____
o. Interpreting the income figures	____	____	____
p. Financial efficiency	____	____	____
q. Capital management	____	____	____
r. Financing	____	____	____
C. Business Organization and Supervision			
1. Developing and Utilizing Human Resources			
a. Recruitment, selection and placement	____	____	____
b. Induction and training	____	____	____
c. Performance, appraisal and promotion	____	____	____
d. Transfers and separation	____	____	____
e. Constructive discipline	____	____	____
f. Communication and job change	____	____	____
2. Human Relations			
a. Health	____	____	____
b. Personal appearance	____	____	____
c. Clothes	____	____	____
d. Voice	____	____	____
e. Mannerism	____	____	____
f. Truthfulness	____	____	____
g. Loyalty	____	____	____
h. Resourcefulness	____	____	____
i. Self-confidence	____	____	____
j. Imagination	____	____	____
k. Showmanship	____	____	____
l. Courage	____	____	____
m. Ambition	____	____	____
n. Adaptability	____	____	____
o. Industry	____	____	____
p. Observation	____	____	____
q. Enthusiasm	____	____	____
r. Courtesy	____	____	____
s. Tact	____	____	____
3. Organizational Charts of Business			
a. Company policies	____	____	____
4. Buying			
a. Studying the customer	____	____	____
b. Studying the market offerings	____	____	____
c. Study of variabilities	____	____	____
d. Buying staples	____	____	____

	NONE	SOME	HIGH
4. Buying (Continued)			
e. Buying shopping goods	____	____	____
f. Surplus items	____	____	____
5. Stock Control			
a. Inventory	____	____	____
b. Unit control	____	____	____
c. Warehousing	____	____	____
D. Management and Economics of Business			
1. Basic Management Problems			
a. Business plans and planning	____	____	____
b. Business objectives	____	____	____
c. Business policy	____	____	____
d. Responsibility	____	____	____
e. Staff organization	____	____	____
f. Organizational morale	____	____	____
g. Basics for control	____	____	____
h. Business procedure	____	____	____
i. Factors of successful business-how to combine them	____	____	____
j. Administrative and operational management (personnel department and training)	____	____	____
k. Credit control	____	____	____
2. Promotion and Advertising			
a. Value of advertising	____	____	____
b. How to reach the customer	____	____	____
c. Trade relationship and association	____	____	____
d. Advertising budget	____	____	____
e. Psychology of advertising	____	____	____
f. Selecting goods to promote	____	____	____
g. Selecting the media	____	____	____
h. Preparing the advertisement	____	____	____
i. Advertising standards and helps	____	____	____
3. Legal relationships			
a. Basic business law	____	____	____
b. Government regulations	____	____	____

III. Trades and Industrial Competencies

	Check degree of competency necessary to enter this job as a beginning employee		
	NONE	SOME	HIGH
A. Building Trades			
1. Masonry			
a. Trends in Masonry	____	____	____
b. Concrete (specifications)	____	____	____
c. Foundations	____	____	____
d. Reinforcing	____	____	____
e. Bricks and other Building material	____	____	____
f. Modular Standards	____	____	____
g. Costs and values	____	____	____
h. F. H. A. Specifications	____	____	____
i. Building Codes	____	____	____
j. New methods and materials	____	____	____
2. Carpentry and Cabinet Work			
a. Trends in building	____	____	____
b. F. H. A. Specifications	____	____	____
c. The square	____	____	____
d. Framing	____	____	____
e. Rafters	____	____	____
f. Wood and its uses	____	____	____
g. Commercial building	____	____	____
h. Cabinets	____	____	____
i. Modular Standards	____	____	____
3. Blueprint Reading			
a. Modular Standards	____	____	____
b. Symbols	____	____	____
4. Plumbing			
a. Building Codes (National, State, Local)	____	____	____
b. Materials	____	____	____
c. Sweating	____	____	____
d. Threading	____	____	____
e. Leading	____	____	____
f. Septic disposal	____	____	____
g. Water systems	____	____	____
h. Costs	____	____	____

NONE SOME HIGH

B. Machine Tool Trades

1. Drafting and Design

a. Sketching..... ____ ____ ____
b. Symbols..... ____ ____ ____
c. Fastening..... ____ ____ ____

2. Manuals, Technical and Service

a. Parts nomenclature..... ____ ____ ____
b. Exploded views..... ____ ____ ____
c. Parts organization..... ____ ____ ____

3. Mathematics

a. Fractions..... ____ ____ ____
b. Decimals..... ____ ____ ____
c. Micrometer and measurements..... ____ ____ ____
d. Basic math skills (add, subtract, multiple, divide)..... ____ ____ ____
e. Algebra..... ____ ____ ____
f. Geometry..... ____ ____ ____

C. Technicians

1. Electricity

a. Building Codes (National, State, Local)..... ____ ____ ____
b. Materials..... ____ ____ ____
c. Planning..... ____ ____ ____
d. Wiring skills..... ____ ____ ____
e. Costs..... ____ ____ ____

2. Quality Control

a. Variables in quality control..... ____ ____ ____
b. Standards..... ____ ____ ____
c. Organization of the business..... ____ ____ ____

3. Time Study

a. Organization of the business..... ____ ____ ____
b. Flat rate manual..... ____ ____ ____
c. Efficiency of movement..... ____ ____ ____

D. Skills and Other Trades

1. Welding (Arc and Oxy-acetylene)

a. Process of welding..... ____ ____ ____

		NONE	SOME	HIGH
1.	Welding (Continued)			
	b. Safety practices	____	____	____
	c. Operating the welder	____	____	____
	d. Square butt weld in flat position	____	____	____
	e. Lap weld	____	____	____
	f. Horizontal fillet weld	____	____	____
	g. Understanding welders construction	____	____	____
	h. Selecting electrodes	____	____	____
	i. Controlling distortion	____	____	____
	j. Cutting metals	____	____	____
	k. Join steel flats with butt weld-flat position	____	____	____
	l. Multiple pass horizontal fillet weld	____	____	____
	m. Join pipe	____	____	____
	n. Build up weld on round stock	____	____	____
	o. Bronze weld	____	____	____
	p. Common metals	____	____	____
	q. Welding cast iron	____	____	____
	r. Vertical welds	____	____	____
	s. Hard surfacing	____	____	____
	t. Welding hard-to-weld steels	____	____	____
2.	Sheet Metal			
	a. Materials	____	____	____
	b. Building Codes (National, State, Local)	____	____	____
	c. Fabrication	____	____	____
	d. Soldering	____	____	____
	e. Fastening	____	____	____
	f. Layout and planning	____	____	____
	g. Cost	____	____	____
3.	Supervision			
	a. Function of a supervisor	____	____	____
	b. Where does leadership begin?	____	____	____
	c. Building staff morale	____	____	____
	d. Developing leadership in the group	____	____	____
	e. Supervision as a skill in human relations	____	____	____
	f. Supervision as a skill in group process	____	____	____
	g. Supervision as a skill in personnel administration	____	____	____
	h. Supervision as a skill in evaluation	____	____	____
4.	Safety			
	a. Standard safety practices	____	____	____
	b. Trends in safety	____	____	____
	c. Safety displays	____	____	____

IV. Communication Competencies

	Check degree of competency necessary to enter this job as a beginning employee		
	NONE	SOME	HIGH
A. Public Speech			
1. Preparing a Speech			
a. Practice in private.....	____	____	____
b. Obligation to audience.....	____	____	____
c. Have a purpose.....	____	____	____
d. From beginning, middle, to end.....	____	____	____
e. Body of the speech.....	____	____	____
f. Conclusion of speech.....	____	____	____
g. Elements of speech.....	____	____	____
h. Being persuasive.....	____	____	____
i. Material for a speech.....	____	____	____
j. Writing the speech.....	____	____	____
k. Using a script.....	____	____	____
2. Manner of Giving a Speech			
a. Fully prepared.....	____	____	____
b. Your introduction.....	____	____	____
c. On using notes.....	____	____	____
d. Smile and start talking.....	____	____	____
e. Audience contact.....	____	____	____
f. Using your hands.....	____	____	____
g. Grammar and enunciation.....	____	____	____
h. Using the microphone.....	____	____	____
i. The anecdote.....	____	____	____
B. Writing			
1. General Knowledge			
a. Purpose--Secure favorable response.....	____	____	____
b. The five "W's".....	____	____	____
c. Preparing a business letter.....	____	____	____
d. Develop a major theme.....	____	____	____
e. The first paragraph.....	____	____	____
f. Using memos.....	____	____	____
g. Preparing reports.....	____	____	____
h. Assigning reports.....	____	____	____
i. Requirements for report writers.....	____	____	____
j. Preparing the outline.....	____	____	____

APPENDIX B

Each pattern category indicates the high means which grouped together for each of the following job titles:

Pattern I - Shop foreman and mechanic

Pattern II - Manager and assistant manager

Pattern III - Manager, assistant manager and salesman

Pattern IV - Manager, assistant manager, salesman, partsman and shop foreman

Pattern V - Manager, assistant manager, salesman and partsman

Pattern VI - Manager, assistant manager and shop foreman

Pattern VII - Manager, assistant manager, salesman and shop foreman

Pattern VIII - All Multiple Range Patterns that will not fit any of the above

Pattern IX - Data schedule items with no significant difference between the means of the job titles

DATA SCHEDULE MEANS AND PATTERN CATEGORY

Data Schedule Item	Job Titles, Number Surveyed, Mean Score						Over-All Mean N=128	Pattern Category a,b
	Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30		
I. Agricultural Competencies								
A. Plant Science								
1. Economics of Crop Production								
a. Relative importance of crops and other farm products	1.80	1.64	1.73	1.30	1.32	1.13	1.46	III
b. Influence of crop yields on community prosperity	1.90	1.64	1.87	1.26	1.37	1.13	1.50	III
c. The importance as a source of food	1.60	1.55	1.60	1.13	1.21	1.03	1.32	III
d. Factors influencing the price of crops	1.87	1.55	1.93	1.30	1.37	1.10	1.49	III
e. Relationship of general and individual high production to profit	1.77	1.73	1.80	1.22	1.32	1.07	1.44	III
f. Most productive methods are not necessarily the most profitable	1.63	1.55	1.67	1.13	1.21	1.03	1.34	III
2. Adaptation of Crops								
a. Factors determining the adaptation of crops	1.70	1.64	1.67	1.22	1.16	1.07	1.38	III
b. Climatic requirements for certain crops	1.67	1.64	1.67	1.13	1.16	1.07	1.35	III
c. Choice of soil to suit crop needs	1.77	1.64	1.60	1.17	1.16	1.07	1.38	III
3. Classification of Field Crops								
a. Terminology Classification--Botanical	1.60	1.55	1.40	1.17	1.16	1.03	1.30	III
b. Special purpose	1.50	1.45	1.40	1.09	1.16	1.03	1.25	III
c. Importance of Field Crops	1.63	1.55	1.67	1.09	1.16	1.03	1.32	III
4. Germination and Growth								
a. Seed structure and composition	1.40	1.55	1.27	1.09	1.11	1.03	1.21	III
b. Qualities for germination	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
c. Conditions necessary for germination	1.37	1.45	1.27	1.09	1.05	1.03	1.18	III
d. Process of germination	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
e. Sources of elements required for growth	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
f. Parts of a plant	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
g. Root and its function	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
h. The leaf and its function	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
i. The stem and its function	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
j. Plant foods	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
k. Food storage	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
l. Respiration	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
m. Energy relations	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
n. Respiration and life	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
o. Reproduction	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
p. Pollination and fertilization	1.37	1.45	1.27	1.09	1.05	1.03	1.19	III
5. The Value and Use of Good Seed								
a. Value of good varieties	1.50	1.45	1.40	1.22	1.00	1.00	1.24	III
b. Value of good seed	1.50	1.45	1.40	1.22	1.00	1.00	1.24	III
c. Conditions which affect quality	1.43	1.27	1.40	1.13	1.00	1.00	1.20	III
d. Profits from the use of good seeds	1.43	1.27	1.40	1.13	1.00	1.00	1.20	III
e. Seed laws	1.33	1.27	1.33	1.13	1.00	1.00	1.16	V
6. Preparation of the Seedbed								
a. Correct preparation increases yield	2.07	1.82	2.13	1.35	1.42	1.23	1.63	III
b. Implements used in the preparation of seedbed	2.13	1.82	2.20	1.48	1.42	1.27	1.69	III
c. Depth and timing of preparation	2.03	1.82	2.07	1.48	1.37	1.27	1.64	III
d. Some characteristics of a good seedbed	2.03	1.82	2.07	1.39	1.37	1.27	1.63	III
7. Seeding Practices								
a. Relationship of seeding practices to kind of seed, vegetative parts, quality of seed, climate and season, and time of seeding	1.53	1.55	1.60	1.13	1.05	1.03	1.28	III
b. Relation of soil productivity to rate of seeding	1.47	1.36	1.60	1.13	1.05	1.03	1.25	III
c. Relation of soil moisture to method of seeding	1.47	1.36	1.60	1.13	1.05	1.03	1.25	III
d. Relation of topography and weeds to method of seeding	1.47	1.36	1.60	1.13	1.05	1.03	1.25	III
e. Relation of seeding practices to crop use	1.47	1.36	1.60	1.13	1.05	1.03	1.25	III
8. Tillage								
a. Classes of crops based on tillage	1.80	1.64	1.87	1.26	1.21	1.17	1.46	III
b. Development of tillage practices	1.73	1.45	1.87	1.26	1.21	1.17	1.43	III
c. Effect of tillage	1.80	1.64	1.87	1.26	1.21	1.17	1.46	III
d. Frequency, depth and time of cultivation	1.77	1.64	1.80	1.26	1.21	1.17	1.45	III

a. Key to Pattern Category on the front page of Appendix B.
b. All pattern categories except IX indicate a significant difference in the means of the job titles of the .05 level, AOV.

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
9. Harvesting and Storage of Grain Crops								
a. Losses from delayed or premature harvesting	1.63	1.73	1.67	1.30	1.37	1.17	1.44	IV
b. Harvesting methods for different crops	1.83	1.73	1.87	1.30	1.42	1.23	1.53	VII
c. Storage, shrinkage and some storage insect pests	1.60	1.55	1.67	1.26	1.37	1.17	1.41	IV
10. Haymaking								
a. Proper stage for harvesting	1.97	1.82	2.07	1.35	1.58	1.30	1.64	III
b. Essential facts about curing hay	1.97	1.73	2.07	1.35	1.58	1.30	1.63	III
c. Changes in plant material during the curing process	1.87	1.64	2.00	1.35	1.47	1.27	1.57	III
d. Market quality	1.90	1.73	1.93	1.35	1.47	1.27	1.58	III
11. Weeds								
a. Loss due to weeds	1.73	1.82	1.60	1.22	1.16	1.13	1.41	III
b. Classification	1.67	1.64	1.60	1.22	1.11	1.13	1.37	III
c. Control of weeds	1.73	1.82	1.60	1.22	1.16	1.13	1.41	III
12. Wheat								
a. Production in the world and United States	1.27	1.27	1.27	1.04	1.05	1.03	1.14	VIII
b. Classification	1.27	1.27	1.27	1.04	1.05	1.03	1.14	VIII
c. Wheat regions	1.23	1.27	1.27	1.04	1.05	1.03	1.13	IX
d. Varieties	1.27	1.27	1.33	1.04	1.05	1.03	1.15	III
e. Insects and diseases	1.27	1.27	1.33	1.04	1.05	1.03	1.15	III
13. Sorghums								
a. Production in the world and United States	1.30	1.27	1.27	1.04	1.05	1.03	1.15	III
b. Classification	1.33	1.27	1.33	1.04	1.05	1.03	1.16	IV
c. Distribution and varieties	1.30	1.27	1.33	1.04	1.05	1.03	1.16	VII
d. Insects and diseases	1.27	1.27	1.27	1.04	1.05	1.03	1.14	VIII
14. Cotton								
a. Production in the world and United States	1.17	1.18	1.13	1.00	1.00	1.00	1.07	VIII
b. Classification	1.17	1.18	1.13	1.00	1.00	1.00	1.07	VIII
c. Distribution and varieties	1.13	1.18	1.13	1.00	1.00	1.00	1.06	VIII
d. Insects and diseases	1.13	1.18	1.13	1.00	1.00	1.00	1.06	VIII
15. Soybeans								
a. Production in the world and United States	1.27	1.18	1.20	1.04	1.05	1.03	1.13	IX
b. Classification	1.30	1.18	1.27	1.04	1.05	1.03	1.14	IX
c. Distribution and varieties	1.30	1.18	1.33	1.04	1.05	1.03	1.15	VII
d. Insects and diseases	1.27	1.18	1.27	1.04	1.05	1.03	1.13	VIII
16. Causes of Starvation of Plants								
a. The plant nutrients; water, oxygen, carbon, nitrogen, potassium, phosphorus, sulphur, magnesium, calcium, iron, manganese, boron, zinc, copper, soil acidity	1.53	1.64	1.60	1.17	1.11	1.17	1.34	III
b. Read the hunger signs	1.53	1.64	1.60	1.17	1.11	1.17	1.34	III
c. How to gather soil samples	1.53	1.64	1.53	1.17	1.11	1.17	1.33	III
d. Fertilizers	1.53	1.64	1.53	1.17	1.11	1.17	1.33	III
B. Soil Science								
1. General Knowledge								
a. Physical characteristics of soil	1.43	1.55	1.47	1.22	1.26	1.13	1.31	IV
b. Surface texture	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
c. Permeability	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
d. Depth of surface soil and subsoil	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
e. Slope	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
f. Erosion (wind and water)	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
g. Surface drainage	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
h. Land capability classification	1.43	1.55	1.47	1.17	1.26	1.13	1.30	VII
2. Land Management								
a. Erosion control	1.47	1.55	1.47	1.17	1.11	1.07	1.27	III
b. Acidity or alkalinity adjustment	1.40	1.45	1.47	1.13	1.11	1.07	1.24	III
c. Plant food addition	1.47	1.55	1.47	1.13	1.11	1.07	1.27	III
d. Organic matter replenishment	1.43	1.45	1.47	1.13	1.11	1.07	1.25	IV
e. Crop rotation	1.43	1.45	1.47	1.13	1.11	1.07	1.25	IV
f. Crop selection	1.43	1.45	1.47	1.13	1.11	1.07	1.25	IV
g. Drainage	1.43	1.45	1.47	1.13	1.11	1.07	1.25	IV
h. Tillage	1.43	1.45	1.47	1.13	1.11	1.07	1.25	IV
i. Water conservation	1.47	1.55	1.47	1.17	1.11	1.07	1.27	III
C. Animal Science								
1. Beef Cattle								
a. History and development	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
b. Breeds of beef cattle	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
c. The beef carcass	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
d. Selection of breeding and market cattle	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
e. Feeding beef cattle (rations, cost)	1.23	1.27	1.33	1.09	1.11	1.03	1.16	IV
f. Health and sanitation	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
g. Equipment and facilities	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III
h. Marketing beef cattle	1.27	1.27	1.40	1.09	1.11	1.03	1.17	III

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
2. Dairy Cattle								
a. History and development	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
b. Breeds	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
c. Testing and production	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
d. Selection	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
e. Feeding (rations, cost)	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
f. Health and sanitation	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
g. Equipment and facilities	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
h. Marketing	1.23	1.18	1.33	1.09	1.11	1.03	1.15	IX
3. Sheep								
a. History and development	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
b. Breeds of sheep	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
c. The carcass	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
d. Selection	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
e. Feeding (rations, cost)	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
f. Health and sanitation	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
g. Equipment and facilities	1.17	1.09	1.27	1.09	1.11	1.03	1.12	IX
h. Marketing	1.17	1.09	1.27	1.09	1.11	1.03	1.02	IX
4. Swine								
a. History and development	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
b. Breeds	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
c. The carcass	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
d. Selection	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
e. Feeding (rations, cost)	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
f. Health and sanitation	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
g. Equipment and facilities	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
h. Marketing	1.20	1.18	1.27	1.09	1.11	1.03	1.13	IX
5. Horses								
a. History and development	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
b. Breeds	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
c. Purposes	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
d. Selection	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
e. Feeding (rations, cost)	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
f. Health and sanitation	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
g. Equipment and facilities	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
h. Marketing	1.20	1.18	1.33	1.04	1.05	1.00	1.12	III
D. Agricultural Business Management and Marketing								
1. Budgeting, Records and Analysis								
a. Importance of budgeting	1.63	1.36	1.73	1.09	1.11	1.03	1.30	III
b. Partial budgeting	2.13	1.91	2.27	1.22	1.05	1.07	1.55	III
c. Records of comparative inventory	1.57	1.45	1.40	1.09	1.11	1.00	1.25	III
d. Financial records	1.40	1.55	1.27	1.09	1.11	1.00	1.20	III
e. Performance records	1.27	1.36	1.27	1.09	1.05	1.00	1.15	IX
f. Organization of financial accounts	1.37	1.55	1.33	1.09	1.11	1.03	1.21	III
g. Interpreting the income figures	1.33	1.45	1.33	1.09	1.11	1.00	1.19	IV
h. Financial efficiency (process of analysis)	1.33	1.45	1.40	1.09	1.05	1.00	1.19	III
i. Efficiency in use of labor, power and equipment	1.73	1.64	1.73	1.13	1.21	1.07	1.38	III
j. Efficiency in crops and livestock production	1.60	1.55	1.60	1.13	1.05	1.00	1.29	III
2. Farm Financing								
a. Credit	2.33	2.36	2.40	1.30	1.16	1.07	1.69	III
b. Renting	1.80	1.82	1.67	1.09	1.16	1.00	1.38	III
c. Reducing risks	1.63	1.91	1.67	1.09	1.11	1.00	1.34	III
d. Getting started in business	1.63	1.91	1.67	1.09	1.11	1.00	1.34	III
e. Taxes	1.63	1.73	1.67	1.09	1.05	1.03	1.32	III
3. Farm Management								
a. Principle of diminishing returns	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
b. Principle of the maximum profit point	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
c. Equi-Marginal principle	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
d. The idea of risks	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
e. The idea of fixed versus variable cost	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
f. The principle of substitution	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
g. The idea of complementarity and competition among products	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
h. The idea of time and utility	1.30	1.27	1.40	1.04	1.05	1.00	1.16	III
i. Factors of production-How to combine them	1.33	1.27	1.47	1.04	1.05	1.00	1.17	III
j. Size of business	1.33	1.27	1.47	1.04	1.05	1.00	1.17	III
k. Crop and livestock production-How it effects farm income	1.40	1.45	1.47	1.09	1.05	1.03	1.22	III
l. Farm ownership	1.30	1.27	1.33	1.09	1.00	1.03	1.16	V
m. Field arrangement	1.33	1.36	1.33	1.09	1.00	1.03	1.17	III
n. Farmstead arrangement	1.30	1.27	1.33	1.09	1.00	1.03	1.16	V
o. Farm buildings	1.30	1.27	1.33	1.09	1.00	1.03	1.16	V
p. Planning the farm business	1.33	1.36	1.33	1.09	1.00	1.03	1.17	III

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
4. Marketing								
a. Marketing the farm product	1.47	1.55	1.47	1.17	1.05	1.03	1.26	III
b. Adjusting the farm business to prices	1.37	1.36	1.53	1.17	1.05	1.03	1.23	III
c. How farm prices are made--The demand side	1.33	1.36	1.40	1.17	1.05	1.03	1.20	V
d. Cost of production and prices--The supply side	1.37	1.36	1.47	1.17	1.05	1.03	1.22	V
5. Agricultural Policy								
a. The effects of farm problems on the structure of agriculture	1.50	1.55	1.33	1.17	1.00	1.03	1.24	III
b. Education (farm skills and retraining, employment information)	1.53	1.64	1.33	1.17	1.05	1.03	1.27	III
c. World agriculture and domestic farm policies	1.50	1.55	1.33	1.17	1.00	1.03	1.24	III
d. International commodity agreements	1.43	1.45	1.27	1.17	1.00	1.03	1.21	V
e. The use of surpluses	1.47	1.45	1.33	1.17	1.00	1.03	1.23	III
f. Economic issues of foreign aid	1.43	1.45	1.27	1.17	1.00	1.03	1.21	V
g. Problems of adjustment to progress	1.50	1.55	1.33	1.17	1.05	1.03	1.25	III
h. The formulation of agriculture policy	1.50	1.55	1.33	1.17	1.05	1.03	1.25	III
i. Economic and policy decisions	1.50	1.55	1.33	1.17	1.05	1.03	1.25	III
j. Social values and policy decisions	1.50	1.55	1.33	1.17	1.05	1.03	1.25	III
E. Agricultural Mechanics								
1. Farm Power Machinery								
a. Principles in machines	2.37	2.18	2.27	2.35	2.95	2.80	2.52	I
b. Relationship of mechanisms and systems to process and function	2.23	2.00	2.20	2.17	2.79	2.77	2.41	I
c. Selecting power units and machines to types of farming considering size and number, hours of use, cost, etc.	2.40	2.09	2.53	1.83	2.32	2.33	2.26	VIII
d. Operate farm tractor (spark-ignition and diesel type) and small internal combustion engines	2.00	1.91	2.07	1.96	2.89	2.87	2.33	I
e. Adjust farm tractor (spark-ignition and diesel type) and small internal combustion engines	1.60	1.64	1.67	1.74	2.95	2.90	2.14	I
f. Service farm tractor (spark-ignition and diesel type) and small internal combustion engines	1.40	1.36	1.33	1.65	2.95	2.90	2.02	I
g. Maintain farm tractor (spark-ignition and diesel type) and small internal combustion engines	1.37	1.36	1.27	1.65	2.95	2.90	2.00	I
h. Repair farm tractor (spark-ignition and diesel type) and small internal combustion engines	1.27	1.18	1.13	1.57	2.95	2.90	1.93	I
i. Overhaul farm tractor (spark-ignition and diesel type) and small internal combustion engines	1.20	1.09	1.07	1.43	3.00	2.93	1.89	I
j. Operate field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.97	2.00	1.93	1.70	2.89	2.87	2.27	I
k. Adjust field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.90	2.00	1.80	1.70	3.00	2.93	2.27	I
l. Service field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.53	1.64	1.27	1.65	3.00	2.93	2.08	I
m. Maintain field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.53	1.64	1.20	1.57	3.00	2.93	2.05	I
n. Repair field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.43	1.36	1.13	1.57	3.00	2.93	2.00	I
o. Overhaul field machinery including lubrication, recognition of malfunction, make operating adjustments and properly hitch implements, calibrate planting, fertilizing and spraying equipment	1.33	1.27	1.13	1.43	3.00	2.93	1.95	I
p. Locate and remedy common operation troubles due to wear of parts, breakage, misalignment and other improper functions	1.80	1.82	1.47	1.70	2.95	2.90	2.17	I
q. Plan and execute a program of preventive maintenance including protection-shelter, rust prevention, periodic inspection and adjustment	2.10	2.00	1.93	1.87	2.74	2.73	2.27	I

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
2. Farm Buildings and Conveniences								
a. Lay out a farmstead and plan an integrated farm improvement program, evaluate existing buildings, analyze need for new or remodeled construction plan new buildings and develop a maintenance and improvement program	1.20	1.18	1.13	1.00	1.05	1.00	1.09	IX
b. Plan buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices)	1.17	1.27	1.13	1.00	1.05	1.00	1.09	IX
c. Determine cost of buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices)	1.13	1.18	1.13	1.00	1.00	1.00	1.06	VIII
d. Build the buildings for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices)	1.07	1.18	1.13	1.00	1.05	1.00	1.05	IX
e. Supervise the building for utilities and production equipment to meet operating needs of the farmer (elevators, conveyors, water distribution and disposal system, light and power, feed storage, handling and processing devices)	1.07	1.18	1.13	1.00	1.05	1.00	1.05	IX
f. Recognize and meet requirements of farm animals and poultry for environment and sanitation control, such as temperature, ventilation, light and moisture	1.13	1.18	1.13	1.00	1.00	1.00	1.06	VIII
g. Select suitable building materials and determine cost for specific uses, including durability, functional performance, strength, ease of application, availability, economy and appearance. Recognize standard commercial units, grade estimate quantities and determine construction cost	1.13	1.18	1.13	1.00	1.05	1.00	1.07	IX
h. Recognize good construction methods and standard building materials	1.17	1.18	1.20	1.00	1.05	1.00	1.09	VII
3. Rural Electrification and Processing								
a. Plan wiring systems and rewiring for adequacy, convenience, safety, including determination of probable electric loads	1.07	1.18	1.07	1.00	1.05	1.03	1.05	IX
b. Supervise the wiring systems and rewiring for adequacy, convenience, and safety, including determination of probable electric loads	1.07	1.18	1.00	1.00	1.00	1.00	1.03	VIII
c. Skills to wire new wiring system and rewiring for adequacy, convenience and safety, including determination of probable electric loads	1.03	1.09	1.00	1.00	1.05	1.03	1.03	IX
d. Select lighting equipment and locate it in the yards, lots, building and work areas to provide adequate illumination	1.07	1.18	1.00	1.00	1.05	1.03	1.05	IX
e. Select electrical home appliances and farm equipment including motors and controls	1.07	1.18	1.00	1.00	1.05	1.03	1.05	IX
f. Adapt electricity to farm enterprises, coordinating the equipment with the size and arrangement of farm buildings	1.07	1.18	1.00	1.00	1.05	1.03	1.05	IX
g. Operate electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.	1.07	1.18	1.00	1.00	1.05	1.03	1.05	IX
h. Adjust electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.	1.07	1.18	1.00	1.00	1.05	1.03	1.05	IX
i. Service electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.	1.03	1.09	1.00	1.00	1.05	1.03	1.03	IX
j. Maintain electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.	1.03	1.09	1.00	1.00	1.05	1.03	1.03	IX
k. Repair electrical equipment considering the power transmission, equipment ventilation, servicing, safety, etc.	1.00	1.00	1.00	1.00	1.05	1.03	1.02	IX
l. Overhaul electrical equipment considering the power transmission, equipment ventialtion, servicing, safety, etc.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
3. Rural Electrification and Processing (Continued)								
m. Install electrical equipment considering power transmission, equipment ventialtion, servicing, safety, etc.	1.03	1.09	1.00	1.00	1.05	1.03	1.03	IX
4. Construction and Maintenance								
a. Select hand and power tools and shop equipment for shop including makes, models, size, quantities and grades	1.90	2.00	1.07	1.22	2.63	2.30	1.89	VIII
b. Maintain hand and power tools and shop equipment for shop including makes, models, size, quantities and grades	1.20	1.09	1.07	1.13	2.37	2.33	1.60	I
c. Repair hand and power tools and shop equipment for shop including makes, models, size, quantities and grades	1.13	1.00	1.00	1.13	2.26	2.23	1.53	I
d. Overhaul hand and power tools and shop equipment for shop including makes, models, size, quantities and grades	1.10	1.00	1.00	1.13	1.89	1.87	1.38	I
e. Sharpen, repair, maintain and safely use the common shop tools and equipment	1.23	1.27	1.00	1.35	2.89	2.77	1.84	I
f. Do electric arc welding	1.17	1.00	1.00	1.13	2.68	2.63	1.70	I
g. Do oxy-acetylene welding, cutting, bronze welding and hard surfacing	1.17	1.00	1.00	1.13	2.63	2.60	1.68	I
h. Do hot metal work, including bending, shaping and heat treating	1.13	1.00	1.00	1.13	2.32	2.33	1.56	I
i. Do cold metal work, including cutting, drilling, filing, tapping, threading, riveting and bending	1.13	1.00	1.00	1.13	2.58	2.50	1.64	I
j. Do sheet metal work including, cutting, bending and fastening	1.03	1.00	1.00	1.00	2.16	2.13	1.45	I
k. Do pipe and tubing work and make simple plumbing repairs	1.20	1.18	1.00	1.17	2.26	2.33	1.59	I
l. Select lumber, hardware and other building materials and calculate bills of material	1.13	1.09	1.07	1.04	1.68	1.63	1.30	I
m. Supervise the construction and maintenance of smaller farm buildings and equipment	1.13	1.09	1.13	1.00	1.37	1.43	1.21	VIII
n. Construct and maintain buildings and equipment	1.13	1.18	1.07	1.00	1.53	1.47	1.24	VIII
o. Do painting and glazing. Apply wood preservatuves	1.03	1.09	1.07	1.00	1.47	1.60	1.23	I
p. Construct and maintain adequate farm fences	1.13	1.27	1.07	1.00	1.37	1.47	1.23	VIII
q. Do concrete work including building forms, testing materials, preparing mixes, placing, finishing and curing; and laying concrete and masonry building units	1.03	1.00	1.00	1.00	1.42	1.50	1.19	I
r. Make the more important rope knots, hitches, splices, and halters	1.07	1.09	1.13	1.04	1.26	1.43	1.19	VIII
s. Recognize dangers and hazards connected with the use of tools and equipment and guard against them	2.03	1.82	2.00	2.17	2.53	2.53	2.23	VIII
5. Soil Structures								
a. Run levels and contours by using the farm level	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
b. Locate and place grade stakes, and make contour map	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
c. Plan terracing and simple farm drainage systems. Estimate cost of construction and maintenance	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
d. Plan and lay out irrigation systems, considering the advantages and limitations of the various types and systems	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
e. Maintain irrigation and drainage systems	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
f. Plan and lay out farm reservoir including the choosing of the appropriate site; calculate the expected flow and capacity, determine the procedure for constructing the reservoir, construct adequate spillways, provide outlets and use practices that preserve earthen reservoirs and embankments	1.03	1.00	1.07	1.00	1.00	1.00	1.02	IX
II. Business and Distributive Competencies								
A. Occupational Information and Regulations								
1. Job Opportunities and Trends								
a. Gross national product and its relation to population and jobs	1.53	1.73	1.20	1.04	1.00	1.00	1.22	II
b. Population growth	1.53	1.73	1.20	1.04	1.00	1.00	1.22	II
c. Age groups with population growth	1.47	1.73	1.13	1.04	1.00	1.00	1.20	VIII

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
1. Job Opportunities and Trends (Continued)								
d. Rate of industry growth or decline by areas of U.S.	1.37	1.45	1.20	1.04	1.00	1.00	1.16	III
e. Employment by occupation	1.33	1.45	1.13	1.04	1.00	1.00	1.14	II
f. Change in employment by occupational group	1.40	1.45	1.20	1.04	1.00	1.00	1.16	III
g. Importance of education and requirements to various occupations	1.50	1.45	1.20	1.04	1.05	1.03	1.20	III
h. National needs for various occupations	1.43	1.64	1.20	1.04	1.00	1.00	1.19	II
2. Job Application and Interviews								
a. How to apply for a job	1.93	1.82	2.07	1.96	2.00	1.93	1.95	IX
b. Application forms (legibility, neatness, completeness)	1.93	1.82	2.07	1.96	2.00	1.93	1.95	IX
c. Applicants introduction, manners, expressing oneself, appearance, taking leave	2.00	1.82	2.13	2.04	2.00	1.97	2.00	IX
d. Personal data sheet	1.90	1.82	2.00	1.91	1.95	1.90	1.91	IX
3. Employee Welfare								
a. Insurance	1.77	1.91	1.60	1.26	1.42	1.37	1.52	II
b. Retirement	1.77	1.91	1.60	1.26	1.42	1.37	1.52	II
c. Vacation	1.77	1.91	1.53	1.26	1.37	1.33	1.50	III
d. Employers policies	1.77	1.91	1.53	1.26	1.42	1.37	1.52	III
e. Working conditions	1.77	1.91	1.53	1.35	1.47	1.40	1.55	VII
f. Compensation and benefits	1.77	1.91	1.53	1.26	1.37	1.33	1.50	III
g. Safety and labor regulations	1.73	1.91	1.47	1.35	1.53	1.43	1.55	IX
h. Legal requirements of the job (Federal and State Labor Laws)	1.63	1.91	1.40	1.17	1.32	1.23	1.41	II
B. Duties of Employees								
1. Preparing goods for Resale								
a. Deciding on a price	2.30	2.18	2.27	1.65	1.68	1.23	1.83	III
b. Discounts	2.20	2.09	1.93	1.57	1.47	1.13	1.69	III
c. Credit	2.27	2.18	2.07	1.57	1.58	1.10	1.73	III
d. Shipping terms	2.00	2.00	1.80	1.43	1.53	1.10	1.59	VII
e. Special buying arrangements	2.13	2.09	1.67	1.57	1.47	1.07	1.63	I
f. The buyer's order	2.13	2.18	1.67	1.57	1.53	1.10	1.65	III
g. Receiving the goods	2.20	2.27	1.80	1.87	1.53	1.10	1.74	VIII
h. Checking the goods	2.20	2.27	1.80	1.87	1.53	1.10	1.74	VIII
i. Marking the goods	2.20	2.27	1.80	1.87	1.42	1.07	1.72	VI
j. Storing and arranging the goods	2.27	2.27	1.87	1.87	1.53	1.10	1.77	VIII
k. Invoice control; mechanization	2.27	2.18	1.73	1.83	1.37	1.10	1.71	II
2. Window and Store Display								
a. Psychology of display	2.10	2.00	1.80	2.04	1.05	1.00	1.63	V
b. Window display	2.10	2.00	1.80	2.04	1.16	1.00	1.65	V
c. Interior display	2.10	2.00	1.80	2.04	1.05	1.00	1.63	V
d. Color and design	2.10	2.00	1.80	1.96	1.16	1.00	1.63	VIII
e. Display and store budget	2.10	2.00	1.80	1.96	1.16	1.00	1.63	VIII
3. Salesmanship and Customer Relations								
a. The seller's personality-physical and mental characteristics	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
b. The seller's use of English	2.83	2.91	2.93	2.74	2.63	2.17	2.65	IV
c. The seller's use of arithmetic	2.83	2.91	2.93	2.74	2.63	2.17	2.65	IV
d. The technique of locating customers	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
e. Preparing to meet customers	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
f. Opening the sale	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
g. Analyzing the customer's wants	2.83	2.91	2.87	2.74	2.63	2.17	2.64	IV
h. Presenting a planned sales story	2.83	2.91	2.93	2.74	2.58	2.17	2.64	IV
i. Handling the customer's objections	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
j. Closing the sale	2.83	2.91	2.93	2.74	2.58	2.20	2.65	IV
k. Trade up	2.83	2.91	2.93	2.74	2.58	2.20	2.65	IV
l. Plus selling	2.83	2.91	2.93	2.74	2.58	2.20	2.65	IV
m. Cash register operation	2.73	2.73	2.87	2.65	2.37	2.07	2.52	IV
n. Wrapping packages	1.73	1.73	1.80	2.04	1.68	1.67	1.77	IX
o. Telephone selling	2.83	2.91	2.93	2.70	2.58	2.20	2.64	IV
p. Team play in selling	2.83	2.91	2.93	2.74	2.63	2.20	2.66	IV
q. Problems on the selling floor	2.83	2.91	2.93	2.74	2.63	2.23	2.66	IV
4. Bookkeeping								
a. Records of departments	2.23	2.36	1.40	1.70	1.47	1.23	1.70	II
b. Inventories	2.23	2.36	1.33	1.83	1.47	1.20	1.71	II
c. Valuation of principal assets	2.23	2.27	1.40	1.48	1.16	1.07	1.57	II
d. Depreciation	2.23	2.27	1.40	1.74	1.16	1.03	1.61	II
e. Accounts relative to organization	2.23	2.36	1.47	1.57	1.16	1.07	1.60	II
f. Assets and liabilities	2.27	2.36	1.27	1.39	1.05	1.07	1.54	II
g. Property tax	2.23	2.27	1.20	1.22	1.05	1.03	1.48	II
h. Income tax	2.23	2.27	1.20	1.22	1.05	1.03	1.48	II
i. Social Security and self-employment taxes	2.23	2.27	1.20	1.22	1.11	1.07	1.49	II
j. Profit and Loss Statement	2.27	2.27	1.27	1.39	1.11	1.07	1.54	II
k. Household expenses	2.27	2.36	1.27	1.22	1.16	1.13	1.54	II
l. Summary of receipts	2.23	2.27	1.20	1.26	1.16	1.10	1.52	II
m. Summary of expenses	2.27	2.27	1.27	1.26	1.16	1.10	1.53	II
n. Net Income figures	2.27	2.27	1.27	1.26	1.16	1.10	1.53	II
o. Interpreting the income figures	2.27	2.27	1.27	1.26	1.11	1.07	1.52	II
p. Financial efficiency	2.27	2.36	1.40	1.35	1.21	1.07	1.57	II
q. Capital management	2.27	2.36	1.27	1.26	1.11	1.07	1.52	II
r. Financing	2.27	2.36	1.40	1.22	1.21	1.10	1.55	II

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
C. Business Organization and Supervision								
1. Developing and Utilizing Human Resources								
a. Recruitment, selection and placement	2.27	2.27	1.27	1.22	1.58	1.10	1.59	II
b. Induction and training	2.27	2.27	1.27	1.22	1.63	1.10	1.59	II
c. Performance, appraisal and promotion	2.27	2.36	1.27	1.22	1.63	1.10	1.60	II
d. Transfers and separation	2.23	2.27	1.27	1.22	1.58	1.10	1.58	II
e. Constructive discipline	2.27	2.27	1.27	1.22	1.63	1.10	1.59	II
f. Communication and job change	2.27	2.27	1.27	1.22	1.63	1.10	1.59	II
2. Human Relations								
a. Health	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
b. Personal appearance	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
c. Clothes	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
d. Voice	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
e. Mannerism	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
f. Truthfulness	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
g. Loyalty	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
h. Resourcefulness	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
i. Self-confidence	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
j. Imagination	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
k. Showmanship	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
l. Courage	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
m. Ambition	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
n. Adaptability	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
o. Industry	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
p. Observation	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
q. Enthusiasm	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
r. Courtesy	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
s. Tact	2.87	2.73	2.87	2.87	2.68	2.67	2.78	IX
3. Organizational Charts of Business								
a. Company policies	2.00	2.18	1.93	1.52	1.84	1.47	1.77	VII
4. Buying								
a. Studying the customer	2.27	2.27	2.00	1.91	1.58	1.30	1.84	V
b. Studying market offerings	2.27	2.27	1.87	1.83	1.32	1.17	1.74	V
c. Study of variabilities	2.27	2.27	2.00	1.91	1.42	1.23	1.80	V
d. Buying staples	2.27	2.27	1.87	1.87	1.26	1.07	1.72	V
e. Buying shopping goods	2.20	2.18	1.87	1.87	1.42	1.10	1.73	V
f. Surplus items	2.27	2.27	1.93	1.78	1.53	1.20	1.78	V
5. Stock Control								
a. Inventory	2.27	2.18	1.80	2.35	1.53	1.20	1.86	VIII
b. Unit control	2.23	2.18	1.73	2.35	1.58	1.20	1.85	VIII
c. Warehousing	2.23	2.18	1.67	2.30	1.53	1.27	1.84	VIII
D. Management and Economics of Business								
1. Basic Management Problems								
a. Business plans and planning	2.23	2.18	1.47	1.39	1.42	1.13	1.61	II
b. Business objectives	2.23	2.18	1.47	1.43	1.47	1.20	1.64	II
c. Business policy	2.23	2.18	1.47	1.43	1.47	1.20	1.64	II
d. Responsibility	2.23	2.18	1.47	1.39	1.47	1.20	1.63	II
e. Staff organization	2.23	2.09	1.47	1.43	1.42	1.17	1.62	II
f. Organizational morale	2.23	2.18	1.47	1.43	1.47	1.30	1.66	II
g. Basics for control	2.23	2.18	1.47	1.43	1.42	1.17	1.63	II
h. Business procedure	2.23	2.18	1.47	1.43	1.42	1.20	1.63	II
i. Factors of successful business-how to combine them	2.23	2.18	1.47	1.43	1.42	1.20	1.63	II
j. Administrative and operational management (personnel department and training)	2.23	2.18	1.47	1.43	1.42	1.20	1.63	II
k. Credit control	2.23	2.18	1.47	1.43	1.37	1.10	1.60	II
2. Promotion and Advertising								
a. Value of advertising	2.27	2.27	1.67	1.52	1.42	1.10	1.66	II
b. How to reach the customer	2.30	2.27	1.73	1.52	1.47	1.17	1.70	II
c. Trade relationship and association	2.23	2.27	1.67	1.48	1.53	1.13	1.67	II
d. Advertising budget	2.30	2.27	1.73	1.52	1.42	1.10	1.68	II
e. Psychology of advertising	2.23	2.27	1.67	1.48	1.42	1.13	1.66	II
f. Selecting goods to promote	2.30	2.27	1.73	1.52	1.42	1.10	1.68	II
g. Selecting the media	2.27	2.27	1.67	1.52	1.42	1.10	1.66	II
h. Preparing the advertisement	2.27	2.27	1.67	1.52	1.42	1.10	1.65	II
i. Advertising standards and helps	2.23	2.27	1.67	1.43	1.42	1.10	1.64	II
3. Legal Relationships								
a. Basic business law	1.93	1.82	1.53	1.17	1.26	1.03	1.43	II
b. Government regulations	1.87	1.91	1.27	1.09	1.21	1.00	1.36	II
III. Trades and Industrial Competencies								
A. Building Trades								
1. Masonry								
a. Trends in masonry	1.00	1.00	1.00	1.04	1.00	1.00	1.01	IX
b. Concrete (specifications)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
c. Foundations	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
1. Masonry (Continued)								
d. Reinforcing	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
e. Bricks and other building material	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
f. Modular standards	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
g. Costs and values	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
h. F. H. A. specifications	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
i. Building Codes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
j. New methods and materials	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
2. Carpentry and Cabinet Work								
a. Trends in building	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
b. F. H. A. specifications	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
c. The square	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
d. Framing	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
e. Rafters	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
f. Wood and its uses	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
g. Commercial building	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
h. Cabinets	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
i. Modular standards	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
3. Blueprint Reading								
a. Modular standards	1.00	1.00	1.00	1.00	1.16	1.10	1.05	IX
b. Symbols	1.00	1.00	1.00	1.00	1.16	1.10	1.05	IX
4. Plumbing								
a. Building Codes (National, State, Local)	1.03	1.09	1.00	1.00	1.00	1.00	1.02	IX
b. Materials	1.07	1.18	1.00	1.00	1.00	1.00	1.03	IX
c. Sweating	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
d. Threading	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
e. Leading	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
f. Septic disposal	1.03	1.09	1.00	1.00	1.00	1.00	1.02	IX
g. Water systems	1.07	1.18	1.00	1.00	1.05	1.00	1.04	IX
h. Costs	1.07	1.18	1.00	1.00	1.00	1.00	1.03	IX
B. Machine Tool Trades								
1. Drafting and Design								
a. Sketching	1.03	1.09	1.00	1.00	1.00	1.00	1.02	IX
b. Symbols	1.03	1.09	1.00	1.00	1.00	1.00	1.02	IX
c. Fastening	1.03	1.09	1.00	1.00	1.00	1.00	1.02	IX
2. Manuals, Technical and Service								
a. Parts nomenclature	1.30	2.18	1.33	2.57	1.95	1.80	1.94	VIII
b. Exploded views	1.80	2.18	1.33	2.57	1.95	1.83	1.95	VIII
c. Parts organization	1.83	2.18	1.33	2.57	1.84	1.77	1.92	VIII
3. Mathematics								
a. Fractions	1.67	1.55	1.60	1.52	1.68	1.53	1.59	IX
b. Decimals	1.73	1.73	1.73	1.61	1.89	1.63	1.71	IX
c. Micrometer and measurements	1.33	1.27	1.33	1.43	2.47	2.17	1.71	I
d. Basic math skills (add, subtract, multiply, divide)	2.27	2.27	2.33	2.22	2.26	2.03	2.21	IX
e. Algebra	1.07	1.09	1.07	1.00	1.05	1.03	1.05	IX
f. Geometry	1.07	1.09	1.07	1.00	1.05	1.03	1.05	IX
C. Technicians								
1. Electricity								
a. Building codes (National, State, Local)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
b. Materials	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
c. Planning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
d. Wiring skills	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
e. Costs	1.00	1.00	1.00	1.00	1.00	1.00	1.00	IX
2. Quality Control								
a. Variables in quality control	1.67	1.91	1.33	1.35	1.84	1.57	1.59	IX
b. Standards	1.63	1.82	1.33	1.35	1.84	1.57	1.58	IX
c. Organization of the business	1.73	1.91	1.27	1.35	1.68	1.33	1.52	III
3. Time Study								
a. Organization of the business	2.10	2.27	1.47	1.70	2.00	1.50	1.81	VI
b. Flat rate manual	2.07	2.27	1.40	1.74	2.42	1.93	1.97	VI
c. Efficiency of movement	2.20	2.27	1.47	1.91	2.32	1.90	2.02	VIII
D. Skills and Other Trades								
1. Welding (Arc and Oxy-acetylene)								
a. Process of welding	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
b. Safety practices	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
c. Operating the welder	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
d. Square butt weld in flat position	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
e. Lap weld	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
f. Horizontal fillet weld	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
g. Understanding welders construction	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
h. Selecting electrodes	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
i. Controlling distortion	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
j. Cutting metals	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
k. Join steel flats with butt weld-flat position	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
l. Multiple pass horizontal fillet weld	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
m. Join pipe	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I

Data Schedule Item	Job Titles, Number Surveyed, Mean Score: Manager N=30	Assistant Manager N=11	Salesman N=15	Partsman N=23	Shop Foreman N=19	Mechanic N=30	Over-All Mean N=128	Pattern Category a,b
1. Welding (Continued)								
n. Build up weld on round stock	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
o. Bronze weld	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
p. Common metals	1.13	1.00	1.00	1.13	2.16	2.10	1.48	I
q. Welding cast iron	1.07	1.00	1.00	1.09	1.84	1.67	1.31	I
r. Vertical welds	1.07	1.00	1.00	1.13	1.89	1.83	1.37	I
s. Hard surfacing	1.07	1.00	1.00	1.09	1.47	1.40	1.20	I
t. Welding hard-to-weld steels	1.07	1.00	1.00	1.09	1.47	1.43	1.20	I
2. Sheet Metals								
a. Materials	1.10	1.00	1.00	1.09	1.26	1.23	1.13	IX
b. Building codes (National, State, Local)	1.03	1.00	1.00	1.00	1.11	1.07	1.04	IX
c. Fabrication	1.03	1.00	1.00	1.00	1.21	1.13	1.07	IX
d. Soldering	1.10	1.00	1.00	1.09	1.32	1.27	1.15	IX
e. Fastening	1.10	1.00	1.00	1.09	1.32	1.27	1.15	IX
f. Layout and planning	1.03	1.00	1.00	1.00	1.26	1.17	1.09	I
g. Cost	1.03	1.00	1.00	1.00	1.21	1.13	1.07	IX
3. Supervision								
a. Function of a supervisor	2.30	2.27	1.60	1.65	2.26	1.33	1.87	VI
b. Where does leadership begin	2.30	2.27	1.60	1.65	2.21	1.33	1.86	VI
c. Building staff morale	2.30	2.27	1.60	1.65	2.26	1.33	1.87	VI
d. Developing leadership in the group	2.30	2.27	1.60	1.65	2.26	1.37	1.88	VI
e. Supervision as a skill in human relations	2.23	2.18	1.53	1.65	2.16	1.30	1.81	VI
f. Supervision as a skill in group process	2.20	2.09	1.53	1.65	2.11	1.30	1.79	VI
g. Supervision as a skill in personnel administration	2.27	2.27	1.53	1.65	2.16	1.30	1.83	VI
h. Supervision as a skill in evaluation	2.23	2.18	1.53	1.65	2.16	1.30	1.81	VI
4. Safety								
a. Standard safety practices	2.30	2.27	2.13	2.17	2.58	2.33	2.30	IX
b. Trends in safety	2.30	2.27	2.13	2.17	2.58	2.33	2.30	IX
c. Safety displays	2.27	2.27	2.07	2.17	2.53	2.30	2.27	IX
IV. Communication Competencies								
A. Public Speech								
1. Preparing a Speech								
a. Practice in private	2.37	2.18	2.40	2.13	2.00	1.80	2.13	IV
b. Obligation to audience	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
c. Have a purpose	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
d. From beginning, middle, to end	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
e. Body of the speech	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
f. Conclusion of speech	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
g. Elements of speech	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
h. Being persuasive	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
i. Material for a speech	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
j. Writing the speech	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
k. Using a script	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
2. Manner of Giving a Speech								
a. Fully prepared	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
b. Your introduction	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
c. On using notes	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
d. Smile and start talking	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
e. Audience contact	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
f. Using your hands	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
g. Grammar and enunciation	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
h. Using the microphone	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
i. The anecdote	2.33	2.18	2.40	2.09	2.00	1.77	2.10	IV
B. Writing								
1. General Knowledge								
a. Purpose-secure favorable response	2.40	2.36	2.00	1.91	1.95	1.57	2.00	III
b. The five "W's"	2.40	2.36	2.00	1.96	2.00	1.63	2.03	VII
c. Preparing a business letter	2.43	2.36	2.07	1.91	1.95	1.53	2.01	III
d. Develop a major theme	2.40	2.27	2.07	1.91	1.95	1.53	1.99	III
e. The first paragraph	2.37	2.27	2.00	1.91	1.95	1.53	1.98	III
f. Using memos	2.37	2.27	2.00	1.91	1.95	1.57	1.98	VII
g. Preparing reports	2.40	2.27	2.07	1.96	2.11	1.77	2.08	VII
h. Assigning reports	2.40	2.27	2.07	1.96	2.05	1.67	2.05	VII
i. Requirements for report writers	2.37	2.27	2.00	1.91	2.00	1.73	2.03	VII
j. Preparing the outline	2.40	2.36	2.00	1.91	2.00	1.70	2.04	VII

VITA

J. Brown Morton

Candidate for the Degree of

Doctor of Education

Thesis: DETERMINATION OF EDUCATIONAL NEEDS OF SELECTED JOB TITLES IN FARM IMPLEMENT BUSINESSES IN OKLAHOMA

Major Field: Agricultural Education

Biographical:

Personal Data: Born at Cheyenne, Oklahoma, February 28, 1919, the son of James V. and Morene Morton.

Education: Attended elementary and secondary school at Sayre, Oklahoma and graduated in 1938. In 1940, graduated from Sayre Junior College and transferred to Oklahoma State University. Received the Bachelor of Science degree with a major in Agronomy in the spring of 1942. In the summer of 1946, entered the graduate school at Oklahoma State University from which he received the Master of Science degree in Agronomy in 1947 and also completed the required courses for a certificate to teach vocational agriculture. Additional graduate work was taken during 1954 to 1962. In 1962-1963 he accepted a fellowship to study Agriculture Economics at the Agriculture Policy Institute at North Carolina State University. Requirements for the Doctor of Education degree were completed at Oklahoma State University in May, 1966.

Professional Experience: The writer taught vocational agriculture at Cache, Oklahoma, for six weeks before being inducted into the Army. He taught two years of vocational agriculture at Binger after being released from the Army. He taught vocational agriculture at Rocky, Oklahoma, from 1947 to 1950 and at Clinton from 1950-1954. In 1954, he was hired by the State Board of Vocational Education to Supervise the Northeast District in Vocational Agriculture. He is a member of Alpha Tau Alpha, Phi Delta Kappa and other professional organizations. He writes publications for the State Department of Vocational Education and the Agriculture Education Magazine.