THESIS

on

SOME FACTORS CONCERNING ECONOMIC RESEARCH BY COOPERATIVES

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CHAPTER I

INTRODUCTION

Purpose and Scope

The purposes of this thesis are (1) to present, to cooperative officials, to students of cooperation and to others interested in the cooperative movement, the nature and extent of economic research now carried on by some of the large cooperatives, and to point out the place that business studies may take in cooperative organizations; (2) to discuss a general plan for economic research in cooperatives, indicating some of the chief factors to be taken into consideration; and (3), to discuss in detail a method of statistical analysis as it has been applied to a specific problem in cooperative management.

This treatment is not intended to be exhaustive but merely to deal with some factors concerning the subject.

A discussion of economic research in cooperatives certainly should not be confined to the work of those cooperatives which maintain research departments. This type of work is carried on, in varying degrees, by some associations through regular departments, such as the sales departments and standardization departments.
Definition of the Term 'Economic Research'

In general use, the term "research" is broad and widely applicable. The term "economic research" is likewise rather indefinitely interpreted. It seems well to have an understanding at the outset as to what is meant by the phrase in this discussion. There appears to be little advantage in distinguishing between technical and biological research and economic research, inasmuch as the motives underlying both are so interrelated that often they go hand in hand.

Economic research as used here includes any studies made of any phase of the cooperative business which may aid in determining sound business policies and in improving methods of operation. It may include the analysis of problems dealing with the actual marketing operations of the association such as those of trucking, processing, grading and packing, storing, utilizing by-products, accounting, and financing. It may include the collection, analysis and dissemination of market information, the study of markets, sales methods, advertising, or of public policies which have a bearing on the welfare of the industry in which the association is functioning. Hence, the term as applied to cooperation is very broad.
The Statistical Analysis

The concluding part of the thesis deals with statistical analysis as applied to a practical problem in cooperative plant management. The problem treated is one of a preliminary study to obtain some information concerning the inter-station transferring of live poultry with a view to measuring losses in weight resulting from the process of transference. The incentive for the investigation was the hope of discovering facts which might aid in deciding economical policies to follow in handling poultry in the early stages of marketing. The purpose of this treatment is not to present a contribution to handling practices, but to set forth a practical method of approach to the problem, and to point out some of the obstacles and limitations found in the study.

Sources of Data

In connection with this study a questionnaire was sent out to over seventy of the large cooperatives in the United States representing the principal agricultural commodities: Dairy products, grains, fruits and vegetables, nuts, poultry and eggs, livestock, wool, tobacco, cotton, and others. Most of these cooperatives are of the large central or federated types with local units, branches.
or affiliated organizations. Only a few of the small, independent cooperatives were included in the list. The list was made up principally of marketing and selling organizations, although a few bargaining and educational associations were included.

It is quite safe to assume that as a rule those associations that are taking the most interest in research work answered the questionnaire. About thirty answers were received. Although this number is not sufficient to warrant the drawing of definite conclusions, the results give some indication of the attitude that officials of large cooperatives are taking toward economic investigational work.

The information for the treatment in Chapter IV was derived from a problem which was actually studied in a leading egg and poultry cooperative of the Pacific Coast.
CHAPTER II

JUSTIFICATION FOR ECONOMIC RESEARCH BY COOPERATIVES

Need for Business Studies

With the development of large-scale cooperation, cooperative associations take on many of the characteristics of other large business organizations. Volume of business, in some cases has run into the millions of dollars. During 1929 one association\(^1\) carried on a business of over $161,000,000. Marketing cooperatives with five and ten million-dollar businesses are becoming relatively numerous. The large associations as a rule have complex forms of organization and set-up. New phases of operation are being undertaken which in turn lead to the development of new departments. The departmental form of management is decidedly noticeable in large cooperatives. Economical and efficient operation and the coordination of the various phases of the business warrant careful study and analysis.

The determination of management policies is one of the chief duties of cooperative officials. Sound policies are based upon facts and reasonably dependable information.

\(^1\) National Livestock Producers Association.
A leader in cooperation well expresses the present tendency of cooperatives as follows: "In our contacts, in the Division of Cooperative Marketing, with managers and officials of cooperative associations, we have definite evidence that they are gaining a clearer comprehension of their problems and that cooperative business is being carried on more and more in accordance with carefully developed plans and less and less by rule-of-thumb methods and guesswork". ¹

There is nothing magical about mere cooperation and few associations can hope to carry on for long unless efficient operation is practiced. Where cooperatives have to compete with established private marketing agencies, they cannot always make the great savings expected to result from cooperative enterprise. It has been said that unless a cooperative can render to the farmer the same services as the private dealer at a less cost or more and better services at the same cost, then one outstanding factor justifying the existence of such an association is lacking. Several officials have stated definitely that they find efficient management essential to success-

¹ Chris L. Christensen, "Significant Trends among Agricultural Cooperatives". Mimeographed publication, Division of Cooperative Marketing, Bureau of Agricultural Economics.
ful operation and effective marketing.

Men who are responsible for the operation of the various phases of a cooperative business generally do not have sufficient time and often lack the proper training to work out the most efficient processes and systems. The research director devotes his time and energy to obtaining economic information for the association.

Agricultural leaders are awakening to the realization that one of the greatest weaknesses in the agricultural industry, as compared with other businesses, is the lack of understanding on the part of producers and marketing agencies of supply and demand conditions. One of the chief needs in improving the present situation is the investigation and assimilation of market information and the coordination of this with production policies. The Cooperative is in a position to perform a valuable service as an intermediary in accumulating this practical information, applying it to marketing practices, and passing it on to producers.

Another need in the agricultural industry is the development of standard methods of handling the commodities. Agricultural marketing is relatively unorganized and the methods of handling many agricultural products are for the most part unstandardized. This is particu-
larly true with many perishable products. Organized marketing through cooperatives is a comparatively new form of enterprise. A big problem facing the cooperatives is one of working out feasible methods and processes of getting the product in a suitable form that will reach the consuming public in a desirable and attractive condition. At the same time this must be done at a cost which will bring profitable returns. Cooperatives, in this respect, have pretty much the same problems as the big meat packers, chain stores and other agencies dealing in food stuffs. This function of working out economical, standardized marketing practices necessitates careful study and may involve a great deal of experimentation.

There has been a tendency to establish a large number of individual brands. In view of the fact that relatively small quantities of products may be sold under local brands, the market in which each brand becomes recognized is limited. Cooperative officials are feeling the need for developing a few standard brands which may be sold under well established trademarks in order that a wide reputation may be built up in the regional, national, or world markets, as the case may be.
The Cooperative's Research Policy

Even in the smallest organizations there is doubtless room for some business investigation. The question which arises is to what extent investigations should be carried on. Should limited studies be conducted under the immediate supervision of the manager or other official connected with the management; should such studies be considered a part of the regular operation, each official studying those problems related to his phase of the business; or should the association maintain a distinct research department with a trained and experienced research director and staff? How much time and money should be expended for such work?

These are, of course, questions of policy which must be solved by the directors and officials. Some of the factors which should be taken into consideration, however, may be pointed out here.

The size of the organization and the volume of business will go a long way toward determining the extent of the research program. Large-scale or national associations which are handling an appreciable percentage of the commodity may find it feasible to conduct investigations leading to the improvement of production or marketing conditions of the commodity as a whole. On the other
hand, small local associations will necessarily restrict their studies to problems which have an immediate bearing upon their own operations.

The nature of the commodity and the scope of operation will determine largely the number of problems and the need for investigations. Some commodities, such as perishables, tend to present a greater need and opportunity for investigational work than relatively stable commodities that require little processing before being placed on the market.

Services performed by associations range from collective bargaining to the complete marketing program including the following eight functions or services which have been recognized as parts of the marketing process: standardizing, assembling, selling, transporting, storing, financing and risking, processing, and dispersing.\(^1\) Obviously, the greater the number of services performed by the association, the greater will be the need for economic studies.

Another factor to be considered in this connection, is the degree of organization and standardization of the commodity and of the methods of handling it. Efforts on the part of the Federal Government to develop

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\(^1\) Oregon Agricultural College Extension Bulletin 406, "Factors in the Organization of Cooperative Associations", by George O. Gatlin.
standards for agricultural products are evidences of the importance of such work. Cooperatives handling products for which few or no uniform standards have been developed may find themselves confronted with this task. The same applies to methods and processes of handling such commodities.

Research Now Carried On By Some Cooperatives

Scope of Economic Research by Cooperatives.

As to the scope of research work carried on in the some 12,000 cooperatives in this country, little can be said. In this study, contacts have been made with only about twenty-five of the largest marketing and selling associations. Most of the organizations reporting investigational work did business of well over a million dollars during the 1929 season. About forty of the seventy associations did not reply to the questionnaire. That this is conclusive evidence that extensive economic studies are not made by those associations is, of course, questionable. It is safe to believe that the majority of the small organizations do not devote much attention to business analysis.

On the whole, probably the field of economic research is practically untouched by cooperatives. The possibilities for development along this line appear to
be great. The report of the Research Department of the National Livestock Producers Association illustrates quite well what may be done along this line by large organizations. The privilege is taken to include this report in the appendix.¹ With the development of national and regional organization set-ups now being encouraged by the Federal Farm Board it is probable that more of this type of work will be done by the overhead organizations in the future. Undoubtedly many of the small associations can well afford to carry on some economic studies in connection with the operation of their businesses.

Most of the twenty-five associations from which replies were received carry on some sort of research work. Only eight reported that they maintain a separate department for this purpose. More often it is carried on by the regular departments, each department studying the problems connected with its phase of the business. In a few instances investigations are conducted by a research department or organization maintained jointly by several cooperatives. Six apple associations of the Pacific Northwest have organized the Northwest Council of Apple Cooperatives, through the medium of which they

are launching research studies along the lines of trade practices. The cotton cooperatives of the south conduct research on a joint basis supporting the work by a per bale contribution.

The sums of money appropriated specifically for economic investigations are not an accurate indication as to the presence or absence of this kind of work. Nine associations reported that specific sums were appropriated or expended for economic research. These sums ranged from $500 to $30,000. Other associations indicated that, although no specific appropriations were made, considerable money was spent for this work as a part of the regular operations.

An idea as to the nature of the research work now carried on by some cooperatives may be obtained by reviewing some of the projects described by the officials with whom contacts have been made.

**Market Information.**

The assimilation of market information appears to be one of the chief phases of economic research by cooperatives. This work includes studies of market demands, of changes and trends in demand, of the supplies and conditions in the market, storage holdings and movements, and the like. For example, one federation\(^1\) has studied

\(^1\) National Cheese Producers' Federation.
"The changing trends of the distribution of the commodities which it handles, the changes brought about due to the advent and development of process cheese, and its effect upon the movement of natural cheese into consumptive channels."

In some instances, especially in the case of widely grown stable commodities, studies are made of foreign conditions and of import and export conditions. The California Fruit Exchange, in cooperation with the University of California, has been investigating marketing conditions in the Orient and the storage and transportation problems related to these markets.

Market information is applied in determining policies concerning the when, where, and what to market, price quotations, storage, and the like. Some associations pass the information on to the growers and in some instances use it as a guide in recommending practices to the members.

**Prices.**

Price analysis is also an object of study. One association\(^1\) reports studies concerning the relation of milk and grain prices. A cotton association\(^2\) has

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1 New England Milk Producers Association.
2 Texas Farm Bureau Cotton Association.
investigated and is now studying "the relation of price to world conditions, the relation of production to price, the relation of foreign growths to American growths and how they affect price and the study of market trends based on a general commodity index and American as well as world conditions".

Production. --

Some officials indicated special efforts to improve production methods of the members. In some instances this consisted of finding out the results of research studies made by governmental, state and other research institutions, and passing these on to the growers; in others, of making special studies of problems related to production methods and production programs, independently or in conjunction with other agencies. Among those reported are studies concerning economics of production, improvement of quality, utilization of proper qualities of fertilizers and seeds, methods of pest control, adjustment of production to fit demand, and the like. Several associations employ field men who make contacts with the member growers and carry on this type of work.
Efficient Operation. --

Economic studies directed to develop efficient and economical operations deal with such problems as marketing costs, operating costs, seasonal variation in operating load, accounting practices, utilization of by-products and economical methods of processing and manufacturing. Serious concern is given, in some instances, to the development of new methods of processing and new types of products.

Standardizing, grading and packaging. --

Some associations have considered these phases of sufficient importance to warrant establishment of a standards department. Considerable research work is conducted through such departments, particularly in regard to grades and their effect on the markets, to the development of new crops or more suitable varieties, and to the use of new packages. Efforts have been made, in some cases to build up a few standard grades under which a large quantity of the product can be marketed and a wide reputation established in the markets for the quality products of the association.1

1 California Fruit Exchange.
Other Projects. --

Two national associations\(^1\) and one produce exchange\(^2\) indicated specifically that they are taking part in or are fostering the investigation of national problems related to their respective commodities. Efforts along these lines have been directed to improving the status of a particular commodity and to studying its relationship to other commodities. Influence has been exerted also on public policies such as those of tariff making.

The element of credit is receiving attention in the cotton belt and in other regions. Since the advent of the Federal Farm Board, studies have been made of the credit situation and efforts are being made to take advantage of the existing credit facilities.

Mutual fire insurance is being studied in some of the cotton districts.

Other problems which are being subjected to economic investigations are related to claims, rates and adjustments, refrigeration, transportation, and similar phases of the cooperative business.

\(^1\) National Livestock Producers Association.  
National Pecan Growers Exchange.

\(^2\) Eastern Shore Produce Exchange.
Sources of Information and Data. --

The sources of information and data used in the research studies reported may be treated under two general heads: (1) Those within the association, and (2) those outside of the association.

Within the Association: Three chief sources of information may be found within the bounds of the organization itself. They are (1) association records, (2) collection of specific data, and (3) experiments. The very nature of cooperative operation generally necessitates the keeping of extensive systems of records and accounts. These records may constitute one of the chief sources of information for investigations, particularly for studies concerning management policies and practices. Frequently specific data and information needed for such studies may be collected at nominal costs. Experiments carried on in conjunction with the various departments offer possibilities for working out new processes and methods.

Outside sources: In answer to a question concerning the chief sources of information used in economic research studies, one official replied, "Every possible and available source". For studying markets, marketing conditions, and market information, there is a host of
literature put out by public and private agencies.¹

Large quantities of this material are in the nature of bulletins, pamphlets and circulars covering studies of specific problems and projects. Other information, especially that dealing with current conditions, is furnished in periodicals. This information is supplied in official publications by the federal and state governments, colleges, universities, and the material furnished cooperatively by these public agencies through the medium of the extension service and experiment stations. Most of the associations reporting economic research work indicated that they use this information freely.

Oftentimes valuable information may be obtained by studying the operations and practices of other agencies handling similar products.

Attitude of Cooperative Officials Toward Economic Research.

The answers to a question as to what particular value, if any, they had found in economic research studies shows quite well the importance that some officials

¹ See "Market Research Agencies", a guide to publications and activities relating to domestic marketing. Published by the United States Department of Commerce.

See "Principal Sources of Economic Information", Published by the Bureau of Agricultural Economics, United States Department of Agriculture, December 1, 1926.

See "Research in Progress in Bureau of Agricultural Economics", Published by Bureau of Agricultural Economics, June 30, 1929.
assign to this type of work. Two or three indicated that their associations were too small to afford such work. Generally, however, the attitude was found to be decidedly in favor of investigational studies. A few examples of the answers may illustrate. "We find that it is absolutely necessary for us to maintain this type of work if we are to be able to meet competition and keep our members properly satisfied." 1 "Such work is considered quite valuable and necessary for the successful operation of such an organization. It makes possible the rendering of additional services to members and patrons of the Association." 2 "A better understanding of conditions, especially in our guidance for the sale and fixation of prices of cotton." 3 "Better use of sales opportunities; more saleable and less competitive form of products." 4 "Research work enables us to market our product efficiently. Perhaps the most valuable information to us is business trend, and import and export data." 5 "All have been practical." 6 "Statistical information makes it possible

1 National Cheese Producers' Federation.  
3 Texas Farm Bureau Cotton Association.  
4 Sun-Maid Raisin Growers Association.  
5 California Walnut Growers Association.  
6 California Fruit Exchange.
for us to advise our member producers relative to their production problems, time of marketing, etc. This is a very important phase of our work."¹ "Promotes better efficiency in plant."² "Of much value on marketing information. Of much value in cooperative and organization progress."³ "Your judgment is no better than your information."⁴

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¹ Milk Producers of Central California.
² Western Cattle Marketing Association.
³ Maryland Tobacco Growers Association.
⁴ Western Cattle Marketing Association.
CHAPTER III

A GENERAL PROCEDURE OF ECONOMIC RESEARCH
BY COOPERATIVES

Selection of Problems to be Investigated

It is doubtless true that in most large cooperatives the question is not whether there are problems which need solution but what problems should be investigated. At the start, a program of economic research naturally involves a preliminary survey of the various phases of the business to reveal the general condition of each and to find out the problems related to each. Such a survey would be most advantageously conducted by an experienced research director and should form the basis of later studies. The selection of problems should receive careful attention in order that efforts and expenditures will not be made in vain and that they will be made where most needed and where they likely will do the most good.

Some of the factors which will bear consideration in choosing the problems to be studied are:

1. The number of important problems.

2. The relative importance of each problem.
3. The probable importance of the discoveries which may be made.

4. The information and data available.

5. The probable time and cost involved in the study.

6. The size and qualifications of research staff.

**Plan of Investigation**

In order that the problem may be well understood and the study carried on in a reasonably systematic way with a somewhat definite object in mind, a plan of investigation generally should be laid down insofar as possible at the outset. It goes without saying that plans may be altered as developments and findings at any point of the study warrant. However, unless as complete a plan as possible is worked out at the start, there is the chance that considerable time and energy will have been spent before some obstacle, such as insufficient or inadequate data, will be found and continuation of the study will not be feasible.

**Statement and Delimitation of the Problem**

The problem should be stated as definitely as possible and the statement based upon the opinions and be-
lies of those acquainted with the situation. Having set up a theory as to what the trouble is, what information is needed, and what the investigation is likely to reveal, the investigator is in a favorable position to proceed with the study. The various features of a cooperative business are so interrelated that a particular problem may involve many factors. Here again the judgment of the trained and experienced research director may play an important part in deciding how far the study can and should be carried and yet be of significant and practical value.

Effort should be made to find out just where the trouble lies and what bearing it may have on other phases of the business.

Careful consideration should be given as to what may be expected to be done with the data available. Some forces may be measured accurately while others may be measured only partially or not at all. The reasonable measurement of a few factors, however, may be valuable in that it may place the investigator in a more favorable position to estimate the influence of other forces.
Gathering Information and Assembling Data

Only general statements can be made here concerning the collection of information. This, of course, depends upon the nature and source of information desired. Accordingly, it may be obtained from within the association, or by visits, conferences, correspondence, studies of published material, and contacts with other outside sources.

In assembling data, regardless of whether they are taken from association records or from other sources, the material should be carefully examined to determine whether the data available are suitable for the study. They may have to be put into suitable form or even discarded. Intelligent appraisal of the data requires a thorough understanding of just what they represent and of what use is expected to be made of them.

Statistical Computations

Unless statistical computations are treated by those who have some knowledge of the principles governing the use of data, even relatively simple calculations may be misleading and misrepresentative of the facts which they apparently present.

The trained statistician is acquainted with varie-
ous methods of testing and checking computations for validity of results. The case of averages may be cited, taking prices or cost figures, for example. An average of a series of prices or cost figures may mean little as a fair representation of the existing conditions when the variation in individual prices or cost figures is relatively wide. The value of an average may be tested by what is known as the coefficient of variability or the variation of the individual figures from the average.

Again, and in connection with averages too, the size of the sample of data or the number of prices or cost figures may have an important bearing on the dependability of results of computations.

Attempts at correlating several factors are generally a job for the statistician. As a statistical method for measuring relationships correlation has its place. Intelligent application of the correlation method may, however, depend upon an appreciation of its limitations.

**Interpretation of Results**

Perhaps one of the most important parts played by the experienced research director and competent cooperative officials is that of analyzing and interpreting the information and the statistical results obtained. The
success of the whole program of economic research depends largely upon the ability of the investigators to interpret intelligently the results of the investigation. The results of the study should be presented in an unbiased manner. Oftentimes an inexperienced research worker feels that in order to show results he must prove that a certain condition exists. It is well to keep in mind that it may be just as important to find out that a certain situation does not exist or to show that trouble does not exist where it was believed to lie, or that the trouble is not sufficiently serious to warrant a change of policy.

**Application of Results**

The information should be drawn up in suitable form for presentation to the directorate and management of the association. Tables, charts and explanatory statements used to show the facts should be as simple and clear as possible. Unnecessarily voluminous reports generally are not welcomed by directors.

The application which may be made of the information obtained through the study depends, of course, largely upon the facts learned. One point may well be made here. Statistical computations in themselves are not
necessarily conclusive evidence that certain policies or practices should be adopted. Statistical methods are merely tools for use by the economic investigator and should be considered as such. In some cases calculations may furnish all of the information needed. In any case, however, statistical computations should be taken for what they are worth and generally should be considered as a contribution of evidence and as a supplement to other information, all of which are subjected to the exercise of sound judgment.
CHAPTER IV

A PRACTICAL APPLICATION OF ECONOMIC RESEARCH TO A PROBLEM IN COOPERATIVE POULTRY PLANT MANAGEMENT

Although the data and information available at the time this investigation was made were found to be too inaccurate and too inadequate to show satisfactory results, the treatment presented here will serve as one illustration of the possibilities and limitations in the uses of statistical analyses in cooperative management problems involving the use of data. It is intended also to point out some types of difficulties which one may expect to encounter; difficulties which may require considerable time and effort to overcome.

The method presented is the one which was followed, as far as this study was carried. The treatment suggests a method of attack for similar problems.

The Problem of Inter-Station Transferring of Live Poultry

The poultry industry generally includes many farm flocks widely scattered throughout a poultry producing region. The cooperative marketing enterprise under consideration here involves the maintenance of a relatively large number of local assembling units with a few central
killing and packing plants. This feature necessitates considerable transporting of live poultry to the central plants.

The cost of handling live birds is significant. In addition to the actual expense of trucking, there is another cost resulting from losses in weight of the live birds while being moved. It was the opinion of the cooperative officials that the costs of handling the live poultry are excessive and that an investigation was warranted. A decision was made to study the situation with a view of finding out whether some means could be discovered whereby savings might be realized. It was believed that such information would be helpful in determining the location of plants and in formulating efficient management policies.

Plan of Investigation

The plan for the study was built primarily around two questions: (1) What is the loss in weight of live poultry when transferred from one station to another? and (2) what is the relation of the various factors believed to cause shrinkage to the total loss in weight?

The basis of the investigation was the judgment and opinions of the cooperative officials and others
acquainted with the characteristics of live poultry and its general reactions to handling.

It was suspected (1) that live poultry shrink in weight when transferred resulting in significant losses, (2) that the total losses in weight could be measured by the use of data taken from the association records, (3) that several factors affect the amount of shrinkage, the most important probably being the time en route, distance hauled, climatic conditions and feeding practices, (4) that the influence of some of the factors on shrinkage can be measured either wholly or partially, and (5) that the information obtained might be applied to later studies made with a view of improving the situation. Concerning the latter it was suggested that, in the event that the evidence collected was found to be sufficient to substantiate the above opinions, several methods might be considered for improving matters. For instance, if a relatively large part of the loss in weight was found to be due to certain factors, the causes might be eliminated or partially removed. In some cases the number of live shipments might be reduced by eliminating unnecessary transferring of live poultry. Again, it might be found advisable to maintain temporary or permanent killing plants in certain local areas. In this
case the poultry could be transferred in the dressed rather than the live state.

It should be pointed out that the factors mentioned above were not believed to be the only ones which affected the shrink in weight of poultry when moved. Some other factors including the condition of the birds and the ranch practices were suspected of having a slight influence. Hens which had just completed a heavy laying period were suspected of reacting differently to transportation than light layers or non-layers. Fat hens, it seemed, would be likely to react differently than hens in poor condition.

There were no data concerning these conditions and it was not considered feasible to extend the investigation beyond the local station to the producer. However, these factors should, of course, be kept in mind when the results of the investigation were interpreted.

Data were not available for measuring the influence of feeding practices at the stations nor for an accurate measure of the time en route of transfers. It was aimed to measure the total shrink in weight for shipments from each station to the central plants and from each plant to other plants, and, insofar as possible, the influence of distance hauled and of the variations
in climatic conditions. Knowing these, it was believed that the position for estimating the effects of the other factors on loss in weight would be more advantageous.

**Direction of Poultry Movements**

A preliminary step in the investigation was one of finding out just where the live poultry transfers were taking place. Generally the live birds are moved from the local stations to the central killing and packing plants.

Most of the shipments of poultry are hauled by trucks, owned and operated by the association. A few lots, however, are transported by rail and in one instance the birds are carried by boat.

Inter-station transfers may take place for various reasons; the principal one being the movement to the central plants for processing. The general rule is to hold the broilers at the central plant for a few weeks for fattening. Hens and other fowl are generally dressed shortly after arrival. At certain times, usually the peaks of the moving periods, receipts at a plant may be larger than the handling capacity of the plant. In such instances it is necessary to make transfers to some other plant. Another reason for transferring poultry may be
to supply market demands in certain localities. It may be mentioned that, in addition to serving as assembling places for members' poultry, the local units generally act as feed distributing stations. Sales of poultry are made at any plant or station where a market exists.

In order that a picture of the inter-station movements might be obtained, it was proposed to show the volume of transfers to each plant and to other points by graphical presentation. The data needed were obtained from the association records.

The poultry handled through the association at the time of this study were graded into more than a dozen grades. Obviously, any system of charting all movements by individual grades and by months would be too confusing to be of practical value. If they are to be of practical use to the cooperative officials, graphs, of course, should be made reasonably simple, clear and comprehensive. No more charts than are necessary to show the facts should be presented. In view of this fact, it was decided to group the grades into two classes, (1) broilers, and (2) hens and miscellaneous fowl. The chief reasons for keeping apart the hens and broilers were that the heavy moving months for hens are in the fall and spring while most of the broilers are marketed
around May, June and July. Furthermore, as has been pointed out, broilers are generally held for several weeks at the plant for finishing while hens are generally dressed on arrival without any attempts to fatten them. Again, broilers were believed to react more sensitively to handling and were suspected of suffering greater losses in weight when transferred.

One difficulty which was encountered in plotting the poultry movements was the wide range in the total number of head transferred from certain stations in different months. The total volume of shipments varied in some instances from less than one hundred to over sixty thousand head. In order to plot the movements on charts of convenient size, it was necessary to work out a suitable unit for each station which would show satisfactorily the total number of head transferred in each month.

Charts constructed according to this plan showed the directions of poultry transfers and also the periods of heaviest movements.

**Computing the Loss in Weight**

Two groups of data were needed for computing the loss in weight of poultry transferred, one group showing the shipping weights, and a second group showing the
receiving weights of the same shipments. This information was found in the association records.

At the time a lot of poultry is received from a member at the local receiving station, it is graded and weighed and the number of head are noted with the weights on a station transfer invoice. When the transfer to a central killing plant is made, the shipment, upon arrival, is again graded and weighed and the number of head together with the weights is recorded by grades on a receiving ticket.

Assuming that all types of poultry do not respond alike to handling, it seemed advisable to group the grades into four general classes: hens, broilers, rejects, and miscellaneous fowl. The miscellaneous group was made to include roasters, capons, slips, staggs, old cox, ducks, geese, turkeys, rabbits, and others.

At first it appeared to be a simple matter to compute the loss in weight of transfers. It seemed that the difference between the sum of the receiving weights and the sum of the shipping weights for a month, expressed in a percentage figure, should give the average per cent of shrink in weight for that period.

In view of the fact that the nature of the records would have made it a laborious task to assemble
figures for all transfers made during the year, data were compiled for two sample months. To include a heavy broiler and a heavy hen moving period, June and October of 1939 were chosen as representative months. These two months were fairly representative of climatic conditions during the marketing season.

For convenience, the central killing and packing plants may be designated as plant A, plant B, etc., while the local receiving units may be referred to as station 'a', station 'b', station 'c', etc.

Figures were assembled and the average percentages of shrink were computed for transfers made from stations and other plants to plant A during June and October. Taking the difference between the sum of the shipping weights and the sum of the receiving weights of the transfers made to plant A from each point of origin and expressing these differences in percentage terms presumably gave the average percentages of shrink for transfers from each station and from each other plant.

Wide variations in the averages computed gave reason to question the reliability of the figures. Take the case of transfers from plant C for example. Computations showed an average shrink of 2.2 per cent for June shipments of hens. In contrast, the average shrink
as computed for October transfers was 12.2 per cent. There was little apparent reason to expect such a wide variation in loss of weight for shipments from the same plant in different months. Such conditions prompted a check up on the nature of the data.

A comparison of the two groups of records showed that the total number of head of a certain class of poultry shipped from plant C to plant A did not correspond to the number received at plant A. The same situations were found in the cases of total transfers from other plants and from local stations to plant A.

A detailed examination of the corresponding records of individual shipments revealed a rather marked interchanging of grades resulting from the process of transferring. Generally the shift in grades was downward; that is, some birds shipped in one grade were placed in lower grades upon arrival at plant A.

The interchange of grades was so frequent that it was necessary to adjust the grouping of the grades. There was, however, practically no interchanging between the broilers and the other classes of fowl. The two general classes which appeared to suit the situation were (1) broilers and (2) hens and miscellaneous fowl.

This example suggests the importance of understand-
ing the true nature of the data in order to know whether they show the real situation.

The following treatment illustrates how the computations were checked for reliability and what was done in trying to iron out the irregularities in the records with a view of getting the data into usable form.

Having set up a new classification of groups, it was found advisable to calculate the loss in weight for each individual transfer made to plant A during June and during October. This having been accomplished the average per cent of shrink for June and October shipments from each plant to plant A was found by computing the arithmetic mean of the percentages of shrink of all transfers from the respective plants during each month.

Reliability of the Averages

It was very important that the dependability which might be placed on the computed averages as a fair representation of the loss in weight be tested. The averages with their standard deviations and coefficients of variability are given in the table below. No figures are given for broilers where the number transferred was insignificant.
As may be seen in the table, little consistency is indicated in the average percentages of shrink, even for transfers from the same plant in different months. It may be noted further that the coefficients of variability are very high in nearly every case, indicating relatively wide ranges in the percentage of shrink in individual shipments. June shipments of hens from plant D, for instance, showed a mean shrink of 6.3 per cent and a coefficient of dispersion of .77. The percentages of loss for individual shipments ranged from 0 to 17 per cent. In this case it is quite obvious that the average of 6.3 per cent is not a fair indication of the true situation. Whereas the mean is considered to be of little value if

<table>
<thead>
<tr>
<th>Plant transfers</th>
<th>HENS &amp; MISC. FOWL</th>
<th>BROTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (Shrink)</td>
<td>Stand. Dev.</td>
</tr>
<tr>
<td></td>
<td>Month</td>
<td>Shrink</td>
</tr>
<tr>
<td>Plant A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant B</td>
<td>June: 2.9</td>
<td>2.25</td>
</tr>
<tr>
<td></td>
<td>Oct: 2.7</td>
<td>2.02</td>
</tr>
<tr>
<td>Plant C</td>
<td>June: 3.8</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>Oct: 2.4</td>
<td>1.63</td>
</tr>
<tr>
<td>Plant D</td>
<td>June: 6.3</td>
<td>4.88</td>
</tr>
<tr>
<td></td>
<td>Oct: 3.1</td>
<td>1.60</td>
</tr>
<tr>
<td>Plant E</td>
<td>June: 6.0</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>Oct: 5.4</td>
<td>2.80</td>
</tr>
</tbody>
</table>


the coefficient of variability is above .20, the mean in this case is obviously of very little value as representative of the shrink of all shipments. October transfers from plant D showed a range in percentages of shrink of from 1.4 to 5.6 with a coefficient of variation of .52. Little reliance can be placed on the average of 3.1 as an indication of the loss in weight of the majority of shipments.

The data were again examined to find, if possible, a reason for the wide ranges in the percentages of shrink. In tracing back to the transfer invoices and corresponding receiving tickets, a partial explanation was found. Knowing the average weight per head for each grade of poultry, it was possible to test the correctness of the recorded weights. In some cases it was found that either the recorded shipping weights or receiving weights were out of line for the grade. Making the adjustment usually brought the percentage somewhere near the average. Such corrections, however, necessarily must be based on average weights, and could not be depended upon to give accurate results. Assuming, then, that the extreme deviations might be due to errors in weighing or to some other abnormal conditions, it was suggested that the average be computed from the inter-quartile range. For such a
method the samples were too small. For example, there were only seventeen transfers in June from plant E. Although from a correct statistical standpoint, the size of this type of sample was too small, it might have been found to be of some value in this particular study had the coefficient of dispersion been low. With the coefficients as they had been found in the computations thus far, the samples were entirely too small to give even a good rough estimate.

Further study was made of the data. Particular attention was given to the rejects. The shipping and receiving figures for each shipment during June and October were listed in such a manner as to show the number of head and number of pounds of hens and miscellaneous fowl, of broilers, and of rejects shipped and received. In studying these figures, it appeared that the shrinkage of rejects was often high, thereby giving the appearance of a high per cent of shrink to the whole shipment. By excluding the rejects from the class of hens and miscellaneous fowl, a narrower range in the percentages of shrink for this class was usually found. Still there were cases of shipments found where the number of rejects received was greater than the number shipped, indicating that some birds were rejected from other grades upon their
arrival at plant A.

Frequently instances were found where the number of head received could not be made to correspond with the number shipped. Discarding figures for shipments in which irregularities appeared made the already small samples of June and October entirely too small to give dependable information. Apparently the only procedure left to follow, with these data, was to check carefully the transfers from each plant or station for as many months as possible in an endeavor to obtain figures which could be considered as dependable.

Because the punch card tabulation of the shipping figures did not always correspond to the figures recorded on the transfer invoices, it appeared that it would be necessary to check the punch card proof sheets with the transfer invoices, if these figures were to be used. First, however, tabulations were made from the punch cards in such a manner as to give the total shipping figures for transfers to plant A, by grades, by months, and by plants making the transfers. In doing this, it was hoped that several months might be found in which the number of head shipped did correspond to the number received, and that computations made with figures for these months would be found to show satisfactorily the informa-
tion wanted. In this case the laborious task of checking the proof sheets would be avoided.

In the tabulations made, it was observed that the first four months, January, February, March, and April must be eliminated. The reason for this was that during the first part of the year, no compensation had been allowed to members for rejects shipped. At the same time, many poor quality birds had been thrown in and shipped along with the other grades, but they had not been recorded on the transfer invoices. They were, however, listed on the receiving tickets in some instances.

Examination of figures for other months showed that monthly totals could not be used in any case for satisfactory calculation of loss in weight of poultry transferred.

It was then decided to calculate the percentages of shrink from the data for May, July, August and September, as had been done for June and October, to see what kind of results could be obtained. The shipping figures for each lot transferred in these months were taken directly from the transfer invoices and checked with the corresponding receiving figures which were taken directly from the receiving tickets.

Computations were made for shipments from each of the plants or stations which had transferred live
poultry to plant A. The results of the calculations made are shown in table II and table III. In the table are shown the number of shipments for each month from other plants. No figures are shown for months during which only one or two lots were moved.

The largest number of transfers made from any one plant in any month was 18. For transfers made from each plant or station in each month, the highest and lowest percentages of shrink are shown. This information, together with a knowledge of the number of lots transferred is important from the standpoint of judging the value of the averages computed.

The narrowest range of the percentages of shrink in any case was 1.8, extending from 6.0% to 7.8%; the widest range, varying from 0.0% to 16.4%, was 16.4. Other percentage ranges varied between these two extremities, the majority, however, being between 2 wide and 6 wide.
TABLE II. AVERAGE PERCENTAGES OF SHRINK IN WEIGHT OF LIVE HENS AND MISC. FOWL TRANSFERRED TO PLANT A FROM OTHER PLANTS, MAY TO OCTOBER (Inc.) 1928

<table>
<thead>
<tr>
<th>Origin</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug.</th>
<th>Sept.</th>
<th>Oct.</th>
<th>6 M0. Average</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. shipments</td>
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<td>10</td>
<td>15</td>
<td>11</td>
<td>16</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>% Range</td>
<td>0.0-5.7</td>
<td>1.2-6.0</td>
<td>1.0-8.5</td>
<td>1.7-5.4</td>
<td>0.5-2.8</td>
<td>1.5-5.5</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.6</td>
<td>2.6</td>
<td>3.5</td>
<td>2.7</td>
<td>2.0</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Median</td>
<td>3.7</td>
<td>1.7</td>
<td>2.5</td>
<td>2.4</td>
<td>2.2</td>
<td>2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>No. shipments</td>
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<td>9</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>% Range</td>
<td>6-7.8</td>
<td>0.0-14.2</td>
<td>4.2-10.4</td>
<td>3.3-8.6</td>
<td>3.4-7.9</td>
<td>0.2-6.7</td>
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</tr>
<tr>
<td>Plant C</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>6.9</td>
<td>6.9</td>
<td>6.7</td>
<td>5.6</td>
<td>5.1</td>
<td>3.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Median</td>
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<td>6.4</td>
<td>5.9</td>
<td>5.6</td>
<td>5.1</td>
<td>4.7</td>
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<td>15</td>
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<td>% Range</td>
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<td>1.7-5.7</td>
<td>1.0-4.6</td>
<td>1.4-5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>-</td>
<td>4.5</td>
<td>4.4</td>
<td>3.9</td>
<td>2.8</td>
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<td>3.7</td>
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<tr>
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<td>4.4</td>
<td>4.2</td>
<td>2.7</td>
<td>2.8</td>
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<td>8</td>
<td>14</td>
<td>18</td>
<td>14</td>
<td>12</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>% Range</td>
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<td>3.8-8.9</td>
<td>3.1-7.6</td>
<td>2.1-7.4</td>
<td>3.5-7.5</td>
<td>3.5-6.3</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
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<td>6.1</td>
<td>5.4</td>
<td>5.3</td>
<td>4.9</td>
<td>4.5</td>
<td>5.1</td>
</tr>
<tr>
<td>Median</td>
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<td>5.8</td>
<td>5.6</td>
<td>5.7</td>
<td>4.4</td>
<td>4.5</td>
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<td>15</td>
<td>15</td>
<td>11</td>
<td>9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>% Range</td>
<td>0.0-16.4</td>
<td>4.7-17.6</td>
<td>2.7-11.6</td>
<td>4.6-3.7</td>
<td>1.5-10.7</td>
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<td>Station &quot;a&quot;</td>
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<tr>
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<td>-</td>
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<td>5.8</td>
<td>5.2</td>
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<td>-</td>
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<td>8.8</td>
<td>5.2</td>
<td>5.2</td>
<td>4.4</td>
<td>6.5</td>
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### TABLE III. AVERAGE PERCENTAGES OF SHRINK IN WEIGHT OF BROILERS TRANSFERRED TO PLANT A FROM OTHER PLANTS, MAY TO OCTOBER (Inc.) 1928

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Plant B</td>
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<td></td>
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</tr>
<tr>
<td>Mean</td>
<td>1.4-3.2</td>
<td>1.7-2.1</td>
<td>4.7-7.4</td>
<td>2.1-4.9</td>
<td>2.2-4.7</td>
<td>0.8-5.0</td>
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<td>3.6</td>
</tr>
<tr>
<td>Median</td>
<td>1.4-3.2</td>
<td>1.7-2.1</td>
<td>4.7-7.4</td>
<td>2.1-4.9</td>
<td>2.2-4.7</td>
<td>0.8-5.0</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Plant C</td>
<td></td>
<td>8.5</td>
<td>7.4</td>
<td>9.2</td>
<td>7.0</td>
<td>5.5</td>
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<td>4.2</td>
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<tr>
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<td>9.2</td>
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<td>Plant D</td>
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<tr>
<td>Mean</td>
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<td>7.5</td>
<td>6.2</td>
<td>8.1</td>
<td>6.2</td>
<td>7.5</td>
<td>6.2</td>
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<td>7.5</td>
<td>6.2</td>
<td>8.1</td>
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<td>7.5</td>
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### Station "a"

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<tr>
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<th>% Range</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.7-10.5</td>
<td>8.5</td>
<td>8.7</td>
</tr>
</tbody>
</table>

The table presents the average percentages of shrink in weight of broilers transferred from other plants to Plant A, May to October (Inc.) 1928, categorized by the origin of the broilers. The table includes the number of shipments, mean, and median for each month, and the overall average for the period.
In some instances, it may be noted, the width of the range approximates the size of the sample. Plant D June shipments of the hens and miscellaneous fowl class, for example, shows a range in percentages of shrink of 5, while the number of shipments was only 7. In such cases one or two relatively high percentages might have thrown the average considerably out of line. It may also be observed that the computed mean averages of the percentages of shrink are relatively small figures as compared with the width of the ranges. Generally the percentages computed were found to be quite uniformly distributed over the range. Obviously, then, the coefficients of variability, if computed, would be very high in nearly every case, and little or no dependence could be placed upon the means as a fair indication of what the loss in weight of a lot of poultry transferred might be expected to be.

With the mean is also shown the median average. In the table the medians run quite closely to the means. The medians, like the mean or the mode, may be of slight value if the number of shipments is small.

At this point the study was brought to a close, at least for the time being, largely on account of a lack of
Interpretation of the Results of the Study

No definite conclusions could be drawn from the information obtained so far in this study. The results of the computations merely suggest that the amount of shrink varies with transfers from different plants or stations and with individual transfers from the same plant or station. The wide variations in the percentages of loss in weight indicated by the computations doubtless are due in part to inaccurate records and partly to differences in handling practices, and other factors.

This much is obvious, however: That the averages which have been computed for the monthly series of transfers are of little or no value as a fair representation of the true situation, and that the records available up to the time of this study are not sufficiently accurate for this investigation. Reliable figures for individual shipments are lacking and, as well, information concerning climatic conditions, time on route, and feeding practices does not exist.

The computations seem to indicate that the percentage of loss in weight of poultry when transferred is of sufficient significance to warrant further study. If dependable data were obtained, the results of the study
might be valuable as evidence in determining the location of plants or in making decisions concerning proposed changes in handling practices and management policies.

**Data and Information Needed to Complete this Study**

To obtain satisfactory information in this investigation it appears that accurate data concerning a relatively large number of individual shipments are needed. The opinion is that lots of live poultry vary considerably in loss in weight during the process of transportation. If this is the situation, large samples are essential to dependable results of computations. Accurate records concerning each shipment are needed showing the shipping weights and receiving weights and also the number of head shipped and received in each case. Careful notations should have been made concerning the number of dead birds and the number of rejects in each lot. The time when each lot was last fed before being weighed out for transferring should be known. Concerning the time en route, information should be made available as to the length of the period between the time at which the shipment was weighed out at the point of origin and the time of weighing in at the destination. Heat is likely the outstanding feature of climatic conditions which affect
poultry in transit. It is suspected that live poultry are particularly susceptible to shrinkage in weight under crowded shipping conditions on hot days. Some information concerning the average temperature during the moving period should be known, particularly, if the relation of climatic conditions to loss in weight is to be measured.

Considering the fact that other problems may seriously need investigating, the time and attention required for obtaining the accurate data mentioned above should receive consideration, of course, from the standpoint of practicability.

With these data, however, dependable information could probably be obtained showing the real percentages of shrink. An analysis of this information might show relatively high or low percentages of loss in weight due apparently to hot or cool weather or to long or short routing times, etc. For general purposes the relative influences of these various conditions might be comprehended satisfactorily by inspection on the part of persons not prepared to place statistical values on the factors.

The trained statistician could, however, determine the relationship between these factors and variations in
loss in weight by the method of partial correlation. In this way the variations in shrink due to hot or cool climatic conditions might be accounted for. The influence of the routing time factor might be determined by the same method. The effects of all factors upon the loss in weight of live poultry transferred obviously are not measurable. Knowing the influence of some factors, however, the position for estimating the effects of others and for comparing the amount of shrink in transfers from different stations under different feeding practices and other conditions would be more advantageous.
CHAPTER V

CONCLUSION

With the present tendency seemingly in the direction of large-scale cooperation, economic research is destined to assume an important role in the cooperative organization. At the present writing this type of work appears to be carried on only to a limited degree even in many of the large associations. Some cooperative officials are realizing more and more the great need for market studies and business analyses and their value to the development of efficient, effective, up-to-date marketing enterprises.

Economic investigational work may be expected to increase as cooperative officials become better acquainted with methods of conducting business studies and of analyzing and interpreting market information.

It appears to the writer that the cooperative holds a strategic position for bringing about a better understanding on the part of the farmer of the supply and demand situation. By studying and interpreting market conditions and applying this valuable information to the cooperative policies, cooperative officials should be able to develop more effective marketing. From its intermediary position the cooperative should be able
to go a long way toward improving the agricultural situation by coordinating production and marketing conditions.
The work of the Research Department of the National Live Stock Producers Association got under way last April. This is a comparatively short period of time, especially in terms of research, but while it is impossible to measure results in terms of dollars and cents, it is rather gratifying to point out some of the accomplishments during the past nine months.

In taking over the research work of the National Producers Organization at that particular time and especially in view of the trends in live stock marketing, and the probable developments following the passage of the Agricultural Marketing Act, it was quite obvious that much of the research work should deal with our national problems.

The lack of supply and demand information on the part of many live stock producers offered an almost untouched field of service, which might be rendered by a marketing organization. In view of this, it seemed desirable to make available in the form of a market service the practical results of our research on market
demand, supplies and prices. In this way, help producers plan their production and marketing so as to obtain more satisfactory returns and at the same time help stabilize market conditions. It is recognized that many of our marketing problems may be solved through informed and orderly production.

It was apparent that there were many marketing problems which would require more or less research so as to bring about a more efficient and successful operation of the various terminal units, subsidiaries, and the whole marketing structure of the organization.

With all of this in mind, the research program of the National Organization has been developed with three general objectives in view, namely:

1. To bring about a clear understanding of the status and needs of the present live stock marketing structure and the live stock industry in general, so as to improve conditions for the live stock producer and to effect policies in regard to a national production and marketing plan.

2. To encourage and bring about a broader dissemination of market information, which would be of particular value to the individual live
stock producer in planning a profitable production and marketing program.

3. To analyze the local market situation and adjacent territory of the various terminal units so as to make available information which will be of value in correcting unsatisfactory conditions prevailing at the market and make for a more successful operation of the terminal associations.

**National Problems**

With Federal efforts for Farm Relief centered around cooperative marketing, our national problems were considered of most importance so the first tangible result of research work was the preparation of a statement entitled, "Major Problems Facing Hog Producers." This was given general distribution within the Organization and was of particular value in indicating some of the major causes of the unsatisfactory conditions prevailing in the whole livestock industry. It served as a basis for many of the policies in regard to our national marketing program and indicated ways and means of solving some of the problems of the livestock producer. A few of the facts and conclusions brought out in this study were:
1. Increased competition of fats and oils and changing dietary habits in certain consuming areas have reduced the domestic demand for lard and the various fat-cuts of pork. This is a problem of vital importance to the corn and hog producer, and one to be attacked from a national viewpoint.

2. Hogs in general are not being bought on the basis of the retail value of their products. This has made for increased direct marketing and indicates the need for official standard grades for hogs and hog products.

3. The lack of stabilization in hog production and marketings is one of the major losses to the hog industry. Developing ways and means of bringing about orderly production and marketing is a national problem and one of vital concern to a national marketing organization.

4. The increased cost of processing and distributing hog products and other meats has been much greater than it was prior to 1920. This has added a decided burden on the livestock producer, especially those producing both hogs and corn. Hogs are not selling on a parity
with products which the farmer buys. This condition has a depressing effect on the industry and may be considered our "Agricultural Problem," as it applies in general to all agricultural products, especially those requiring considerable processing and storing.

Considerable work has been done in developing plans for stabilizing hog production and also ways and means of solving many of our other national problems. The results of these studies are not only of importance to the Producers' marketing organization but of vital importance to the individual farmer and the live stock industry as a whole.

**Service Work of the Organization**

The establishment of a research department involves the assembling and analysis of a large volume of statistical data. Considerable time and effort has been expended in preparing permanent tabulations, record of historical data, analytical tables and charts and indexes which are necessary for future reference and which serve as a basis for a quick analysis of the live stock situation and conditions at any time.

In making practical use of the results of this
kind of research work, the Producers' research department sends out regularly every two weeks a series of eight or more charts along with four or five pages of comment on the current and prospective live stock market situation. This material goes to all the managers of the terminal associations, field men, and many others who make general use of it. Also, this material is being sent on request to a number of men in the Agricultural Colleges and to several State Live Stock Marketing Specialists. At present, the distribution is limited but it is being utilized very much by the terminal associations as a source of material for their market letters and in their radio talks. This gives it a fairly broad dissemination within the organization and to members and shippers. However, it is hoped that this type of service may be expanded and as it becomes more accurate and complete its distribution extended to managers of shipping associations, bankers, and others who are in daily contact with live stock feeders and producers.

Also, to further the general dissemination of this kind of economic material, a full page is used in each issue of the National Live Stock Producer for discussing the current market situation and prospective supply and demand conditions which seem to be of particular value
to the live stock feeder and producer.

Feeding and Marketing Practices

In our analytical studies of prices and supplies, we find very regular and definite seasonal variations during the year. To enable the live stock feeder and producer to take advantage of these and especially to encourage feeders to adjust their feeding practices more to market demands, a publication was prepared especially for those who obtain cattle from the National Stocker and Feeder Pool, entitled - "Cattle Feeding - What Kind of Cattle to Feed and When to Market." The object of this publication was to help the feeder select and feed the proper kind of cattle for the different seasons of the year, and especially follow a plan of finishing and marketing which would give him the greatest net return. Approximately 700 copies of this statement were distributed and about half of them were sent out on request.

A somewhat similar pamphlet was prepared on handling western lambs. This also received a fairly general distribution and seemed to be appreciated by lamb feeders. Material of this nature is being assembled for a publication for hog producers. It, however, will give
more emphasis to the most economical rations and feeding practices which are more important than the time of marketing.

Research Studies Under Way

There are several studies which are under way and will be completed in due time. Most of these, however, are now sufficiently complete for practical use in our analytical work and at present serve as a reliable basis for general conclusions. The following studies are under way:

1. Factors affecting the market supply of hogs. This study is well completed and so far has given a very accurate forecast of the future market supply of hogs.

2. A study of the relation between the price and supply of hogs at Chicago, Indianapolis, and East St. Louis markets has been practically completed and shows significant seasonal variations between prices of the different weights of hogs at these markets.

3. Factors affecting the supply of cattle is a study which has been started recently and it is hoped that this will give an accurate measure
of the number of cattle on feed and especially serve as a reliable index to future marketings of fed cattle.

4. As the hog producer is vitally concerned with corn prices, a study has been about completed which gives an accurate measure of the factors which determine corn prices and something as to prospective prices.

Cooperative Research and Promotional Work

More or less work is being done regularly in cooperation with other institutions and agencies, some of which is along the following lines:

1. A study of yield and shrinkage in marketing hogs is in cooperation with the University of Ohio and the National Order Buying Company.

2. Furthering the standardization of hogs and hog products, and the development of a uniform system of market quotations so as to give the organization the necessary information for carrying on a national marketing program and for ironing out some of the inconsistencies
between markets and seasonal variations during the year.

3. Work with the other agencies in obtaining more accurate and complete statistical information, such as the recent arrangements with the Bureau of Animal Industry for obtaining a more accurate measure of the weekly supply of cattle, calves, and lambs slaughtered under Federal inspection. This will eliminate the duplication and the unreliability of market receipts which at present are being used as a guide to consumptive supplies of meats from these animals.

**Proposed Research**

In carrying out the general research program we are now getting to the third phase of the program, namely: The proposed research which may be carried on in cooperation with the individual terminal associations. Such studies will deal with the individual problems of the associations and particularly with their relationship with the local market. The general objective will be to increase their volume of business, efficiency, and self-sufficiency of the separate departments, and to increase the services
rendered to members and shippers of the organization. These general projects or research studies may be roughly grouped under two heads, namely: -

1. Price-Supply-Demand Study at the Market.
2. Territorial Survey and Membership Relation of the Association.

During 1930 much of the research work which is under way will be completed and additional projects will be added as the occasion arises and time and personnel will permit.

With the further growth of the organization, research activities naturally will be centered more on the assembling and analysis of economic information collected within the organization. This would be with the object of measuring the variations in the consist of receipts of the different kinds of live stock and especially measuring marketing costs, differentials and normal demand conditions which prevail at the various markets during the different seasons of the year. With this information and the adoption of uniform standards and with a more accurate market reporting service, live stock may be more economically distributed and merchandised for the country as a whole.

Research will not be confined entirely to the
marketing of the live animals. Studies are to be continued and additional ones made which will indicate the current level of consumer demand and which will show changes in wholesale and retail distribution of live stock products necessary for the producer to more effectively merchandise and to obtain a just return for his live stock.

Production and marketings are to be more closely tied together in the future through more information as to supplies and probable market conditions. Informed production will solve half the problems of marketing and will make for a more stable marketing structure and for more profitable conditions for the live stock producer.
APPENDIX B

LETTER ACCOMPANYING QUESTIONNAIRE

March 8, 1930.

Dear Mr.__________:

On the enclosed sheet you will find five questions relating to studies and analyses of problems in efficient plant operation and marketing.

Little has been published on what definite steps are being taken by cooperatives to cut down operating costs, to work out new methods and processes of handling products, and to investigate problems in grading, processing, financing, adequate accounting systems, etc.

Your experience and comments, as an official of a leading cooperative in your field will be most timely and welcome in this study of economic research by cooperatives.

The answers and information you give will be treated confidentially and will not be published under the name of your association without permission.

Very truly yours,

Signed,

H. J. Emery,
Division of Agricultural Economics.

P.S. Any reports or publications which will show the nature of your investigational work will be greatly appreciated.
1. What commodities do you market through the association and what was the approximate volume of business of each for your last business year ending_______?

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2. Do you maintain a research department? If not, do you carry on any investigational work other than the assimilation of market information?

3. What is your approximate annual appropriation or expenditure for investigational and research work?

$______________________

4. What Problems have you investigated or are you now studying and what were your principal sources of information and data (for example, association records, data collected specifically for the study, experiments, official government information, etc.)?

Projects or problems: Sources of data and information

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5. What particular value, if any, has your association found in the results of economic research studies?