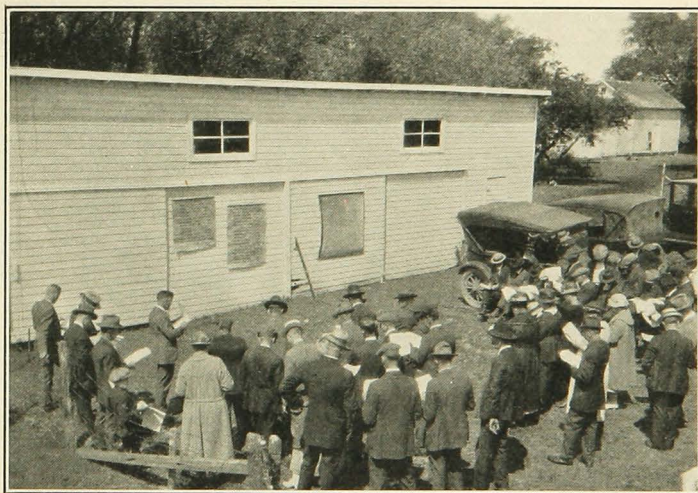


UNIVERSITY OF MINNESOTA
AGRICULTURAL EXPERIMENT STATION
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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF AGRICULTURAL ECONOMICS

RELATION OF VARIATIONS IN THE
HUMAN FACTOR TO FINANCIAL
RETURNS IN FARMING

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UNIVERSITY FARM, ST. PAUL

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RELATION OF VARIATIONS IN THE HUMAN FACTOR TO FINANCIAL RETURNS IN FARMING

WALTER W. WILCOX, ANDREW BOSS, AND GEORGE A. POND¹

INTRODUCTION

In this study an attempt was made to determine some of the reasons why the farmer carries on his farming business with the degree of efficiency which he does, rather than the relative effectiveness of his particular farm organization and production practices. Most studies in the field of farm management have had for their objective an analysis of the farm organization and the farmer's production practices in order to determine what factors were largely responsible for the wide variations in individual earnings found in any farming community.

This type of analysis has not been able to explain all the variations in earnings; neither has it thrown much light on the reasons for the variations in farm organization and production practices followed. If the farmers of a group are located within a small and fairly uniform area, it can be assumed that most of the variations in the factors affecting farm income are directly the result of differences in their personal characteristics. In order better to indicate the relation of this study to other research in farm management and to show rather definitely the present point of attack, the factors affecting the financial success of a farm have been put in the form of a diagram (Fig. 1).

A study of this diagram brings out the fact that the farm operator, through the capacity and efficiency of his management, determines the adjustment made to factors over which he has no control as well as the effectiveness of the functioning of all other factors influencing the farm earnings. This study is concerned with the factors influencing the capacity and efficiency of management, namely, the personal characteristics of the farmer and his family which, in turn, are due to the combination of hereditary and environmental influences.

This study, being experimental and methodological in nature, is more concerned with exploring all approaches to the problem that seem promising rather than with organizing the efforts expended in such a way as to permit broad generalizations from the results. For this reason the methods of arriving at the results are given emphasis as well as the results themselves.

¹ C. L. Holmes and Walter J. Roth, of the Bureau of Agr. Econ., U. S. Dept. of Agr., and O. B. Jesness and C. C. Zimmerman, of the Univ. of Minn., co-operated with the authors in planning this study and gave valuable aid and advice in carrying it out and preparing this report.

Setting of the Study

The farmers furnishing the data for this study were co-operators in a farm management service project started in 1928 and maintained by the University of Minnesota and the United States Department of Agriculture co-operatively. They were keeping financial and production records with the help of a field man who visited them several times a year to check the records for completeness and accuracy. At the end of each year they received full summaries of the year's business in which special emphasis was given to the factors of organization and the farm practices associated with financial success. Representatives of the University and the Department of Agriculture assisted them in studying these records and in using them as a basis for planning improvements in their organization and methods. These contacts with the public agencies

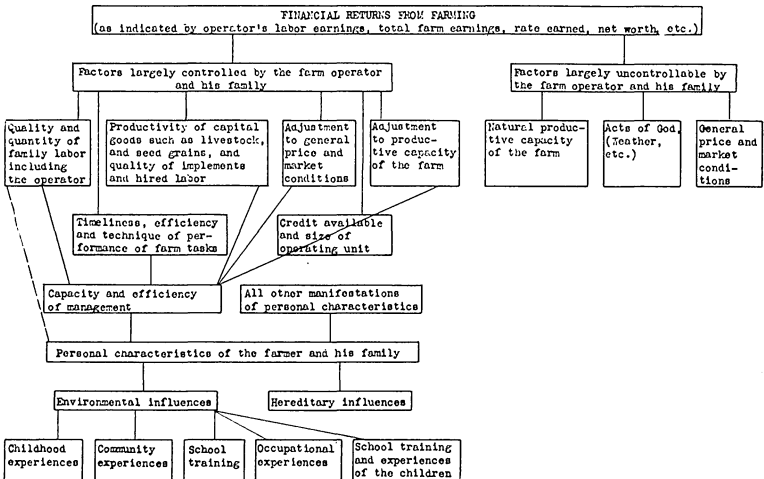


Fig. 1. Factors Affecting Financial Returns from Farming

involved developed a feeling of confidence on the part of the farmers in the workers who were aiding them in a study of their farm problems. They were interested in learning the factors that affect financial earnings and productive efficiency in farming. It would hardly have been possible to secure as full and detailed personal information from a group of farmers whose confidence had not already been established in some such manner as this. The accounting records secured in this farm management service project also supplied the data on farm earnings and production that served as a background for this study. On the other hand, the families included do not represent a normal sample because only the better farmers are interested in keeping farm records and are willing to co-operate. Studies made elsewhere indicate that the average earnings

of such a group are considerably higher than for a cross-section of an agricultural area.²

The farmers were located in Steele, Waseca, Freeborn, Dodge, Rice, and Goodhue Counties. These counties are a part of the southeast dairy farming area.³ Altho the growing season is short for corn production, many farmers get yields of corn fully as large as those obtained on the better farms of the central corn belt. A large proportion of the crop land is in small grain and hay each year. Most of the crops are marketed in the form of dairy products and pork. Butterfat is the usual form in which the dairy products are sold. On some of the farms sugar beets, canning peas, sweet corn, or potatoes are grown but for the most part only feed crops are raised. There is comparatively little tenancy in this area, the type of farming followed being conducive to ownership. Eight per cent of the group studied were tenants not related to the owner, and 21 per cent were tenants related to the owner, whose interests and behavior are very similar to owner-operators.

These farmers were visited twice by the senior author during the summer of 1930 to get the personal and family data related to the financial and production records already available. Thirty-six of them were visited again the following year to make possible an even more complete analysis and comparison of the factors that operated to cause some of the men to have unusually high earnings as compared with those having average or unusually low earnings.

THE PROBLEM

One of the earliest investigations of this nature available in the literature is a study by E. C. Higbie.⁴ One hundred fifty-four groups of 13 men each were rated by college students as to their relative standing on eleven points.⁵ By means of correlation analysis, Higbie arrived at the conclusion that the points listed ranked in the following order of importance as related to financial success—business ability, native intelligence, technical information, skills, physical capacity, mechanical ability, and education. It should be kept in mind that these conclusions were arrived at simply by treating statistically the ratings given 2002 farmers, by 154 college students who were sitting in their class rooms at the time. Altho this somewhat limits the weight that can be given to the findings, they are significant as a phase of this general prob-

² Case, H. C. M., Wilcox, R. H., and Berg, H. A. Organizing a Corn Belt Farm for Profit. Ill. Agr. Expt. Sta. Bull. 329, 1929.

³ Pond, G. A. A Study of Dairy Farm Organization in Southeastern Minnesota. Minn. Agr. Expt. Sta. Tech. Bull. 44, p. 7, 1927.

⁴ Higbie, E. C. An Objective Method for Determining Certain Fundamental Principles in Secondary Agricultural Education. Thesis (Ph.D.), Columbia University, 1921.

⁵ The points on which the men were rated are: Native intelligence, business ability, financial success, general education, agricultural information, managerial ability, field and chore skills, mechanical ability, physical capacity, unpaid family labor, and community value.

lem. A study by Hamer⁶ brings out some of the human factors characteristic of the group of men chosen as Master Farmers. Some of the specific findings will be cited later in connection with the discussion to which they are applicable. A study of the factors affecting the physical and economic costs of dairy production in Pine County, Minnesota, indicated that variations in management were of more influence than all other factors considered.⁷ Altho the measure of management used was largely subjective, some of the personal factors found in this study to be important were considered in its computation.

The human factor is so intangible and presents so many ramifications that the most effective starting place is hard to determine. Accordingly it seemed best to try out several different methods of approach. First, a schedule was mailed to each co-operator listing fifteen factors which usually affect the success of a farm operator. He was asked to rank in the order of their importance the ten that he considered to be of the greatest significance in his success as a farmer. Later, by means of a personal visit, data were obtained on each man's educational, occupational, and economic history; the rate of his children's progress through school; his use of available information; his ability to handle labor; and his age. After partially analyzing these data, a second visit was made. This time the farmers were asked to answer fifty technical agricultural questions, in other words, they were given "trade test." In addition to this, data were gathered relative to the number of certain selected farm practices being followed by each farmer.

What differences in education were associated with differences in earnings? Were differences in occupational training or length of farm experience affecting the income of the operator? Were high earnings due to a better than average financial start in life? Were the men making the higher earnings doing so because of greater inherited ability? If so, their children should find it possible to make more rapid progress through school than those of operators having lower earnings owing to their inheritance of superior mental ability. Trade tests measure some of the same attributes measured by formal intelligence tests. In view of the impracticability of administering a formal intelligence test, what relation is there between a so-called trade test and an operator's labor earnings. Finally, what type of good farm practices are most often neglected and what are the most probable personal traits causing this negligence? These are some of the questions on which this study was designed to throw some light.

⁶ Hamer, O. S. *The Master Farmers of America and Their Education*. University of Iowa Studies. Vol. 6, No. 2. 1930.

⁷ Pond, G. A., and Ezekiel, M. *Factors Affecting the Physical and Economic Costs of Butterfat Production in Pine County*. Minn. Agr. Expt. Sta. Bull., 270. 1930.

The farms are essentially dairy farms, and altho some factors seem to be associated with earnings in certain ways on this group of farms, the results can not be applied too generally to other areas until they have been verified under different conditions and other types of farming.

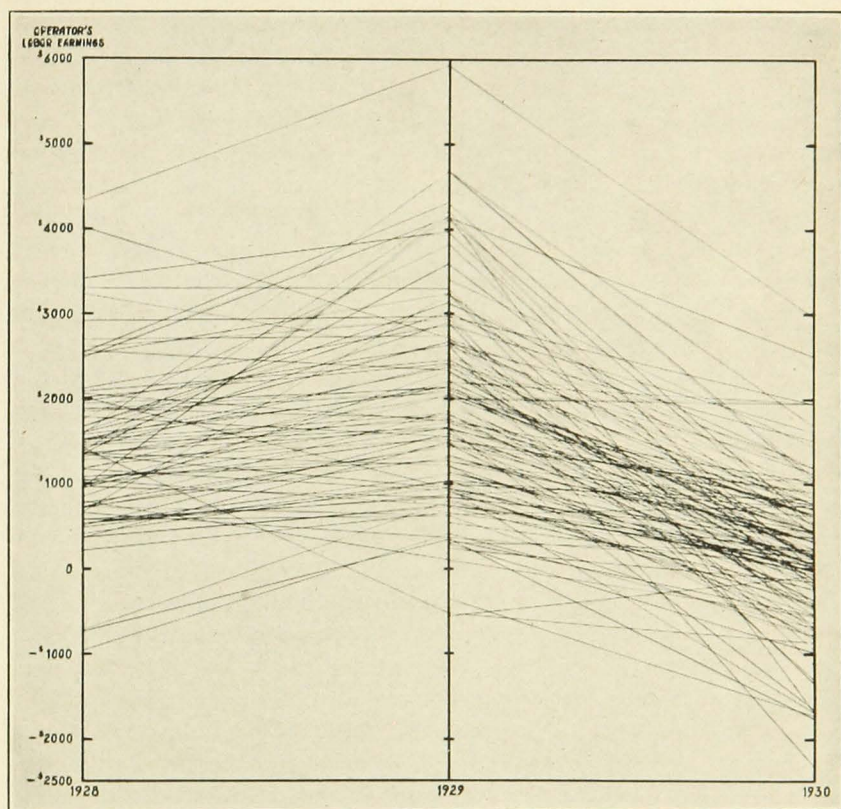


Fig. 2. Array of Operator's Labor Earnings, 1928, 1929, and 1930

The lines connect each man's relative standing for each year in which he is included in the study. This indicates that most of the men had higher earnings in 1929 than in 1928 and lower earnings in 1930 than in either 1929 or 1928. For this reason, an average of the three years' financial and production measures was used for the eighty-three men who had three-year records. An average of the two years 1929 and 1930 was used for the fifty-three men who began keeping records in 1929.

Financial and Achievement Measures

Various measures have been used by different research workers to represent the farmer's financial success or productive achievement. No one of these meets every requirement for which such a measure might be used. The more homogeneous the group, the less is the difference in the relative rating of farmers according to these various measures. After careful consideration and experimentation the authors decided

that "operator's labor earnings" was the best available single measure of the farmer's ability to organize and operate his farm economically. (See Fig. 2.) Several additional measures were computed, however, in order to throw more light on some of the relationships considered, and are presented in the Appendix.⁸

"Operator's labor earnings" are computed by adding the cash farm receipts, the increase in inventory, and the value of the farm produce used in the house and subtracting from this total the sum of the cash expenses, the inventory decreases, a charge for the board of hired labor, an estimate of the value of unpaid family labor, and a 5 per cent interest charge on the total farm investment exclusive of the residence. It represents what the farmer has left as a return for labor and management after all cash and non-cash expenses have been deducted from the gross income. Board of hired labor was charged at \$20 a month. The family labor, more or less of which is supplied by women and children, was reduced to a full man-equivalent basis and charged at a rate of \$60 per month. This rate includes an allowance of \$20 for board and \$40 for wages. The latter was the going rate of pay for hired help on the farms studied. In all cases operator's labor earnings were computed on a "full-owner" basis. Whether owned or rented, mortgaged or unencumbered, the entire value of the farm property used was included in the investment. Any rent or interest paid was omitted from the statement of expenses and all expenses incurred by the landlord, such as taxes, insurance, and building expense, were included. The gross income includes the landlord's share in case of share rented farms. This computation of earnings on an owner basis eliminates variations between farms and farmers due to differences in the systems of tenure, rental rates, proportion of equity, and amount of unpaid family labor, and puts all farmers on a directly comparable basis. Inventory valuations have been so thoroly checked by the supervisors of the accounting project that the authors feel the inventory values represent as accurate an appraisal of current market values as can be made. This careful checking has resulted in a high degree of accuracy in all items of expense and income.

THE FARMER'S REASONS FOR HIS SUCCESS

In response to an inquiry by mail, seventy-two of the co-operators returned usable schedules showing the ranking of factors they thought responsible for the degree of success they attained in farming. They ranked "Farm experience" first, "Co-operation of their wives" second, and "Ambition to succeed" third. These, with other factors, were ranked as listed in Table 1.

⁸ See Appendix A.

Table 1

Rank of Importance Given by 72 Farmers to Fifteen Factors with Respect to Influence on Their Success in Farming

Factor	Rank of importance				All age groups, average
	Men under 40 years of age		Men 40 years of age and over		
	Finished 8 grades or less in school	Finished more than 8 grades in school	Finished 8 grades or less in school	Finished more than 8 grades in school	
Number in group	7	28	23	14	72
Farm experience	3	1	1	1	1
Wife's co-operation	1	4	2	2	2
Ambition to succeed	2	3	4	4	3
Liking for farm work	5	2	6	3	4
Getting work done on time	4	7	3	7	5
Hard work	6	9	5	5	6
County agent's help	10	5	10	11	7
Farm papers	9	10	11	6	8
Production management	8	11	7	12	9
Father having been a good farmer	7	6	13	8	10
School training .....	..	8	12	9	11
Buying and selling ability	11	13	9	15	12
Outlook information	12	12	14	14	13
Ability to handle labor	13	14	15	10	14
Children's help .....	..	15	8	13	15

Perhaps the men were right in ranking farm experience as the most important factor in their success, yet with a few exceptions measurable variations in experience could not be related to variations in earnings. No differentiation was found between the ranking of the factors making for success on the more profitable farms and the ranking given by the operators on the less profitable farms.

There were only slight differences in the ranking given by the men when grouped by age and amount of school training. Those with better than 8th grade education gave liking for their work noticeably higher ranking than did the other men. They also attached more importance to school training than did the men who finished only the 8th grade or less.

FAMILY AND ENVIRONMENTAL INFLUENCES THAT DO NOT SEEM TO AFFECT FARM EARNINGS

The analysis of the data indicated that with the statistical methods employed it was impossible to associate the variations in earnings with variations in most of the family and environmental influences. Some of the factors commonly thought to be associated with differences in earnings, but which in this study were not found to be so associated will be discussed first and a discussion of the factors found to be associated with the current earnings of the farmers will follow.

Number of Farm Papers

The number of farm papers taken and the number read regularly were noted on the schedule of information obtained from the farmers. It was impossible to find any relation between the operator's labor earnings and the number of farm paper subscriptions. The effect of not taking any farm papers is unknown, as only two men in the group did not subscribe for at least one. One of the reasons for the lack of relationship was the fact that it was impossible to determine whether or not any more actual reading was done by the men taking the larger number of farm papers.

Previous Occupational Experience

There was little variation in the occupational experience of these men. With few exceptions, all were born on farms and had spent their childhood days there. Ninety-six per cent of their fathers had owned land. Thirty per cent of the men had had experience in one or more occupations other than farming.

Altho there was considerable difference in the occupations at which they had worked, it was impossible to group them on that basis. When separated into two groups on the basis of inheritance of property, they were found to behave quite differently. This is shown in Table 2.

Table 2
Operator's Labor Earnings and Size of Business as Related to Having Other than Farming Experience

Group	Men Number	Operator's labor earnings	Size of business P.M.W.U.*
No property inherited			
Experience other than farming	26	\$1,254	575
All others	51	1,192	633
Property inherited			
Experience other than farming	15	678	588
All others	44	1,028	619

* Productive man work units or days of productive work for any one farm are a measure of the size of that farm business, using the average number of ten-hour days of man labor required per head of productive livestock and per acre of crops as a common figure for combining the size of the crop and the size of the livestock enterprises.

The men who had experience other than farming and who had not inherited any property were getting current earnings approximately equal to the earnings of men who had not inherited property and had farmed all their lives. On the other hand, the men with other occupational experience who inherited property had distinctly lower earnings than the rest of the group. It seems reasonable to infer from these data that it makes very little difference whether or not the farmer has ever had any other occupational experience. The poor showing made by

those with experience other than farming, who inherited property, leads to the conclusion that these men preferred some other occupation but because of the inheritance of farm property they returned to farming when they probably would not have done so under other conditions.

Nationality Influences

People of American stock and of German descent were the most numerous, accounting for 53 per cent of the entire group. People of Norwegian, Danish, and Irish descent brought the total accounted for up to 89 per cent. The remaining 11 per cent was made up of people of Swedish, Czechoslovakian, Scotch, French, English, and Swiss descent. In this sample, its selection being due to the factors mentioned in earlier paragraphs, a careful analysis of the relation of the nationality to the relative ranking in income-earning ability revealed no tendency for the stock of one nationality either to excel or fall behind the others.

Community Affiliations

The relatively high general level of this group is brought out in a consideration of their community affiliations. Taking the group as a whole, each man belonged to an average of three organizations. Almost every one belonged to at least one organization and most of them were officers in one or more. The more successful farm operators seem to be assuming their share of community leadership, altho there is no marked difference in the business success of the men grouped on the basis of the number of different offices they have held in the last five years. As would be expected, the men holding the higher number of offices in community organizations were somewhat older than the average of the group.

Variations in School Training

Studies made in different states, New York⁹, ¹⁰ and Missouri¹¹ for instance, have been interpreted to show that higher education is associated with higher than average farm earnings. On the other hand, Hamer did not find significant differences in the net incomes of the Master Farmers when they were grouped on the basis of the amount of school training they had acquired.¹² No marked relationship is found in this study. (See Table 3.) Because of the bias introduced into the sample by studying only farm account keepers, no valid conclusions can

⁹ Warren, G. F., Livermore, K. C., and others. *An Agricultural Survey*. Cornell (N.Y.) Agr. Expt. Sta. Bull. 295. 1911.

¹⁰ Warren, S. M.. *The Relation Between Education and Profits in Northern Livingston County*, New York. *Farm Economics*, No. 65.

¹¹ Johnson, O. R. and Foard, W. E. *Land Tenure*. Mo. Agr. Expt. Sta. Bull. 121. 1914.

¹² Hamer, O. S. *The Master Farmers of America*. Univ. of Iowa Studies, Vol 6. No. 2. 1930.

be drawn with reference to the value of formal education to farmers as a whole. The question may well be raised, however, as to whether or not a portion of the higher earnings attributed to the school training in other studies is not due to the greater inherent ability of those who had the higher school training. It is evident that other factors are more important than school training in determining variations in earnings in this group of farmers.

Table 3
Operator's Earnings, Size of Business, and Agricultural Test Score as Related to School Training

Group	Men	Operator's labor earnings	Size of business	Test score
8th grade or less	77	\$1,031	603	74
High school	40*	1,210	631	80
Technical agricultural training	19†	1,176	613	83

* Four of these men attended college one or more years. One of them had a Bachelor of Science degree.

† No co-operators were agricultural college graduates. This group is made up of those attending the School of Agriculture or a 3-months short course one or more winters.

Children's Help

The farmers seemed to be justified in the low rating they gave children's help as a factor in their success. The men who had only the help of their wives had higher operator's earnings than any group in which children's help was used (see Table 4). The men who had the most help from their children, a total of 11 months of family labor, had somewhat higher family labor earnings.

Table 4
Relation of Operator's Labor Earnings, Family Labor Earnings, Size of Business, and Age of Operator to Available Family Labor

Group	Farms*	Operator's labor earnings	Family labor earnings†	Size of business	Age of operator	Labor‡	
						Hired	Family
	Number			P.M.W.U.	Years	Months	Months
Wife only	40	\$1,283	\$1,398	568	36	7	2
Wife and relatives other than children	22	1,040	1,533	672	33	5	8
Wife and one or two chil- dren over 10 years ...	40	1,069	1,526	599	49	6	7
Wife and three or more chil- dren over 10 years	26	1,050	1,699	653	48	3	11

* Eight farms were omitted because of irregular labor arrangements.

† Family labor earnings differ from the operator's in that the estimated value of unpaid family labor is not included in the expense items deducted from the gross income.

‡ Operator's labor not included.

In arriving at the months of labor performed by the farm family, each member's labor was put on a hired-help equivalent basis, that is, the estimated amount of time it would take a hired man to do the same

work. This was then valued at hired man's wages. On this basis the operator's labor earnings are slightly less when children's help is available. Probably some of the advantages of having growing children to help with the farm work are offset by the greater amount of time spent by the parents in the children's interest. The children go to school more days of the year now than formerly, quit school at a later age, and have more outside interests than was the case a generation ago. These circumstances all contribute to making the child of less help to its parents during its early years.

Hired and Family Help Compared

The relative advantages of hired and family help is a common subject of discussion among farmers. From 1918 to 1931 it was difficult to obtain efficient hired help at wages that farmers could afford to pay. By dividing the farms which had businesses of 500 or more productive man-work units into two groups on the basis of size, and then dividing each group into three groups on the basis of the amount of labor hired, some interesting facts are brought out. These are shown in Table 5.

Table 5
Relation of Operator's Labor Earnings, Size of Business, and Accomplishment per Worker to Amount of Labor Hired

Group	Farms	Operator's labor earnings	Hired labor	Family labor*	Size of business	Accomplishment per worker
	Number		Months	Months	P.M.W.U.	P.M.W.U.
Size of business—501 to 750 work units						
Over 12 months hired labor	10	\$1,210	14	2	652	279
6 to 11 months	23	1,041	9	3	614	299
Less than 6 months	31	918	2	10	571	298
Size of business over 750 work units						
Over 12 months hired labor	16	1,732	16	3	1,004	383
6 to 11 months	4	1,684	10	3	922	368
Less than 6 months	10	1,448	3	15	907	372

* Operator's labor not included.

In the most common size group, 501 to 750 productive man work units, the men with the most hired labor were making the highest operator's labor earnings. They also used the least family labor. The sixteen men with large businesses and over 12 months of hired labor had higher operator's earnings than the ten men with less than 6 months of hired labor and over 750 productive man work units. In both size groups the amount of family labor used decreased as the amount of hired labor increased.

There was no consistent difference in the number of work units handled per worker, as related to the proportion of family and hired labor used. If all sizes are grouped together, a significant difference is

found. This is due, however, to the larger businesses of those hiring the most help.

Other things being equal, more work units are handled per man on the larger farms. These data indicate that the men who had to hire help to do most of the work they could not do themselves were not in any way handicapped in these three years. This would not necessarily be true in years of extremely low prices for farm products, as 1931 and 1932. These men did not hire much more than the equivalent of one man for the full year. There is no basis for believing that the same relationships would hold if several men were hired. Aside from the cash cost of hired help and its contribution to the farm income, both of which have been considered here, the farmer considers other factors before hiring a man, such as boarding and rooming the single man. Looking at it from the financial side only, however, these men who hired some labor and operated a larger business with this extra help, had a return left for themselves.

Effect of Grown Sons at Home

The men 45 years of age and over were grouped into those who had one or more grown sons working at home full time and those who had none. (See Table 6.) One significant thing brought out by this grouping was that the men who had the help of grown sons were, as a group, not so strong physically as the other men. Some of the men with grown sons at home made excellent earnings; others made very low earnings. This was true also of those not having grown sons at home. The coefficient of association is $-.286$, showing very little association.¹³ No doubt the father had turned over part of the responsibility and management of the place to the son, who was not so capable as his father. The division of responsibility may result in less carefully guided effort on the farm or the operator may not be so capable because of declining health.

Table 6
Operator's Labor Earnings, Size of Business, Age, and Physical Ability as Related to Having Grown Sons at Home
(Operators over 44 years of age)

Group	Farms	Operator's labor earnings	Size of business per worker	Age	Physical ability*
	Number	\$	P.M.W.U.	Years	Score
Grown sons at home	29	842	268	56	85
No grown sons at home	25	1,084	304	50	102

* Each man was given a rating on his physical ability by the field agent and the senior author.

¹³ In a rough way the coefficient of association corresponds to the simple or gross correlation coefficient. For a discussion of its validity and the method of computation, see the discussion by Dorothea Kittredge in "Research Method and Procedure in Agricultural Economics," Vol. 2, p. 197-211.

Farming the Same Farms Their Fathers Did

The men under 41 years of age who were farming the same farms their fathers had farmed were also compared with those who were operating other farms. (See Table 7.) The former group had somewhat larger farms, thus having larger investments than the others. They also had slightly lower operator's labor earnings. The men are approximately equally distributed in the income earning range, indicating that the chances of getting high returns are about the same whether or not they are farming the same place that their fathers had farmed.

Table 7
Operator's Labor Earnings, Proportion Who Inherited Property, and Years of Farm Experience, as Related to the Farm Operated (Operators under 41 years of age)

Group	Men	Operator's	Inherited	Farm
		labor earnings	property	experience*
	Number	Per cent		Years
On farms fathers farmed	45	\$1,106	36	9
On other farms	20	1,386	40	9

* Years operating a farm.

VARIATIONS IN FAMILY AND ENVIRONMENTAL INFLUENCES THAT SEEM TO AFFECT FARM EARNINGS

As contrasted to the foregoing seemingly unimportant differences observed in the family and environmental influences, some seemed to be directly related to variations in earnings.

Wife's Co-operation

The field man and others acquainted with the families agreed on the 12½ per cent, or 17 wives co-operating most and the 17 wives co-operating least with their husbands in operating the farms. In selecting these 34 families they had in mind all those ways in which the wife of a farmer may or may not be of help, some of which are: helping make the farm plans, taking an active interest in and understanding the many farm problems, assisting in making adjustments of the farm budget, and helping occasionally with chore work.

A comparison of the earnings of these two groups of families indicates that the farmers were entirely right in giving so much credit for their success in farming to the co-operation of their wives. (See Table 8.) More than half of the farmers with whom a high degree of co-operation existed had operator's labor earnings of over \$1,500 as compared with one-ninth of those making such earnings with whom the least co-operation was in evidence. Again, only one farmer had operator's labor earnings of less than \$500 with whom the wife co-operated best as compared with six, or one-third, of those whose wives

co-operated least. The coefficient of association was $+ .70$, indicating a fairly high degree of relationship between the ratings of best and poorest co-operators and operator's labor earnings.

Table 8
Operator's Labor Earnings and Size of Business of the Seventeen Men
Having the Best, and the Seventeen Men Having the Least
Co-operation from Their Wives*

Group	Men	Operator's labor earnings	Size of business
	Number		
Men with most co-operation	17	\$1,757	P. M. W. U. 622
Men with least co-operation	17	842	687

* For discussion of the basis of selection see text, page 15.

Inheritance of Property

The farmers who inherited half or more of their present property had very low labor earnings as compared with the rest of the men. Those who inherited some property, but less than half their present holdings, made slightly lower earnings than those who had accumulated all their present property. (See Table 9.) But the difference between the earnings of the group that inherited a small amount of property and the one that did not inherit any was so small that it is insignificant. This agrees with Hamer's findings in his study of Master Farmers.¹⁴ He found that more than half of them had inherited very little, if any, property and that these had, on the average, the highest incomes.

There is some indication that the men who inherited the most of their farms do not have as good farms as the others. Value of land in dollars per acre is one of the most common criteria of quality. A comparison of the value per acre of the land in the three groups brings out the fact that the men who did not inherit any property had the most valuable land. There was little difference between the other two groups. Since the relative current value of the land is influenced by such things as quality of highway passing it, distance to town, and present state of fertility, as well as its natural inherent productive capacity, an effort was made to obtain such a measure independent of the money value placed on the land. The means of obtaining this measure is explained in the footnote to Table 9. Using this measure, the first two groups of farms seemed to be of about the same quality but the last group was somewhat inferior. Neither measure, however, shows enough difference in quality of farms to explain the variation of over 100 per cent in operator's labor earnings between the men who inherited most of their property and the rest of the group.

¹⁴ Hamer, O. S. *The Master Farmers of America and Their Education*. University of Iowa Studies, Vol. 6, No. 2, p. 36. 1930.

Table 9

Operator's Labor Earnings, Quality of Farm, Value of Land and Buildings per Acre, Size of Business, and Test Score as Related to Inheritance of Property

Group	Cases	Operator's labor earnings	Quality of farm*	Value per acre		Size of business	Test score
				Bare land	Build- ings		
No property inherited	77	\$1,213	9.5	\$84	\$23	P.M.W.U. 614	80
Less than half of property inherited	38	1,176	10.0	75	21	616	74
Half or more of property in- herited	21	558	7.1	73	22	602	74

* The county agents, the field man, and the senior author who interviewed the men grouped the farms into four classes. A, B, C, and D, on the basis of their natural productive capacity. For tabulation purposes the three individual ratings were averaged and all A farms given a value of 15, B a value of 10, C a value of 5, and D a value of 0. The figure 9.5 as in the first group then means 0.5 of one point less than an average of B grade farms in the group.

In other groupings made, it was found that those who inherited some property did not respond in the same way to the factor on which the sort was made as did the men who did not inherit any property. This leads to the belief that some factors are more closely associated with the earnings of men who inherit some of their property, than with the earnings of those who do not.

Importance of Non-economic Influences

Statistical studies have consistently shown that the size of business operated is one of the important factors governing the net returns the operator can expect. H. C. Taylor's theory that "the better men tend to get on the better land,"¹⁵ is commonly accepted. It is interesting to note in this connection that approximately 62 per cent of the group had some family connection that made it expedient for them to buy or rent their particular farm rather than another they might choose, or might have chosen when they began farming. Most of the men have been farming long enough that they should have had some opportunity to change the size and quality of the original farm; however, adding more land to an original farm is a relatively difficult thing to do advantageously. Especially is this true when buildings have been erected and the surrounding land has been improved. The high percentage of men who select their farms in view of family or other non-economic considerations and the relative inelasticity or lack of mobility in land ownership indicates the great extent to which economic tendencies are modified by non-economic motives.

¹⁵ Taylor H. C. *Agricultural Economics*. The Macmillan Co., New York. 1919.

A tabulation of the mens' farm experience shows that approximately 76 per cent of the men on farms of 120 acres or less had had experience operating larger farms. Seventy per cent of the men on small farms had no desire to operate larger farms. The rest were kept from attaining their desire by lack of capital and inability to buy adjoining land. Eighteen per cent of the men thought they had the optimum size of business, considering their managerial ability. This leaves 52 per cent of the men on the small farms who definitely prefer the mode of life and the restrictions of income on the small farms to the more strenuous, less private life, which must be lived by the operator of the larger farms.

These are only two concrete examples of how non-economic motives influence a farmer's financial earnings. In no other industry is the home so much a part of the business as in farming, and probably no other industry is as much influenced by non-economic motives as is agriculture.

PERSONAL DIFFERENCES THAT SEEM TO AFFECT FARM EARNINGS

Operator's Age and Labor Earnings

There was a distinct relation between the age of the farmer and his earnings. (See Table 10.) From 35 to 45 years of age is apparently the prime of life from the standpoint of the farmer's earning ability, altho there was not much variation between any of the groups in the 30- to 55-year range. The age at which the farmers seem to be getting the highest labor earnings compares very closely with the average age at which all men reach their greatest earning power, according to Dublin and Lotka.¹⁶

Table 10
Operator's Labor Earnings and Size of Business as Related to Age of the Farm Operator

Age	Men	Operator's labor earnings	Size of business
Years	Number		P.M.W.U.
Under 30	10	\$ 427	608
30 to 34	31	1,209	585
35 to 39	19	1,469	647
40 to 44	24	1,265	573
45 to 49	17	1,040	583
50 to 54	16	1,242*	674
55 to 59	9	837	579
60 and over	10	468	716

* The operator's labor earnings of one man in this group was \$4,421. The average of the other fifteen is \$1,030.

¹⁶ Dublin L. I., and Lotka, A. J. *The Money Value of a Man*. The Ronald Press Co., New York. 1930.

Probably the lack of capital and the lack of experience on the part of the men under 30 years of age combined to account in a large measure for their lower earnings. There seemed to be little difference in the effect of age on earnings between the men who inherited some property and those who did not.

Inherent Differences

Thus far, the study quite largely has been concerned with variations in family connections and physical influences. The next step is a consideration of variations in the operators themselves. These are much harder to disentangle and consider separately. It is common knowledge that there are great variations in the results different men obtain even tho they start with equal opportunities, but it is hard to analyze and describe the variations within the men themselves that cause these variations in tangible results.

One of the first series of differences it seemed well to analyze was the inherited variation in capacity along several lines, such as judgment, ambition, and emotional drive. Standardized psychological tests were considered as a measuring device only to find several serious objections to their use. Most psychological investigations have been conducted with students and the investigators had complete control and unquestionable authority to compel the student to take the test. The farmers from whom these data were gathered were busy men living too far apart to attend a central meeting. This made it impracticable to apply either group or individual psychological tests in detail.

An even more important reason is that these tests, with the exception of the Army Alpha, have not been generally standardized for adults, and there is no uniform agreement as to what the results of a so-called intelligence test would mean as a measure of inherent differences. The trend of psychological thought has been away from the consideration of an intelligence test score as a direct measure of inherent ability or capacity. The present status of opinion relative to the proportions of credit that should be given to nature and environment can very well be summed up by H. S. Jennings' statement that, "Characteristics do not fall into two mutually exclusive classes, one hereditary, the other environmental."¹⁷ The general tenor of his conclusions seems to be that the individual at any given time is the product of both environment and inheritance, so much interwoven that for most purposes it is impossible to differentiate them.

It is obvious, in view of these considerations, that any and all attempts to measure inherent differences can measure only certain indi-

¹⁷ Jennings, H. S. *The Biological Basis of Human Nature*. W. W. Norton & Co., Inc., New York. 1930.

cations of, or phenomena associated with, inherited variations and can not measure the inherited factors themselves.

According to the laws of inheritance, superior parents tend to produce superior children. This does not always mean that the children will duplicate their parents' ability. It does mean, however, that parents superior in intellectual and physical capacity will have a much larger proportion of children who are superior in these respects. The possibilities of measuring the differences in the children as an indication of the differences in the parents immediately presents itself.¹⁸ The measure that seemed most feasible and practicable for this study was an index of the rate of the children's progress through school. The validity of such a measure is based on the assumption that, in general, the relation of the child's age to the grade reached in school is a result of the child's ability. No doubt, many other factors might affect a child's age-grade relationship in school. Some of these are: the age at which the child started to school, its health, and the ability of the teacher. In spite of these difficulties it seemed worth while to construct such an index of the children's progress through school for each family. This was done by relating the children's age at the time of finishing their highest grade to the median age for all children in that grade in a city where such figures were available.¹⁹ The children's rate of progress was then expressed as a ratio or index, 100 being equal to the median of the city children. Incidentally, the progress index of these farm children averaged over 100, indicating that they made slightly more rapid progress in school than did the city children.

Table 11
Operator's Labor Earnings, Size of Business, and Agricultural Test Score
as Related to the Children's Progress Through School

Group	Families Number	Operator's labor earnings	Size of business		Test score
			P.M.W.U.		
Progress ratio*					
Less than 95	8	\$ 553	543		73
95 to 104.9	52	1,182	644		75
105 and over	29	1,434	659		80

* For method of calculation see text above.

Relating these indices of the children's progress through school to the earnings of their parents, a positive relationship is found. (See Table 11.) The parents of the children who were making the most rapid progress in school were making significantly higher earnings than

¹⁸ Dr. Florence L. Goodenough of the Child Welfare Institute, Univ. of Minn., made many valuable suggestions in directing this section of the study.

¹⁹ Terman, L. M., and others. *Genetic Studies of Genius*. Vol. 1. Stanford Univ. Press, Calif. 1926.

those of the more backward children. This suggests the existence of a causal factor as a partial explanation common to both the parents' relative financial returns and the children's progress in school. It indicates the presence of differences in innate qualities associated directly with differences in success in farming.

Agricultural Knowledge

The other method of approximating a measure of inherited differences involved measuring differences in agricultural information. This was done by having each farmer answer 50 agricultural questions and scoring his answers. Several underlying relationships should be considered in interpreting the results of such a test. One's knowledge regarding a given subject at a given time is largely the result of three sets of phenomena: the ability to acquire and retain knowledge, which the person inherits; the experiences the individual has gone through, that is, his environment, training, and other related factors; and his motivation to acquire knowledge in that particular subject, which may be influenced by many things such as general health, environmental and fortuitous circumstances, and inherited tendencies.

Dr. Jennings points out that the more homogeneous the group in respect to environmental, training, and motivating factors, the higher is the probability that the individual differences are largely due to inherited differences.²⁰ This seems reasonable and the logical deduction seems to be that to the extent that the other two factors mentioned above are constant for the group, variations in agricultural knowledge are an indication of variations in inherited capacity. The factors making for homogeneity of these influences may be summarized briefly. With few exceptions all the farm operators were born on a farm and have spent most of their lives there. Only a small percentage of them have attended any agricultural or other special training institution. The test that was given the men was constructed with the help of agricultural extension specialists and covered only a few of the most important facts the farmers should know about their business. The operators themselves are mature men, so they have had opportunity to acquire this technical agricultural information from farm papers, extension meetings, and state and Federal agricultural bulletins.

In the light of these considerations, the results of the agricultural information test may be considered. The scores ranged from 43 to 95, showing a great variation in the ability to answer the questions correctly. A reasonable interpretation of these scores is that they tend to measure differences in the agricultural knowledge of the operators, of which

²⁰ Jennings, H. S. *The Biological Basis of Human Nature*. W. W. Norton & Co., Inc. New York. 1930.

the test questions are a sample, and they also indicate, to a certain extent, variations in the mental ability of the individuals, which is at least partially a result of inherited differences.

An analysis of the relationship of these scores to the operator's earnings, as shown in Table 12, indicates in general that better than average test scores and better than average earnings are associated. For purposes of comparison the men were grouped on the basis of whether or not they inherited part of their property and the relation of the test score to earnings in the two groups determined. It seems that factors other than those measured by the test were more important if property had been inherited. Altho the groups were too small to be more than suggestive, this was no doubt due to the fact that the relative earnings of the individuals who did not inherit much property were largely the result of the operator's own efforts, which is not so likely to be the case if they inherited a large part of their property.

The positive correlation of the results of this test with operator's labor earnings, which increases markedly as other influencing factors are eliminated, indicates the relationship between variations in factors measured by the test and variations in earnings. The practical conclusions to be drawn hinge on the question of what influences the score made on the test. Undoubtedly, one of these influences is inheritance, so we can say that these farmers probably differ to a considerable extent in inherited qualities. This partially accounts for the variations in earnings. Another is their habits of life and thought, due to a considerable extent to training received from their parents and their school, and to their environment. Unless it is assumed that these training and environmental factors have been ideal, thereby causing the individual to acquire agricultural information to the limit of his inherited capacity, it can be assumed that the individual has not reached his highest possible level of agricultural knowledge. The same would hold true of any other attributes associated with knowledge of these test questions thus influencing earning ability.

Table 12
Operator's Labor Earnings, Size of Business, Grade Finished in School,
and Age of Operator as Related to the Score Made on the
Agricultural Trade Test

Score of group	Operator's				
	Men	labor earnings	Size of business	Grade finished in school	Age
	Number		P. M. W. U.		Years
Under 65	23	\$ 696	592	8	49
65-74	25	942	603	9	44
75-84	46	1,110	573	8	41
85 and over	42	1,408	674	10	39

Mental Alertness

The field man on the accounting route and the senior author, who interviewed the men, gave them relative scores on some personal characteristics, one of which was their "mental alertness." The senior author was not familiar with the financial records of the men, and the field man was instructed to disregard any financial records he remembered. The term "mental alertness" was interpreted to mean much the same as the term "general intelligence," that is, "possession of knowledge," a "quick understanding," and a "resourceful mind." There was a significant positive relationship between the scores given the men and their operators' labor earnings. (See Table 13.) The coefficient of correlation between the "mental alertness" scores and operator's labor earnings was $+0.517 \pm 0.063$ which indicates in another way the positive relationship.

Table 13

Mental Alertness Scores as Related to Operator's Labor Earnings and Quality of Farm Operated

Range in score *	Men	Operator's labor earnings	Quality of farm
	Number		Score
Under 90	21	\$ 563	8.1
90-119	39	706	8.3
120-149	47	1,202	9.8
150-179	29	1,893	10.7

* For discussion of method of scoring see text above.

Altho better than average scores on quality of farm were associated with the higher scores on mental alertness, the greatest average difference between any two groups was equal to only a little over half the difference between B and C quality farms. This seems to be of too little importance to explain any considerable portion of the observed association between mental alertness scores and operator's earnings.

Ambition

The men were also scored by the same persons on their ambition or the apparent strength of their desire to make economic progress. Here, again, wide differences were found between the men, and their relative scores showed a positive relation to their operator's labor earnings. (See Table 14.) The coefficient of correlation in this case was $+0.564 \pm 0.058$. Altho the correlation coefficients were not very high, the wide range between the earnings of the lowest-scoring and the highest-scoring groups in both mental alertness and ambition shows that the average earnings of those with low ratings are much lower than those with high ratings. So many factors influence the labor earnings of the

operator that a coefficient of correlation between any one factor and earnings, is almost certain to be low.

Table 14
Ambition Scores as Related to Operator's Labor Earnings and Quality of Farm Operated

Range in score	Men	Operator's labor earnings	Quality of farm
	Number		Score
Under 99	16	\$ 363	7.5
100-119	51	795	8.7
120-139	47	1,394	10.5
140-159	16	1,669	9.0
160-179	6	1,865	10.0

Interest

It has been generally recognized that a liking for the work is one of the first criteria of the vocation to be chosen. This is partly because of the greater happiness to be derived from liking the work and partly because one is likely to be more successful in doing work of his liking. It seemed reasonable to suppose that some of the variations in earnings were caused by variations in the liking for, or interest in, farming as an occupation and for the various enterprises that make up the farm business.

Table 15
Dairy, Hog, and Poultry Returns Associated with Personal Attitude Expressed Toward the Enterprise by the Operator

Item	Farms	Cows	Hogs		Returns over feed costs		
			produced	Hens	Per cow	Per 100 lbs. hogs	Per 100 hens
	Number	Number	Pounds	Number			
		Dairy Enterprise					
Dislike expressed	12	8	....	...	\$48	...	...
All others	124	16	....	...	64	...	...
		Hog Enterprise					
Dislike expressed *	14	....	9,373	...	..	\$0.68	...
All others	122	....	14,831	...	..	1.89	...
		Poultry Enterprise					
Dislike expressed †	48	....	....	117	..	...	\$121
All others	88	....	....	158	..	...	194

* No hogs produced on one farm.

† No poultry kept on one farm.

Differences in the interest, or the liking for the various farm enterprises, were determined by asking each operator as to his like or dislike for several of the major enterprises on his farm. The returns over feed cost, if a livestock enterprise was disliked, were then compared with the returns for the rest of the group, as shown in Table 15. It was

evident that there was a very clear relation between the attitude toward the enterprise and the returns obtained from it. Returns over feed cost per 100 pounds of hogs produced seemed to be the most closely associated with variations in interest. Differences of from 25 to 50 per cent were also found between the returns for those liking poultry and dairy cows, and those disliking them. As would be expected if the enterprise was disliked, it was smaller than on the other farms.

The statements of those interviewed as to the reasons why they engaged in farming were classified into three groups, representing degrees of liking for their work. (See Table 16.) Here, again, a significant relation was apparent. There was a significant difference between the average earnings of those who began farming because of "personal preference" and "only training." Those who began farming because of inheriting some property had the lowest earnings. Probably they would have preferred to do something else, but owing to the inheritance of some farm property took up farming. Evidently they have not found a good substitute for a keen interest in and enjoyment of the business of farming.

Table 16

Operator's Labor Earnings as Related to Reason for Starting Farming

Reason	Men	Operator's labor earnings
	Number *	
Personal preference	43	\$1,332
Only training	62	1,074
Inherited farm property	28	795

* Three men were omitted who gave poor health as the reason for farming.

These men were also given relative scores on their apparent liking for their work and their eagerness for agricultural information. Combining these two ratings into a single score a definite relationship with earnings is apparent from Table 17. Variations in this score are not so closely associated with financial returns as the variations in "ambition" and "mental alertness" scores, however, for the coefficient of correlation was only $+ .293 \pm .012$.

Table 17

Interest in Farming Scores as Related to Operator's Labor Earnings and Quality of Farm Operated

Range in score	Men	Operator's labor earnings	Quality of farm
	Number		Score
Under 100	15	\$ 687	8.3
100-119	75	1,014	9.1
120-139	30	1,283	10.3
140-160	16	1,558	9.4

MEANS BY WHICH THESE VARIATIONS IN PERSONAL AND FAMILY INFLUENCES AFFECT FINANCIAL RETURNS

Farm Organization

As brought out in the introduction and in Figure 1, these differences associated with earnings must operate through their influence on the management and planning of the farm business. The one exception is the physical labor contributed by members of the family. In most agricultural communities the natural and economic forces are such that they permit a rather wide range of variation in the organization of the farms and the amount of emphasis given the different enterprises. Where such conditions do exist, as they seemingly did in the area of this study, each farm operator apparently finds it advantageous to put maximum emphasis on the enterprise he likes best. (See Table 18.)

The group of farms of from 140 to 179 acres had a wide range in organization and within these limits there seemed to be little relation between the specific organization and the farmer's ranking on operator's labor earnings. This does not mean that all these men had the best organization. No doubt many of them could have improved their organization to advantage, and only by using superior practices were they able to have earnings equal to those with better organizations. It does indicate, however, that within these limits other factors must be more important than organization.

Table 18

**Range in Numbers of Livestock and Acres of Crops Associated with
Various Income Earning Groups on Farms of 140 to 179 Acres in Size**

Item	Operator's labor earnings									
	Lowest 20 per cent (10 farms)		Second 20 per cent (11 farms)		Third 20 per cent (11 farms)		Fourth 20 per cent (11 farms)		Highest 20 per cent (10 farms)	
	Low- est	High- est	Low- est	High- est	Low- est	High- est	Low- est	High- est	Low- est	High- est
Operator's labor earnings	\$103	\$949	\$970	\$1,491	\$1,511	\$2,120	\$2,141	\$2,698	\$2,704	\$4,699
Cows kept	8	18	8	21	4	19	7	23	10	20
Y o u n g cattle kept, animal units	7	14	1	20	3	27	8	27	10	21
Hogs produced, 100 pounds	1	175	62	159	49	205	91	223	42	395
Hens kept	35	264	36	247	106	309	85	270	0	267
Horses	4	8	4	7	3	7	4	8	4	8
Corn, acres	9	33	12	46	12	40	15	36	11	44
Oats, acres	0	37	0	23	0	25	0	66	0	34
Alfalfa, acres	3	17	0	22	0	19	4	18	0	25
Timothy and clover, acres	0	22	0	20	0	28	0	18	0	30

Practices Followed

Crop production and livestock returns vary widely on these farms. The causes for the wide variations are no doubt many and diverse. Among them, variations in the practices followed in caring for each enterprise seems to be one of the most important. Accordingly, a list of practices recommended for best results with each enterprise was taken to each man and the number of such practices he was following was noted. The tabulation of results indicates that there is a wide variation in the number of practices followed and that following a high percentage of them is associated directly with high returns from that enterprise; conversely, the following of a low percentage of them is associated with low returns. (See Table 19.) It seems that if farmers knew that such a relationship existed between these practices and the returns realized, they would be following them whenever practicable.

Table 19

Dairy, Hog, and Poultry Returns Associated with the Number of Selected Farm Practices Followed,* 1929

Practices followed	Farms † No.	Returns above feed cost		
		Per cow	Per 100 lbs. hogs produced	Per 100 hens
Dairy enterprise (12 practices)				
6 or less	27	\$67	...	...
7-9	50	72	...	...
10-12	59	87	...	...
Hog enterprise (10 practices)				
4 or less	54	..	\$2.20	...
5-7	57	..	2.54	...
8-10	17	..	3.92	...
Poultry enterprise (10 practices)				
4 or less	28	..	...	\$114
5-7	65	..	...	186
8-10	53	..	...	252

* Practices and basis of selection are discussed in the text above.

† In addition to the 136 farms used in the previous analysis, 19 farms on which records were available for only 1929 are included. Any farms on which the enterprises were not comparable were omitted.

If the farmer did not follow a practice, his reason for not following it was noted. (See Table 20.) These reasons were classified into five groups. The first group included reasons that indicated that the operator knew of the value of the practice but did not care to follow it. This group was called "operator's choice." If the operator said that he had intended to follow a certain practice, such as confining his pullets early in the fall, but did not find time, or for some other reason neglected to do it, his reason was classified under the heading "did not get to it." Some men indicated definitely that lack of capital was the important factor. Others said they were kept from following the practice by

circumstances over which they had incomplete control. A few were not sufficiently informed to be convinced of the value of the practice, and their reasons were classified under the heading "lack of information."

Table 20
Relative Importance of the Reasons Assigned for Not Following
Selected Farm Practices

Assigned reason	More than average returns over feed cost	Less than average returns over feed cost	All farms
	per cent	per cent	per cent
Dairy practices (12)			
Per cent of practices not followed	19	30	24
Operator's choice	63	68	66
Did not get to it	7	4	6
Lack of capital	3	5	4
Uncontrollable circumstances	26	19	22
Lack of information	1	4	2
Total	100	100	100
Hog practices (10)			
Per cent of practices not followed	39	48	43
Operator's choice	78	76	77
Did not get to it	12	12	12
Lack of capital	0	1	1
Uncontrollable circumstances	2	1	1
Lack of information	8	10	9
Total	100	100	100
Poultry practices (10)			
Per cent of practices not followed	19	34	26
Operator's choice	75	79	77
Did not get to it	17	15	16
Lack of capital	1	2	2
Uncontrollable circumstances	4	2	2
Lack of information	3	2	3
Total	100	100	100

By far the majority of the reasons fell under one of two headings "Operator's choice" or "Did not get to it." In the case of the poultry enterprise, these two classifications accounted for about 93 per cent of the reasons given when the farmers were not following the practice listed. The percentage was almost as high in the case of the hog enterprise practices, 79, but dropped to 72 for the dairy management practices. It has already been shown that the following of these practices is definitely related to the returns from the enterprise. It is now found that the two chief reasons why they are not followed are that the operators choose not to follow them, or they do not get around to it. It seems that the men who decided not to follow them must have used poor judgment and those that "just did not get to it" were lacking in ambition or energy to carry out that which they knew it would pay them to do. Expressing it in another way, differences between the operators in ability

to make wise decisions, and in ambition or will power apparently are associated with differences in net returns. Efficiency of livestock production is one of the most important factors influencing the operator's labor earnings in this section. In general, the men who follow a high proportion of the recommended practices in one enterprise tend to follow a high proportion of those recommended in all the enterprises, and vice versa. Apparently, variations in judgment and will power are associated directly with variations in labor earnings.

COMPARISON OF GROUPS OF MEN HAVING DIFFERENT LEVELS OF OPERATOR'S LABOR EARNINGS

From the 136 men studied in the foregoing analysis, the 12 having the highest earnings, the 12 having the lowest, and the 12 having earnings half way between these two groups were singled out for more detailed study and comparison. After a careful analysis of the data just presented, these selected men were interviewed again at some length regarding their farm practices, the source of their information on such practices, and their early training, and asked for a fuller explanation of any other factors thought to affect their present financial returns whether or not covered in previous schedules.

The senior author, who interviewed these 36 men, had visited them twice before in obtaining the personal information so was fairly well acquainted with each family and able to get a great deal of detailed information. This series of interviews, together with information gathered from the field man in charge of the accounting route and from the county agents, made possible complete and well checked information relative to each farm and farm family.

Comparison of Organization and Efficiency

Four of the farms in the high-earning group, five in the medium-earning group, and three in the low-earning group were under 160 acres in size. Two of the farms in the high-earning group, none in the medium-earning group, and four in the low-earning group were over 200 acres in size. The smallest farm included had 98 acres and the largest 338 acres. Both fell in the low-earning group. This indicates that differences in the size of farms measured on an acre basis have not been primarily responsible for the variations in earnings of the operators. All these farmers followed the general type of farming common to that area. There was, however, a marked difference in the amount of livestock kept on the farms in the high-earning group when compared with the farms in the other two groups, as shown in Table 21.

The larger amount of livestock kept on the farms in the high-earning group seems to be the result of three factors:

1. A somewhat larger acreage of tillable land.
2. Fourteen to 25 per cent larger yields from an equal amount of land in crops, making more feed available for livestock:
3. Twenty to 80 per cent more livestock produced per unit of feed, making possible the production of more livestock and livestock products with a given amount of available feed.

Table 21

Comparison of Certain Farm Organization and Efficiency Factors on Three Selected Groups of Twelve Farms Each*

Factor	Group		
	I	II	III
Operator's labor earnings	\$2,252	\$1,278	\$ 204
Total farm earnings †	\$4,080	\$2,591	\$1,707
Net cash available †	\$2,402	\$1,434	\$ 886
Index of accomplishment †	116	102	85
Productive man work units	777	516	528
Total acres	177	148	180
Tillable acres	145	107	132
Quality of farm, score.....	12.1	8.3	8.8
Hogs produced, pounds	22,428	12,634	6,815
Cows kept	19.9	12.8	13.4
Hens kept	178	148	105
Returns above feed cost per unit of all livestock	\$ 80	\$ 66	\$ 44
Crop yields, index.....	114	100	91
P.M.W.U. per worker	376	290	275
Power, machinery, and building expense per P.M.W.U.	\$ 1.58	\$ 1.39	\$ 1.61

* For the basis of selection of the groups see text, page 29.

† For an explanation of these measures see Appendix A.

An analysis of comparative expenditure on these three groups of farms indicates that altho there are differences on individual farms which affect the operator's earnings, taken as a group, variations in expenditures are relatively unimportant as compared with the variations in income. Power, machinery, and building costs per productive man-work unit are slightly higher on the group of farms having the high earnings. This indicates that it costs a little more to get these 14 to 25 per cent higher yields. However, since labor, which is always a large cost on dairy farms, definitely was saved on these farms, the higher power, machinery, and building costs per unit of business were more than made up in the saving of labor. Farms of the high-earning group handled 30 per cent more business per worker than the middle group, and 38 per cent more than the low-earning group.

Financial and Physical Differences Summarized

The causal factors may be summarized under the following heads:

1. The high-earning farms were somewhat larger and had more till-

able acres than the middle group but about the same as the low-earning group.

2. Somewhat higher quality farms on the part of the high-earning group as compared with the other two groups, but no difference in the lower two groups.
3. Higher yields on the high-earning farms, lower on the middle group, and lowest on the low-earning group.
4. Higher efficiency in the use of feed in producing livestock and livestock products on the high-earning group, lower on the middle group, and lowest on the low-earning group.
5. Factors 3 and 4 resulted in more livestock being kept on the two higher earning groups.
6. The increased amount of livestock handled more efficiently meant higher earnings.
7. There was a marked difference in the efficiency of the use of labor among the three groups.

Environmental and Historical Comparisons

Only half, six men, in the high-earning group could be rated as having had better than average home environment and training as boys. Four had about average homes and home training and two had poorer than average environment. In the medium-earning group half of the men had better than average home advantages as boys, two had about average, and four had poor home advantages. In the low-earning group only three of the men could be said to have had better than average home training, five had about average, and four had poorer than average. The basis for this classification was arrived at by questioning the operators and by obtaining reports from the county agents and the field man. The two main considerations were the progressiveness of the operator's father as a farmer and the training in farming that he actually gave his son.

As an average, the parents of each of the operators in the high-earning group owned 250 acres of land at the age of 50; in the middle group the parents owned 152 acres at the same age, and in the low-earning group the parents owned 251 acres.

There was no marked difference in the amount of school training acquired by these groups of men. There was a wide range in individual cases, however, the lowest grade completed being the second, and the highest grade fourth-year college. Each group averaged about eight grades completed. In addition, three men in the high-earning group had completed a business course and one a short agricultural course. Two in the middle group had had short agricultural courses and two in the low-earning group had attended business college, one an automobile school, and one an agricultural school.

A comparison of the occupational experiences of these men brings out the fact that the men in the high-earning group have been farming, on the average, 17 years; the middle and the low-earning groups each averaged 15 years. The low-earning group included three men who had only four years experience operating farms, and two men who had over 30 years experience. This wide range was not found in either of the other two groups. Without exception, these men were born and reared on farms. All but eight of them, about equally distributed among the three groups, were reared in the locality in which they are now farming. Seven of the eight migrated from Iowa as mature men and the other one was reared in southwestern Minnesota.

Twelve of these men had worked for from a few months to several years at some occupation other than farming. From the distribution of the men in the three groups, five in the high-earning group, three in the middle group, and three in the low-earning group, and the type of positions they held, it seems safe to conclude that such experience had very little influence on the variation in earnings observed.

A comparison of the financial start which the members of each of these groups had brings to the front two things: first, the men in the high-earning group obligated themselves for more, as an average, when they began farming; second, fewer of the men in the high-earning group inherited property than in the other two groups. The greatest amount inherited by any one man in the high-earning group was approximately half of his present real estate. This was true in only one case. In the middle group, also, only one man inherited so large a proportion of his present holdings. Contrasted with these two cases is the low-earning group, in which two of the men inherited the bulk of their present holdings, and three others inherited about half of their present property. The conclusion drawn from the former analysis regarding inheritance of property seems to be borne out in these selected groups. More of the men in the low-earning group than in any other were the recipients of inherited property; also they inherited larger units. It seems that inheritance of property operated in the direction of causing the recipient to be a less successful farmer in terms of earnings than he otherwise would have been.

It might be well, at this point, to compare the number of tenants and owners in each group. Three of the men in the first group, four in the second group, and five in the third group were tenants. Only two, however, were not related to their landlords.

Size, Age, and Composition of Families

The number of children per family ranged from none to ten in the first group and from none to seven in both the second and third groups. Three of the men in the low-earning group were unmarried and had a

mother or a sister keeping house for them. Five of the men in the high-earning group, six in the second group, and eight in the low-earning group had no children over 10 years of age. Four of the men in the high-earning group, five in the middle group, and eight in the low-earning group had no children under 10 years. These numbers include the cases with no children in both instances. The total number of boys and girls over and under 10 years in each group are shown in Table 22.

Table 22

A Comparison of Certain Family and Environmental Factors Affecting the Three Selected Groups of Twelve Men Each

Group	Average age of operator	Number of men		Length of time farming	Land owned by parents at age 50	Men inheriting property	Families having boys at home		Families having girls at home	
		Under 30 years	Over 45 years				Over 10	Under 10	Over 10	Under 10
I	40	0	2	17	250	4	2	5	6	7
II	40	0	3	15	162	6	5	5	5	5
III	40	2	4	15	251	8	4	4	3	3

From this wide variety of numbers and ages of children found in the different families and their distribution throughout the three earning groups, it appears that the differences in numbers and ages of children in the family had very little influence on the operator's earning ability. The fact that the low-earning group included three unmarried men and that all but one of the unmarried operators on the farm accounting route had earnings below the average, suggests some relationship between low earnings and bachelorhood.

Co-operation of Wives

A significant difference was found in the co-operation and help the different groups of men received from their wives. From his contact with the men and their families, the senior author, who visited them, classified the wives into three groups on the basis previously described on page 15. On this basis, ten of the wives in the first group fell in Class A and two in Class B; five in the second group fell in Class A, four in Class B, and three in Class C. In the lower group one fell in Class A, two in Class B, and the others in Class C. Using a scoring system, the field man rated all these women. The average scores from high- to low-earnings groups are, respectively, 70, 62, and 46. It seems that here is the first significant personal difference between the groups in finding an explanation for the variation in incomes. The men in the high-earning group received definitely more help from their wives than the men in either of the other earning groups.

Differences in the Men Themselves

In considering differences in the men themselves, a comparison of their relative ranking on ambition, mental alertness, and interest scores²¹ as shown in Table 23 indicates that they differ significantly in these characteristics. The men of the high-earning group had scores on mental alertness averaging 47 per cent higher than the average score of the low-earning group and 18 per cent higher than the average score of the middle group of farmers. The farmers of the high-earning group averaged 39 per cent higher on ambition scores and 36 per cent higher on interest scores, than the low-earning group.

A careful qualitative appraisal of the dominant characteristics of each man leads to the belief that there is more difference between the groups in the factor "ambition" than is implied by the relative scores in Table 23. At least eight of the high-earning group are keen farmers who are primarily interested in making their farm operations yield high net returns. They might be characterized as being willing to go to considerable length to increase their farm earnings. They spend practically all their energies in that one direction. The other four might be characterized as interested in making a good income but more easily satisfied in a monetary way. They wish to make the most economical use of their resources but are also quite as much interested in other phases of life.

Table 23
Average Rating of the Three Selected Groups on Mental Alertness, Ambition, and Interest in Farming*

Group	Mental alertness	Ambition	Interest
	Score	Score	Score
I	143	131	128
II	121	117	118
III.....	97	94	94

* For basis of rating and meaning of terms, see text, pages 23 to 25.

Six of the men in the middle group might be classified in the same manner as the eight above. There is, however, a slight difference in the quality of the ambition in this group, that is, these six men, altho ambitious to make their farms as productive as possible, seem not to have as much tenacity of purpose as the first group. In some cases they show periodic lapses in their interest in keeping every part of the farm returning income to full capacity. The other six men are interested in receiving high earnings from their farms, but they are not sufficiently interested to exert themselves greatly to increase their earnings. In some cases they are not interested in any change in their

²¹ For a discussion of the method of determining and the meaning of these scores see text, pages 23 and 24.

methods of farming, feeling that their combination of psychic and monetary income is most satisfactory under the present arrangement. In some cases there is an implied feeling that they have reached the point of most profitable combination and utilization of resources and the only way their income can be increased is by a general increase in the price of farm products.

Only two men in the low-earning group can be described as evincing a keen ambition to make the farm return the highest earnings possible. Several of the younger men seemed to be fairly well satisfied to accept a moderately low standard of living rather than to exert themselves sufficiently to attain a better one. Some of the older men had accumulated some property when younger, part of which was inherited. They are content to live partially on the proceeds of their accumulations, so are not particularly interested in changes in farming practices that would entail any great changes in their habits of life and work.

Tied up closely with differences in ambition are differences in interest. A qualitative characterization of the first group on this factor would describe them as feeling that farming was their chosen occupation and their chief interest in life. They felt that farming was an occupation on par with any other and were proud to be members of such a group. Contrasted with this, several members of the low-earning group wished to go into some other occupation and constantly regretted the fact that it was impossible to do so. Several of them, failing to make the earnings they anticipated when they began to farm, have decided that they are not fitted for the vocation, or that certain other vocations offer greater financial opportunities. The members of the middle group can be characterized as being about half way between the two in degree of interest shown.

A comparison of the scores these men received on the agricultural trade test brings out the fact that several of the young men in the low-earning group made comparatively high scores altho they had low earnings. This indicates that lack of factual knowledge was not the limiting factor in their case. Lack of ambition and tenacity of purpose, with rather immature judgment, are probably the chief factors responsible for their low earnings. The high scores made by these young men caused the average score for the entire low-earning group to be slightly higher than for the middle group. The high-earning group had an average score of 83, the middle group a score of 73, and the low-earning group of 74. This difference in scores is indicative of a variation in knowledge of the technological and economic basis of farming, which was evident at the time of the personal interviews. As in the case of the rating on "ambition," the variations in average scores

between these three groups of men did not emphasize sufficiently the true conditions.

All but two or three of the men in the high-earning group seemed to have an unusual understanding of the fundamental basis of the modern technic of farming. The other two or three might be characterized as obtaining high earnings because of their unusual energy or some other characteristic making up for an average or mediocre knowledge of farming. Several in the middle group seemed to have an excellent knowledge of farming but were content with the operation of farms too small to make possible earnings equal to those of the high-earning men. More, however, had only about an average knowledge of technical agricultural production. Two or three seemed to be less intelligent on agricultural matters than one would expect of the ordinary farmer.

In the low-earning group, as pointed out before, some of the young men exhibited an excellent knowledge of technical agriculture. The rest of the group were decidedly inferior, however, with respect to such knowledge. This comparison on the basis of possession of agricultural information is closely associated with the scores given the men on the factor of mental alertness. The two are somewhat different, for agricultural information is only a part of the basis for the rating given on mental alertness or general intelligence.

Judgment

Still another characteristic on which these men differed was suggested in a discussion of why the best farm-management practices were not followed in the analysis of the data for the entire group of one hundred thirty-six men. Differences in judgment or wisdom of decisions are recognized as one of the important sources of variations in farming practices and hence in farm earnings. The difficulty has been to secure a measure of variations with respect to this characteristic other than the effectiveness of the farming operations. These three groups of men were selected in the first place on the basis of average operator's labor earnings, which are commonly accepted as one of the measures of the effectiveness of farming operations. Even tho it is impossible to measure the difference between the groups on the factor of "judgment" as compared with the other factors that were found to be influential, a good acquaintance with the men and their farming plans leads the writers to emphasize the fact that differences in the wisdom of the decisions of the men was one of the most important factors influencing their relative earnings.

Personal and Family Differences Summarized

A careful appraisal of the men in each of the three groups indicates that there are significant differences between them in at least five factors, namely, ambition, interest, judgment, agricultural knowledge, and mental alertness or general intelligence. Tenacity of purpose or stick-to-it-iveness is thought of as a part of the expression of ambition.

There was a distinct difference in the amount of co-operation or stimulation, encouragement, help, and advice that the men in the different groups received from their wives. This was positively related to differences in earnings.

Differences in the quality of home training of the operator, schooling, occupational experience, or tenure could not be related definitely to differences in earnings. More of the men in the low-earning group inherited property and in greater amounts than those of the higher earning groups.

There was no significant difference in the amount of property their parents owned at age 50 with the exception of the middle group.

Differences in size, age, or composition of the family could not be related to differences in earnings.

Farm Practices Compared

The weakness involved in comparing numbers of practices followed was particularly apparent in the more detailed study of these three groups of men. Two important factors are involved in the profitable operation of any farm enterprise, one is the practice with respect to the enterprise and the second is skill in the execution of the practice. To illustrate, a farmer might regularly cull his hens twice a year, yet through improper culling have a much poorer flock than would have been the case had no culling been attempted. Again, a man may be a member of a cow-testing association yet not get any of the benefits because of his utter disregard of the records. It is almost impossible, as in variations in judgment, to obtain any measure of the variations in skill except the contribution of the enterprise to the total farm income. There seems to be, however, a general tendency for superior skill and the following of superior practices to go together.

With these considerations in mind the farm practices followed by these men may be compared by referring to Table 24. A fairly definite rotation including a legume at least once every five years and certain other features is generally recognized as an essential part of the foundation upon which to build a profitable farming business in this locality. One-third of the men in Group I, one-half of those in Group

II, and two-thirds of those in Group III lacked such a definite rotation. A much higher percentage of the men in the higher-earning groups had alfalfa hay or sweet clover for their cows than was the case in the lower earning group.

Table 24
Number of Men in Each Earning Group Following Certain Farm Practices and Accompanying Differences in Efficiency of the Enterprise

Practices	Group		
	I	II	III
Crop practices			
Men having a definite rotation	8	6	4
Men raising alfalfa	11	8	4
Men raising sweet clover.....	9	6	4
Index of crop yields.....	114	100	91
Dairy practices			
Men weighing and testing milk	9	4	2
Men having legume pasture	10	7	6
Nutritive ratio of ration	1:6.9	1:7.1	1:8.0
Per cent of cows fall freshening	72	69	49
Returns over feed cost per cow	\$73	\$70	\$46
Hog practices			
Men using swine sanitation.....	10	4	0
Returns over feed cost per 100 lbs. of hogs produced ...	\$2.47	\$1.73	\$1.06
Poultry practices			
Men feeding mash regularly	9	6	4
Men selling male birds by June 15	12	11	6
Men culling hens twice a year	8	6	3
Men confining pullets by Oct. 1	5	3	2
Returns above feed cost per 100 hens	\$210	\$175	\$117

The same difference was noted between the three groups in the dairy enterprise. Without exception the men in Group I had good herds of grade or purebred dairy cattle. Altho only three of the men in Group II had herds mixed with beef cattle, several had dairy cattle of inferior quality. Five of the men in Group III had nondescript mixed beef and dairy herds and only one or two of the men had a first-class dairy herd.

The men in the higher-earning groups fed rations with a higher protein content and had a larger percentage of their cows freshen in the fall. A striking difference was evident in the number in each group who belong to dairy herd improvement associations or themselves test the cows.

The same laxity on the part of the low-earning men in the care of swine and poultry enterprises was noted. Only two of the men in Group I failed to follow a satisfactory swine sanitation program as compared with eight in Group II and all of Group III. A comparison of numbers who fed mash to their poultry regularly, sold their breeding males by May 15, or culled their hens at least twice a year, finds the large numbers in the high-earning groups.

It is generally recognized that variations in such factors as interest in farming and ambition may be a result rather than a cause of the variations in earnings associated with them. This is especially true in regard to liking for the various farm enterprises, that is, low returns from the poultry can be the cause of disliking the enterprise instead of the low returns being the result of the expressed dislike. With this in mind, these men were questioned informally regarding whether or not they had formerly liked the enterprise if at the time of the interview they had low returns from the enterprise and disliked it. The number of cases involved is inadequate to support either theory. Both were sustained in individual cases with the larger number indicating that they had a deep-seated dislike for the enterprise, especially poultry, which kept them from trying to do their best with it.

In general, the same situation was observed with respect to interest or ambition in farming. The attitude of a few of those who began to farm with high ambition and a keen interest underwent a change because of severely disappointing results in the first few years. Many of the men seemed to have had their present lethargic interest and ambition for some time, however, and their current low earnings are a result, not a cause, of the personal characteristics observed.

GENERAL SUMMARY AND CONCLUSIONS

Other Factors Important Also

Both this more detailed study of these selected men and the general analysis of the entire group indicates that in addition to the factors already discussed many others are involved and at a given time any one of them may be the important limiting factor. Some of these factors are health,²² fortuitous events, interest of the children, social obligations of the operator, sales resistance, and emotional drive. Needless to say, it is impossible to determine the relative influence and importance of all the human factors responsible for the variations in earnings in this first attempt to study these factors from a farmer's earnings standpoint. Indeed, it is entirely probable that such an ideal accomplishment never will be fulfilled.

Measurable Influences Restated

In considering the findings of this study as a whole, the data seem to point to variations in three stimulating influences or factors of motivation and one of ability that are directly reflected in the earnings or business success of the farmer. The factors of motivation are "in-

²² The state of health of the operator and his family for the last few years was listed for this group of farmers. Anyone entirely incapacitated was left out of the analysis. There were, however, a few cases of serious illness in the families making low earnings.

terest," "need," and "ambition, or will." "Judgment," the factor of ability, is conditioned, in part at least, by the factors of motivation. In going over the data to see how variations in earnings may be associated with variations in these factors, a clear concept of the meaning of the terms is necessary.

The factor of interest and its relation to earnings was discussed earlier. It will be necessary to clarify the concept of "need." The motive generally regarded as largely responsible for an individual doing physical labor or undertaking economic enterprises is the desire for personal gain or betterment of his economic position. This usually is amplified to include the desire not only to satisfy the current needs of the individual, but also to provide for expected future requirements. It is apparent, if we consider only the necessity for sustaining life, that as the accumulation of economic goods increases the need for further accumulation decreases. The same principle holds true as to the number of dependents the individual is supporting and the extent of their probable need for support in the future. Relatively, the relation of the individual's economic accumulations to his probable personal and family requirements may be thought of as described by the present use of the word "need."

Data in Table 9, which show that the men who inherited half or more of their property are not making as high current earnings as those who had to work for their entire capital, indicate a variation in need either at present or at some time in the past. Those who looked forward to, or inherited property did not feel as much need for further economic accumulations as did those not inheriting any property. The men who were farming the same farm their fathers did, altho not necessarily inheriting any of it, were not making quite as high operator's labor earnings as the men not so situated. Those that had grown sons to help them showed no better results with this combination of family effort. The older men who had grown families and an accumulation of property did not make as high earnings, on the average, as did the younger men. In every case where there was a difference in evident "need" between two groups, the group having the greatest "need" also had the highest earnings. It does not necessarily follow that the largest families, living under the poorest conditions, are making the highest earnings. Other things, such as lack of ambition for a higher standard of living, and lack of ability usually are the controlling factors in such cases.

The scores on ambition were discussed earlier in the text. Variations in these scores were found to be associated with earnings. It was also found that the accumulation of economic goods is not the only desire and ambition of people. Some knowingly sacrifice pecuniary gains to attain certain other objectives. It seems that many of the farmers on the small farms definitely preferred to have their income-gaining pos-

sibilities limited by a small operating unit rather than give up some of the leisure and freedom from care associated with the small farm. They do not have the ambition to earn the large financial incomes of the men who are willing to accept the responsibilities of the larger farms in order to get the higher incomes.

Ambition and interest are closely related. If a man has an ambition to make every part of his farm return him a profit to the limit of its ability, it seems reasonable to suppose that he would show genuine interest in every phase of the business. He would hardly admit a dislike for an enterprise and yet have a strong ambition to make that enterprise a profitable one on his farm. The score made on the agricultural test, which was definitely related to earnings, is another indirect indication of ambition. It seems entirely logical that those with the higher ambitions would make more than the usual effort to inform themselves on agricultural topics.

As pointed out earlier, most of the reasons given for not following a recommended practice fell under the two headings "Operator's choice" and "Did not get to it." The last heading was essentially an admission of lack of will power to put into practice that which they knew it would pay them to do. The relative scores on ambition showed a significant positive relation to financial returns. Altho the tabular evidence is somewhat meager, many other indications of variations in ambition and will were associated with earnings, but were not susceptible to statistical treatment.

Good judgment and wise decisions are the very foundation of any manager's success. To a large extent, the balance sheet at the end of the year is a reflection of the soundness of the judgment and the wisdom of the decisions which the manager exhibited the preceding year. This is only a little less true in the case of the farm operator, for he combines the functions of both business manager and farm laborer. Some men have greater ability in this way than do others. This is recognized so universally that very little space will be devoted to a discussion of it.

There are, however, three indications in the data just presented of a positive relationship between judgment and the operator's labor earnings. In the first instance, data in Table 12 show a positive relation between scores on the agricultural test and the operator's earnings. To a considerable extent, the same knowledge and understanding are required to answer a high percentage of test questions as are required as a basis for good judgment and intelligent decisions. The second indication is the relation of the scores on mental alertness to financial returns. As in the scores made on the agricultural test, those scoring highest on mental alertness would, in general, have the most accurate and comprehensive facts on which to base their decisions. The other instance of

evident differences in judgment associated with differences in income is in Table 20. It indicates that it is a matter of judgment in a great many cases in which the recommended practice was not followed. As pointed out earlier, evidently these judgments, in general, must have been poor owing to the fact that there was a positive relation between the number of practices followed and the returns realized on the enterprises.

It would be very worth while, indeed, to segregate the ability to make wise decisions and good judgments into two component parts: that due to inherent ability and that due to acquired knowledge and experience. If this were possible, a much more precise analysis could be made of the relation of the several factors entering into judgment-forming ability.

Recognizing the impossibility of achieving the desired results, the best that can be done is to point out some of the factors, other than those that have been inherited, that influence judgment. It will be found that judgment-forming ability is a result of many factors. Experience is one of the first variable factors affecting judgment. Training in school and at home is important. Health, not only at present but also throughout life, has had an effect on the use made of opportunities to gain knowledge and experience. The motivating factors of interest, need, and ambition have had their influence on the individual's course of life up to the present and therefore have influenced his judgment-forming ability. In short, altho in some cases the upper limit has been reached in the increase in ability to make wise decisions owing to a sub-normal inheritance, a great number of the men are still improving their ability by acquiring new information and new experiences every day.

Apparent Individual Relationships Restated

The findings of this study are highly suggestive. In general, there is no satisfactory substitute for intelligence, interest, and ambition in the farm operator. The wife's co-operation is a very important consideration, but the presence of children of a helping age gives little, if any, advantage. The advantage of a grown son at home was offset by physically less able fathers, and by other considerations to such an extent that the farms were operated no more profitably than were the others. The use of family labor instead of hired labor did not result in greater production or higher operator's earnings. In fact, the men with more hired help were getting the higher financial earnings.

Altho many people think that they have not been treated fairly in life because of not having had any property left to them, in this group of men those not inheriting any property were making the higher current earnings and showed superior ability on the agricultural test. This situation is one of the important factors supporting the general conclu-

sion that the operator's economic status or earnings is usually a result of his own ability as a farm manager.

It is evident that there is some factor common to parents and children associated with rapid progress through school on the child's part and better than average earnings on the parent's part. This is probably superior innate ability.

It can be seen that, in general, there is no magic formula by which some of these farmers are obtaining far greater financial earnings than others. At least, somewhat greater financial earnings are within the reach of most men and those who seriously want to better their condition have no reason for feeling they have an insurmountable handicap in the way of lack of family help, lack of capital, lack of schooling, or any other discouraging situation.

APPENDIX A

"Operator's labor earnings" was selected as the best available single measure of the farmer's ability to organize and operate his farm (see page 7) and is used throughout the text. Three other measures, "total farm earnings," "net cash available for family living and investment," and "index of accomplishment" were also computed in order to throw additional light on some of the relationships considered.

"Total farm earnings" is the return to capital and all unpaid labor. It differs from operator's labor earnings in that an interest charge on the investment and an allowance for family labor has not been included in the expenses deducted from the gross income. It represents the amount the operator has to spend for family living, for interest on borrowed capital, and for investment. Like operator's labor earnings, it is computed on an owner basis.

"Net cash available for family living and investment" is the difference between the gross cash income from the farm business and the gross cash expense. Non-cash income such as inventory increases and farm produce used in the household and non-cash expense such as inventory decreases, value of unpaid family labor, and an interest charge on the farmer's equity in the business have not been included in its calculation. Unlike operator's labor earnings and total farm earnings it is computed on the basis of the exact system of tenure practiced and the actual degree of ownership instead of on a "full-owner" basis. Any rent or interest paid is included as an expense and only the cash receipts of the operator are considered as income. In a few cases, the accounting data available for this study were not sufficiently complete in certain details as to rental systems and interest payments to make possible as accurate a calculation of the net cash income available for family living and investment as was possible in case of the two measures previously discussed. It is probable that in some cases the figure presented is too high as the result of imperfect divisions of income and of incomplete interest payments. This measure, unlike operator's labor earnings and total farm earnings, is not influenced by inventory changes due to variations in prices over which the farmer has no control.

A fourth measure of achievement used in this study is an "index of accomplishment." In each county the man's ranking on each of four factors was expressed as an index figure with 100 as the average. These factors were: index of crop yields, index of crop selection,²³ returns

²³ Relative ranking or selection of crops was determined by dividing the crops grown into four classes on the basis of their net return over the last 10 years. To the acreage of crops in Class A was added one-half of the acreage in Class B, and one-fourth of the acreage in Class C; the total was divided by the number of tillable acres in the farm, these divided by their arithmetic mean, and the result multiplied by 100.

over feed cost per animal unit of livestock, and productive man work units handled per man. These four factors were then combined into a single index by multiplying the crop yield and livestock efficiency indexes by 3, summing the indices and dividing by 8. The weights used were arrived at by considering the net regression coefficients of these factors in a multiple correlation analysis of the factors affecting the operator's labor earnings on these farms. Other evidence supporting this weighting is found in a study of factors affecting farm profits in the dairy section of southwestern Illinois.²⁴

It was found that for this group of men the index of accomplishment was not materially influenced by size of business. From the mechanics of the calculation, it is apparent that price changes have much less influence than in case of operator's labor earnings and total farm earnings. The range in the index of accomplishment is from 69 to 146 as compared with a range from \$-1,065 to \$4,421 in operator's labor earnings. For this reason the percentage difference between any two groups on the index basis is much less than on an earning basis.

The groupings used in the tables in the text in which operator's labor earnings appeared as a dependent variable are reproduced in this appendix with "total farm earnings," "net cash available for family living and investment," and "index of accomplishment" indicated for each group. In each case, size of business as measured by productive man work units is also shown. The reader who is interested in studying the relation of any of these measures to the factors considered in the text may substitute any of them in the appropriate tables. The numbers of the tables in the appendix are the same as those of the corresponding tables in the text and the letter "a" has been added to differentiate the appendix table.

Table 2a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to Having Other than Farming Experience

Group	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
No property inherited					
Experience other than farming..	26	\$2,859	\$1,556	105	575
All others	51	2,965	1,581	102	633
Property inherited					
Experience other than farming..	15	2,403	1,577	94	588
All others	44	2,687	1,700	97	619

²⁴ Wilcox, R. H., Crickman, C. W., and Trummel, R. G. Management Factors that Influence Farm Profits in Southern Illinois. Ill. Agr. Expt. Sta. Bull. 374. 1931.

Table 3a
Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to the
School Training of the Operator

Group	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Eighth grade or less.....	77	\$2,757	\$1,680	99	603
High school*	40	2,843	1,621	101	631
Technical agricultural training†..	19	2,854	1,494	104	613

* Four in this group attended college one or more years. One had a B.S. degree.

† There were no agricultural college graduates. This group is made up of those attending the School of Agriculture or a three-months short course for one or more winters.

Table 4a
Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to Family
Help Available

Group	Farms*	Total farm earnings†	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Wife only	40	\$2,563	\$1,517	102	568
Wife and relatives other than children	22	3,041	1,803	101	672
Wife and one or two children over 10	40	2,806	1,680	100	599
Wife and 3 or more children over 10	26	3,132	1,847	98	653

* Eight farms were omitted because of irregular labor arrangements.

† These data indicate that altho there was no significant difference in the operator's earnings of the groups as shown in Table 4, the men having the more family help had somewhat higher total farm earnings and a little more cash available for their family expenses. From a production standpoint, however, as measured by the index of accomplishment, their businesses were not so efficiently conducted as those of the men without children of a helping age.

Table 5a
Total Farm Earnings, Net Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to Amount
of Labor Hired

Group	Farms	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Size of business 500 to 750 work units					
Over 12 months hired labor.....	10	\$2,748	\$1,555	101	652
6 to 11 months.....	23	2,581	1,375	100	614
Less than 6 months.....	31	2,655	1,513	94	571
Size of business over 750 work units					
Over 12 months hired labor....	16	4,181	2,364	105	1,004
6 to 11 months	4	4,234	2,696	107	922
Less than 6 months.....	10	4,445	2,663	104	907

Table 6a

Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to
Having Grown Sons at Home
(Operators Over 44 Years of Age.)

Group	Farms	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Grown sons at home.....	29	\$3,049	\$1,887	96	667
No grown sons at home.....	25	2,747	1,609	100	593

Table 7a

Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to Farms
Operated
(Operators Less Than 40 Years of Age.)

Group	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
On farms fathers farmed.....	45	\$2,809	\$1,592	100	644
On other farms	20	2,561	1,308	165	552

Table 8a

Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to the
Co-operation the Men Received from Their Wives

Group	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Men with most co-operation.....	17	\$3,278	\$1,837	110	622
Men with least co-operation.....	17	2,724	1,642	94	677

Table 9a

Total Farm Earnings, Cash Available for Family Living and Investment,
Index of Accomplishment, and Size of Business as Related to Inheritance
of Property

Group	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
No property inherited	77	\$2,929	\$1,629	103	614
Less than one-half of property inherited	38	2,817	1,797	100	616
One-half or more of property inherited	21	2,249	1,372	90	602

Table 10a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to Age of the Farm Operator

Age	Men	Total farm earnings*	Cash available for living and investment	Index of accomplishment	Size of business
Years	Number				P.M.W.U.
Under 30	10	\$2,189	\$ 896	91	608
30 to 34	31	2,658	1,444	101	585
35 to 39	19	3,088	1,795	105	647
40 to 44	24	2,730	1,819	103	573
45 to 49	17	2,717	1,565	99	583
50 to 54†	16	3,270	2,043	100	674
55 to 59	9	2,681	1,516	99	579
60 and over	10	2,870	1,814	93	716

* The total farm earnings and cash available for family living do not drop off in the older age groups as do the operator's earnings and accomplishment index. Probably this is due to the fact that the older men have accumulated more property and have more family labor than the younger men and are content to use some of the earnings imputed to these factors.

† The total farm earnings of one man in this group was \$6,404 and the cash available for family living and investment, \$4,765. The averages of the other 15 men are \$3,061 and \$1,862, respectively.

Table 11a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to the Children's Progress Through School

Progress ratio	Families	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Under 95	8	\$2,349	\$1,485	90	543
95 to 104.9	52	3,065	1,792	101	644
105 and over	29	3,186	1,995	104	659

Table 12a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to Score on Agricultural Trade Test*

Range in score	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Under 65	23	\$2,572	\$1,740	94	592
65 to 74	25	2,725	1,726	98	603
75 to 84	46	2,589	1,417	101	573
85 to 94	42	3,177	1,767	104	674

* The average age of the men in these groups runs from 49 years for those with the lowest scores to 39 for those with the highest scores. As brought out in Table 10a, the older men tend to have the more cash available for family living and higher total farm earnings in proportion to their labor earnings than do the younger men. To a large extent these counteracting factors offset each other so that no significant relation is apparent between total farm earnings or cash available for family living and investment and the scores on the agricultural trade test.

Table 13a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to the Mental Alertness Scores of the Farm Operators

Range in score	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Under 90	21	\$2,067	\$1,232	91	569
90 to 119	39	2,359	1,299	93	571
120 to 149	47	2,827	1,711	103	587
150 to 179	29	3,846	2,262	112	743

Table 14a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to the Ambition Scores of the Farm Operators

Range in score	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Under 100	16	\$2,024	\$1,197	89	535
100 to 119	51	2,292	1,343	95	557
120 to 139	47	3,211	1,865	104	660
140 to 159	16	3,345	2,121	114	637
160 to 179	6	4,356	2,225	110	858

Table 16a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to Reason Given for Beginning Farming

Reason	Men*	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Personal Preference	43	\$2,997	\$1,818	104	599
Only training	62	2,754	1,644	100	611
Inheritance of farm property.....	28	2,532	1,331	94	635

* Three men who began farming because of ill health were omitted from this tabulation.

Table 17a

Total Farm Earnings, Cash Available for Family Living and Investment, Index of Accomplishment, and Size of Business as Related to the Interest-in-Farming Scores of the Farm Operators

Range in score	Men	Total farm earnings	Cash available for living and investment	Index of accomplishment	Size of business
	Number				P.M.W.U.
Under 100	15	\$2,338	\$1,327	91	578
100 to 118	75	2,650	1,560	98	597
120 to 139	30	3,027	1,753	105	618
140 to 160	16	3,447	2,068	108	711

APPENDIX B

Forms Used in Securing Data

The following forms were used in securing the data covering the personal history and characteristics of the families included in this study. Form 1 is a questionnaire mailed out in advance of the first personal visit. Forms 2 and 3 were used by the senior author in his first visit. Forms 4 and 5 were used when he visited the farms the second time.

Form 1—Questionnaire

UNITED STATES DEPARTMENT OF AGRICULTURE

Bureau of Agricultural Economics

St. Paul, Minnesota., May 3, 1930

Dear Co-operator :

When we returned to you your account book record we discussed with you some of the business factors that affected your earnings. In making a further study of your records and those of other farmers we feel that certain personal factors may also be important in influencing earnings. Below we are listing fifteen of these factors. We would like your own opinion as to the relative importance of these points in accounting for your success in farming.

Place "1" on the line after the factor you feel is most important in your case, and "2" after the one second in importance thus ranking at least 10 of the factors. If you feel any factors not mentioned have been important in your case, please list them at the bottom of the page, giving them the correct ranking number. Please return this promptly in the enclosed addressed envelope. This information will be held strictly confidential.

- Farm experience _____
- School training _____
- Use of county agent and extension information..... _____
- Use of government and state economic information (including out-look reports) _____
- Information gained from reading farm papers..... _____
- Father was good farmer..... _____
- Wife's co-operation _____
- Children's help _____
- Hard work _____
- Ability to handle labor _____
- Liking for farm work..... _____
- Ambition to succeed..... _____
- Getting work done on time in the best way known..... _____
- Production management _____
- Buying and selling ability..... _____

Form 2—Survey

Farm Management Studies of Personal Factors in Successful Farming

Name _____ Date _____

What parts of the bookkeeping work you are doing in co-operation with the University do you think most valuable to you ?

1. Keeping an accurate record of receipts and expenses? _____
2. Finding your relative efficiency in producing different crops and classes of livestock and livestock products? _____
3. Knowing your relative standing on various efficiency factors as compared with the average of the group? _____
4. Getting advice on reorganization of your farm business from a University representative? _____
5. Having the record for use as a basis of reorganization yourself? _____
6. Other reasons _____

Do you plan your crop and livestock production several years in advance? _____

Do you modify your dairy enterprise plans (number of heifers raised, number of cows milked, etc.) as a result of economic conditions? _____, Hog enterprise? _____, Where do you get the information that is used as the basis for such plans? Neighbor _____, Farm papers _____, County agent _____, Extension meetings _____, Others _____

Do you study government, state or agricultural college reports of production, price forecasts, etc., when deciding the number of acres and kind of crop to grow? _____, sows to breed _____, heifer calves to raise _____, when to sell the poorer cows _____, when to market the hogs _____, when to sell wheat _____.

Whom do you consult for management counsel? Father _____, Landlord _____, Banker _____, County agent _____, Wife _____, Son _____, Brother _____, Neighbor _____, No one _____.

Amount of influence on farm program? Much _____, Little _____, None _____.

Are you often kept from making what you feel would be profitable changes in the farm organization due to lack of capital? _____

Purpose for which money was needed _____

Do you borrow capital for such changes when necessary? _____

Farm Papers Taken			Children in Club Work	
	Read regularly	Read little	Kind of club	Total years membership
Hoard's Dairyman.....	_____	_____	_____	_____
The Farmer	_____	_____	_____	_____
Wallace's Farmer and Iowa Homestead	_____	_____	_____	_____
So. St. Paul Market Reporter	_____	_____	_____	_____
Farm Stock and Home...	_____	_____	Date of short courses you attended at University Farm (one week) _____	

Time of arising during busy season _____, of finishing chores _____.

Time of arising during slack seasons _____, of finishing chores _____.

Number men hired by the month last year———. How many different men last year?———. When did present men start working for you?———. Do you have trouble keeping help?———.

Why? _____

Does the hired help problem have any influence on the number of acres you farm?———. How?———.

On the amount or kind of livestock you keep?———. How?———

What per cent of your farm machinery repair work is done on the farm?———.

Do you like to do work on machinery?———, with livestock———, cattle———, poultry———, hogs———.

Reason for taking up farming: Inherited farm———, married girl with farm———, health———, only training———, personal preference———.

What is the most significant reason for your not having a larger business unit (either acres or livestock)? Lack of capital———, optimum size from managerial standpoint———, hired help situation———, inability to get land near by———, satisfied with present status———.

Do you think your farm is as good as the average in your county?———. If not, why do you not get on a better farm? Lack of capital———, family connections———, prefer to own inferior farm rather than to rent superior one———. Other reasons———.

Occupational History

Age	Occupation	Geographical location	Inheritances, gifts
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Community Affiliations

Organization	Member	Number offices held last 5 years
Church	_____	_____
Farm Bureau	_____	_____
Breed association	_____	_____
Community clubs	_____	_____
Local, political organizations	_____	_____

Years co-operator's father spent on farm———, as owner———. Other occupations and years spent at each_____

Age now or at death———. Cause of death_____

Age co-operator left school———, highest grade finished_____

Age wife left school———, highest grade finished_____

Girl, Boy	Month born	Age	Grade in school, 1930-31	Age left school	Grade finished	Why left

List any sickness of the family (more than colds) during the last two years:

Operator's height _____, weight _____, national descent _____, age _____.

**Form 3—Survey
RATING SHEET**

Name _____

Factors to be rated by investigator

- 1. Mental alertness
- 2. Liking for farm work
- 3. Condition of farmstead
- 4. Mechanical ability
- 5. Condition of livestock
- 6. Ambition
- 7. Eagerness for information.....
- 8. Physical ability to get work done.....
- 9. Personal appearance
- 10. Condition of field work.....
- 11. Wife's co-operation

Notes:

Form 4—Survey

Name _____ Date _____

**FARM MANAGEMENT PRACTICES WITH RESPECT TO
CROPS RAISED**

Efficiency Factors

	Your farm*	Most efficient 25%*
Index of crop yield.....		116
Per cent of land in higher return crops.....		35.5
Per cent of land tillable.....		77.5
Number of acres tillable.....		120.4

* These data are taken from office tabulations.

Was 1929 a normal crop year for you?_____. If not, why?_____
 Do you belong to a crop improvement association?_____

Number of Good Crop Management Practices Followed, with Reasons Why When They Are Not Followed

Practice	Follows the practice	Reasons for not following practice				
		Operator's choice	Did not get to it	Lack of capital	Uncontrollable circumstances	Lack of information
Do you have a legume on each field every 5 years?						
Do you raise enough alfalfa hay for the dairy herd?						
Do you have some sweet clover pasture?						
Do you follow a definite cropping system?						
Do you use seeds of know variety and tested production?						
Do you clean all small grain before seeding?						
Do you test your seed corn for germination?						
Do you test your other seeds for germination?						
Do you select your seed corn from the standing stalk?						
Do you treat your grains before seeding?						
Do you cut all noxious weeds in the grain fields before they mature seed?						
Is a special effort being put forth to kill noxious weeds?						
Is the barn yard manure produced on the farm applied to the fields in a systematic manner?						
Do you obtain a perfectly clean field at the last cultivation of your row crops?						

FARM MANAGEMENT PRACTICES WITH RESPECT TO THE DAIRY ENTERPRISE

Efficiency Factors

	Your farm*	Most efficient 25%*
Net returns above feed cost per cow		\$107
Butterfat production per cow		284
Nutritive ratio fed		1 :7.8
Pounds of alfalfa hay fed per cow		1,297
Total digestible nutrients fed per pound of butterfat produced		14.6
Per cent of cows freshening in the fall		58
Average number of cows kept		12.67

* These data are taken from office tabulations.

Was 1929 a normal year for your dairy enterprise? _____ . If not, why _____

Have you had contagious abortion in your herd the last two years? _____
 Loss of 20% of calf crop or more? _____ . Have you lost more than 10% of your herd with tuberculosis in the last 5 years? _____ . Any other abnormal situation _____

What is the main reason for your not having more cows? Lack of help _____ , lack of capital _____ , lack of feed _____ , lack of barn room _____ , other _____

What is the main reason that you keep as many cows as you do? Like cows _____ , family help _____ , have the feed _____ , have the barn room _____ , increase the farm income _____ , other _____

Are your housing facilities for the dairy herd good? _____ , fair _____ , poor _____

**Number of Good Dairy Management Practices Followed and Reasons Why
When They Are Not Followed**

Practice	Follows the practice	Reasons for not following practice				
		Oper- ator's choice	Did not get to it	Lack of capital	Uncon- trollable circum- stances	Lack of informa- tion
Do you feed a balanced ration?						
Do you feed as much alfalfa hay as the standard?						
Do you have some legume pasture for the dairy cows?						
Do you feed grain to the heavy producing cows when they are on pasture?						
Do you feed each cow individually according to her production?						
Do you belong to a Dairy Herd Improvement Association?						
Do you weigh and test the milk from each cow at least once a month?						
Do you have a non-freezing supply of water for your cattle in the winter?						
Do you keep breeding records?						
Do you keep the bull confined?						
Do you have at least 58% of your cows freshen in the fall?						
Are you using a bull with a 400-lb. D.H.I.A. record or its equivalent?						
Do you sell all unprofitable cows as soon as they are discovered?						

FARM MANAGEMENT PRACTICES WITH RESPECT TO THE HOG ENTERPRISE

Efficiency Factors

	Your farm*	Most efficient 25%*
Returns above feed cost per 100 lb. hogs produced..		\$4.59
Number of pigs per litter.....		6.4
Number of spring litters.....		9
Number of fall litters.....		5
Total pounds of hogs produced.....		20,611
Grain and mill feed cost per 100 lb. of hogs produced		\$4.44
Tankage and skimmilk cost per 100 lb. hogs produced		\$1.05
Total feed cost per 100 lb. of hogs produced....		\$5.68

* These data are taken from office tabulations.

Was 1929 a normal year for your hog enterprise? _____. If not, why _____

Are the building facilities for the hogs good?_____, fair_____, poor_____.

Is the feeding equipment for the hogs good?_____, fair_____, poor_____.

Why do you not raise more hogs? Don't like them_____, do not have the feed_____, do not have the equipment_____, other _____

Why do you raise as many hogs as you do? Market skimmilk_____, market other feed_____, like hogs_____, increase farm income_____, other _____

**Number of Good Hog Management Practices Followed, with Reasons Why
When They Are Not Followed**

Practice	Follows the practice	Reasons for not following practice				
		Oper- ator's choice	Did not get to it	Lack of capital	Uncon- trollable circum- stances	Lack of informa- tion
Do you shut up each sow separately at farrowing time?						
Do you stay up nights to attend sows at farrowing time?						
Do you keep the breeding herd separate from the fattening hogs?						
Do you wash the sows before farrowing?						
Do you disinfect the farrowing pens with boiling lye water?						
Are the pigs kept entirely out of old lots?						
Do you full feed the pigs during the summer?						
Do you feed tankage when short of skimmilk?						
Are your pigs given water in addition to slop in the winter time?						
Do you feed a mineral mixture containing iodine?						
Do you start your pigs on feed in a creep before weaning?						
Do you treat your pigs for worms?						
Do you abstain from using patent tonics, necro remedies, and similar preparations?						
Do you use a pure bred boar?						
Do you mark your pigs from the best sows so that they may be used for breeding stock?						
Do you plan to have your pigs ready for market in months when the market is normally above the yearly average?						

FARM MANAGEMENT PRACTICES WITH RESPECT TO THE
POULTRY ENTERPRISE

Efficiency Factors

	Your farm*	Most efficient 25%*
Returns above feed cost per 100 hens.....		\$368
Eggs laid per hen.....		127
Pounds of concentrates fed per 100 hens.....		12,420
Pounds of skim milk fed per 100 hens.....		8,951
Value of poultry sold per 100 hens.....		\$269
Average number of hens kept.....		129

* These data are taken from office tabulations.

Was 1929 a normal year for your poultry?_____. If not, why?_____

Are your housing facilities for the poultry good?_____, fair_____,
poor_____. Do the hens ever freeze their combs in winter?_____.

What proportion of the care of the poultry is done by your wife?_____,
the children_____. Why do you not keep more chickens? Do not like
them_____, lack of housing facilities_____, lack of help_____,
other _____.

Why do you keep so many chickens? Find them profitable_____, like
chickens_____, have housing room_____, other _____.

**Number of Good Poultry Management Practices Followed and Reasons Why
When They Are Not Followed**

Practice	Follows the practice	Reasons for not following practice				
		Operator's choice	Did not get to it	Lack of capital	Uncontrollable circumstances	Lack of information
Do you feed mash the year around?						
Do you feed for high winter egg production?						
Do you use dropping boards?						
If so, do you clean them twice a week?						
If not, do you clean the house once a month?						
Do you confine or sell the breeding males by June 15 each year?						
Do you cull your hens at least twice a year?						
Do you cull your pullets before putting them in winter quarters?						
Do you disinfect the winter quarters before confining the pullets?						
Do you put the pullets in winter quarters by October 1?						
Are the chickens allowed all the liquid they will drink 3 times a day in the winter?						
Do you keep oyster shells and grit before the poultry at all times?						
Do you keep sufficient litter on the floor in the winter to hide the grain?						
Are your chicks hatched before May 15 each year?						
Do you use cockerels from flocks having a higher egg production than your own?						
Do you introduce new blood each generation?						
Do you abstain from using patent tonics and such preparations?						

FORM 5—TRADE TEST

A Schedule of Technical Agricultural Questions
Directions

Several possible answers are suggested for all of the questions. Mark with an (x) the correct or best answer.

Example

Cows pasturing on sweet clover should be fed some additional roughage to:

- 1 _____ make them give more milk
 - 2 _____ save the pasture
 - 3 _____ lessen danger of bloat
 - 4 _____ prevent objectionable flavors in the milk
1. The mineral which Minnesota cows need in addition to feed and salt may be best supplied by self feeding:

1 _____ potash	3 _____ rock phosphate
2 _____ bonemeal	4 _____ sulphur
 2. Late hatched pullets during the first winter lay:

1 _____ more eggs than early hatched pullets	3 _____ fewer eggs
2 _____ the same number of eggs	
 3. Round worms in hogs may be controlled by:

1 _____ supplying minerals	4 _____ feeding tankage
2 _____ hog tonics	5 _____ feeding alfalfa meal
3 _____ sanitation	
 4. The chief value of keeping records of income, expense, inventories, and feed:

1 _____ to determine your net worth
2 _____ to determine your income for the year
3 _____ to discover how the farm may be made more profitable
4 _____ to aid in getting credit at the bank.
 5. Molasses is used in fattening cattle:

1 _____ to get the cattle to eat more feed	3 _____ as a roughage
2 _____ as a protein supplement	4 _____ to furnish minerals
 6. Hog prices are usually lowest in the month of:

1 _____ January	3 _____ December	5 _____ August
2 _____ June	4 _____ April	
 7. A dairy herd improvement association's chief purpose is to help you:

1 _____ find out how your herd compared with the average
2 _____ determine the profit you are making on your dairy herd
3 _____ find out how much butterfat each cow is producing
4 _____ advertise your dairy herd.
 8. Oat smut is carried over from one year to another:

1 _____ in the ground	3 _____ on the oat kernel
2 _____ on the straw	4 _____ in the seeder
 9. The 1929 potato crop brought a good price because:

1 _____ people ate more potatoes
2 _____ potato growers put on a strong advertising campaign
3 _____ there was a small crop
4 _____ the farm board stabilized the market

10. A ration that is too low in protein will cause the hens to:
- | | |
|-----------------------------|--------------------------|
| 1_____lay fewer eggs | 3_____lose flesh |
| 2_____lay soft shelled eggs | 4_____lay infertile eggs |
11. To avoid losses from goitre in pigs, lambs, and calves:
- | | |
|---------------------------------|-----------------------------|
| 1_____feed grain | 3_____feed potassium iodide |
| 2_____exercise the brood animal | 4_____feed a succulent feed |
12. Legumes are beneficial to the soil because bacteria living on their roots store from the air:
- | | |
|-----------------|--------------|
| 1_____phosphate | 4_____potash |
| 2_____lime | 5_____humus |
| 3_____nitrogen | |
13. Hog cholera is a disease caused by:
- | | |
|---|-----------------------------|
| 1_____filthy conditions about the hog lot | 4_____a contagious organism |
| 2_____feeding too much green corn | 5_____undernourishment |
| 3_____changing feed quickly | |
14. The most common cause of loss in lambs is:
- | | |
|---------------------|-----------------|
| 1_____stomach worms | 4_____ticks |
| 2_____tuberculosis | 5_____pneumonia |
| 3_____lice | |
15. Hens that molt early, as compared with those that molt late, as a rule:
- | |
|---|
| 1_____lay about the same number of eggs |
| 2_____lay more eggs |
| 3_____lay smaller eggs |
| 4_____lay fewer eggs. |
16. The three numbers such as (2-12-2) on a complete commercial fertilizer sack refer to:
- | |
|--|
| 1_____date when it was manufactured |
| 2_____trade mark of the company |
| 3_____proportion of the different elements in the fertilizer |
| 4_____time of the year when it should be applied. |
17. Blackhead in turkeys can be best controlled by:
- | | |
|----------------------|-------------------------------|
| 1_____medicine | 4_____changing breeding stock |
| 2_____proper feeding | 5_____feeding minerals |
| 3_____sanitation | |
18. As compared with the smaller farms, the larger-sized farms having the same type of farming usually yield:
- | |
|--|
| 1_____larger net income |
| 2_____larger gross income but smaller net income |
| 3_____larger gross income but equal net income |
19. Check the two feeds which are practically interchangeable in feeding cattle:
- | | |
|--------------|--------------------|
| 1_____corn | 4_____linseed meal |
| 2_____oats | 5_____molasses |
| 3_____barley | |
20. Usually the most economical form in which to buy protein concentrates for balancing the dairy ration is:
- | | |
|--------------------|-----------------------------|
| 1_____linseed meal | 3_____wheat middlings |
| 2_____bran | 4_____commercial dairy feed |
21. Hog cycle is a term referring to:
- | |
|---|
| 1_____the stages from birth of the pig to its slaughter |
| 2_____the long time swings in pork production and prices |
| 3_____the swings in the demand for pork products |
| 4_____the variations in the amount of pork products exported. |

22. Most differences in farm earnings on farms of the same size and type are due to differences in:
- 1——price received for products sold
 - 2——quality of farms
 - 3——organization and management
 - 4——number of grown children at home.
23. Butter prices were lower during the winter of 1929-30 than in 1928-29 largely because of:
- 1——a large increase in production
 - 2——increased imports
 - 3——decreased consumption
 - 4——lower tariff.
24. The barberry bush is being eradicated to aid in controlling losses due to:
- 1——oats smut
 - 2——red rust on grains
 - 3——black stem rust of wheat
 - 4——corn borer.
25. The best crop to raise to control Canada Thistle is:
- 1——soy beans
 - 2——alfalfa
 - 3——flax
 - 4——timothy
 - 5——barley
26. The feeding of grain to a heavy producing dairy cow on pasture usually is:
- 1——an unprofitable practice
 - 2——a practice, the profitableness of which has not been determined
 - 3——a profitable practice
27. Of two soils one high and one low in organic matter, the one having the greatest amount will hold:
- 1——most water
 - 2——least water
 - 3——they will both hold water equally well.
28. Check the farm crop having the highest lime content:
- 1——corn
 - 2——oats
 - 3——wheat
 - 4——alfalfa hay
 - 5——clover hay
 - 6——timothy hay
29. A poultry ration that contains only corn, wheat and oats is lacking in:
- 1——protein
 - 2——fibre
 - 3——carbohydrates
 - 4——fat
30. A butterfat average of 400 pounds for a dairy herd is:
- 1——low
 - 2——average
 - 3——high but possible
 - 4——impossible
31. The only disinfectant which will kill the round worm eggs in farrowing pens is:
- 1——creosote dip
 - 2——kerosene
 - 3——boiling lye water
 - 4——carbolineum
32. Check the two largest costs in the production of butterfat:
- 1——labor
 - 2——depreciation of dairy herd
 - 3——housing of dairy herd
 - 4——feed
 - 5——insurance
33. The low price of oats since 1920 has been caused by the fact that:
- 1——we have fewer beef cattle to eat the oats
 - 2——farmers have quit feeding oats to dairy cattle
 - 3——there has been an increase in the production of oats
 - 4——there are fewer horses on the farms and in the cities
34. White diarrhea of chicks is caused by:
- 1——a contagious organism
 - 2——improper feeding
 - 3——improper brooding
 - 4——lack of sunlight
 - 5——inbreeding

35. The large variation in hog prices throughout the year is mostly caused by:
- 1_____packers' manipulation of the market
 - 2_____seasonal demand for pork
 - 3_____competition of beef and mutton
 - 4_____variation in number of hogs marketed at different seasons of the year
36. The present United States Secretary of Agriculture is:
- 1_____Jardine 3_____Legge 5_____McNary
 - 2_____Hyde 4_____Wallace 6_____Haugen
37. The Land O'Lakes is:
- 1_____a large centralizer creamery 3_____a firm of butter makers
 - 2_____a co-operative sales organization 4_____a commission firm
38. Glabron is
- 1_____an off colored chicken
 - 2_____a noxious weed
 - 3_____a smooth awned variety of barley
 - 4_____a high yielding variety of winter wheat
 - 5_____a breed of hogs
39. Contagious abortion of cattle is caused by:
- 1_____lack of minerals 4_____filthy conditions
 - 2_____over-feeding 5_____too heavy milk production
 - 3_____an infectious organism 6_____accidents
40. Money loaned through federal farm loans is obtained by:
- 1_____the general taxes
 - 2_____selling bonds secured by farm mortgages
 - 3_____borrowing money from local banks
 - 4_____borrowing money from federal reserve banks
41. Check the two crops which are most sensitive to lack of lime in the soil:
- 1_____alsike clover 5_____potatoes
 - 2_____soy beans 6_____alfalfa
 - 3_____sweet clover 7_____timothy
 - 4_____millet 8_____bluegrass
42. In growing habits red clover differs from alsike clover in that:
- 1_____one has a tap root system while the other does not
 - 2_____one is a legume and the other is not
 - 3_____one is biennial and the other perennial
 - 4_____one grows on sweet soil and the other will not
43. The object of co-operative marketing is:
- 1_____to fix prices on the basis of cost of production
 - 2_____to get the best possible price for the producer
 - 3_____to eliminate the middlemen
 - 4_____to regulate production
44. Trials comparing the rate of gain between pure bred hogs and cross bred hogs indicate that:
- 1_____there is no difference in rate of gain
 - 2_____the pure bred gain the faster
 - 3_____the cross bred gain the faster
45. Check the two states highest in number of dairy cows:
- 1_____New York 4_____Illinois 7_____California
 - 2_____Wisconsin 5_____Iowa 8_____Washington
 - 3_____Minnesota 6_____Texas

46. In selecting seed corn from the field you should :
- 1_____choose the best ears regardless of stalk conditions
 - 2_____choose only from single stalk hills
 - 3_____choose only from hills having several stalks
47. The most effective way of preventing losses from flax wilt is by :
- 1_____a 4-year rotation of crops
 - 2_____using wilt resistant varieties
 - 3_____treating the seed before planting
 - 4_____using fertilizer
48. On the basis of average yields of oats and barley in Minnesota over the past few years :
- 1_____they are equal in pounds of feed produced per acre
 - 2_____oats ranks higher than barley
 - 3_____barley excels oats
49. Necro is :
- | | |
|--------------------------|----------------------------|
| 1_____a disease of hogs | 4_____a lubricating oil |
| 2_____a disease of lambs | 5_____a disease of poultry |
| 3_____a mineral compound | 6_____a stock tonic |
50. The most common cause of so called sour soils is :
- 1_____lack of adequate drainage
 - 2_____leaching out of lime from surface soil
 - 3_____lack of potash in surface soil
 - 4_____insufficient air in the top layer of the soil