Marketing alternatives for lamb feeder operations in Montana

by Reginald James Woodburn

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Economics
Montana State University

Abstract:
Lamb feeding has offered a substantial economic contribution to the Sidney-Lower Yellowstone and Billings-Hardin agricultural areas since the early 1900's. The lamb feeding industry is confronted with several methods of obtaining feeder lambs and several methods' for disposing of fat lambs, It is felt that a feeder faced with a decision between marketing alternatives could better maximize his returns or minimize his losses by evaluating the efficiency of the different market alternatives. It is the purpose of this thesis to provide a basis for evaluation when making the above decisions.

A comparison between the costs related to purchasing channels has been statistically analyzed and the results indicate a high degree of competition exists between the channels. It is intended to convey an awareness to the feeder that one purchasing channel differs little from the other on a cost basis. The recommendation forthcoming is for strong consideration to be allotted marketing functions of time-, place, and nonmonetary services.

The net return per lamb was resolved for each selling transaction within each selling alternative in disposing of fat lambs. Three alternatives, not including feeding on gain, were- compared to determine the validity of the classification of separate channels. Upon finding the general classification to be acceptable, each grouping of two alternatives was compared in order to test any possible weakness within the overall classification. This second test firmly substantiated the findings of the first and indicated that the data was grouped correctly. It also gave valid indication of progressive classification. From these tests recommendations were reached in advising the feeder through which channel he might expect to realize the largest net return for fat lambs, "Feeding on gain" is open for consideration to some feeders with no other alternative available due to lack of capital and/or credit.

This alternative is also open for consideration to those feeders capable of purchasing feeder lambs. Therefore, Part VII presents a listing of comparative average returns for all possible combinations of buying lambs and selling lambs, and average returns realized by feeding on gain.

MARKETING ALTERNATIVES FOR LAMB FEEDER
OPERATIONS IN MONTANA

by

R. JAMES WOODBURN

A THESIS

Submitted to the Graduate Faculty

in

partial fulfillment of the requirements

for the degree of

Master of Science in Agricultural Economics

at

Montana State College

Approved:

Head, Major Department

Chairman, Examining Committee

Dean, Graduate Division

Bozeman, Montana
June, 1957

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

ACKNOWLEDGMENTS

It is the desire of the author to express his most sincere thanks and appreciation to the staff which presented a most pleasing and congenial environment in which to work while writing this thesis. A special debt of gratitude is due to Mr. C. B. Brotherton who acted in the capacity of major advisor and chairman of the examining committee. He and the committeemen, Mr. D. C. Myrick and Dr. C. R. Harston, devoted considerable time in helpful criticisms and suggestions of the manuscript as it was prepared.

Recognition is also given to the valuable assistance extended by the Holly Sugar Company, various county agents, and agricultural personnel of banks located in the areas of study.

The author accepts sole responsibility for any errors or omissions in this thesis.

ABSTRACT

Lamb feeding has offered a substantial economic contribution to the Sidney-Lower Yellowstone and Billings-Hardin agricultural areas since the early 1900's. The lamb feeding industry is confronted with several methods of obtaining feeder lambs and several methods for disposing of fat lambs. It is felt that a feeder faced with a decision between marketing alternatives could better maximize his returns or minimize his losses by evaluating the efficiency of the different market alternatives. It is the purpose of this thesis to provide a basis for evaluation when making the above decisions.

A comparison between the costs related to purchasing channels has been statistically analyzed and the results indicate a high degree of competition exists between the channels. It is intended to convey an awareness to the feeder that one purchasing channel differs little from the other on a cost basis. The recommendation forthcoming is for strong consideration to be allotted marketing functions of time, place, and non-monetary services.

The net return per lamb was resolved for each selling transaction within each selling alternative in disposing of fat lambs. Three alternatives, not including feeding on gain, were compared to determine the validity of the classification of separate channels. Upon finding the general classification to be acceptable, each grouping of two alternatives was compared in order to test any possible weakness within the overall classification. This second test firmly substantiated the findings of the first and indicated that the data was grouped correctly. It also gave valid indication of progressive classification. From these tests recommendations were reached in advising the feeder through which channel he might expect to realize the largest net return for fat lambs.

"Feeding on gain" is open for consideration to some feeders with no other alternative available due to lack of capital and/or credit. This alternative is also open for consideration to those feeders capable of purchasing feeder lambs. Therefore, Part VII presents a listing of comparative average returns for all possible combinations of buying lambs and selling lambs, and average returns realized by feeding on gain.

PART I. CHARACTERISTICS OF LAMB FEEDING IN MONTANA

Origin of Lamb Feeding in Montana

Sheep began to appear in Montana in the early 1860's and gradually increased in numbers until a peak was reached in 1903 with an estimated 5,736,000 head.[1] However, in the historical description of Montana by Helen Fitzgerald Saunders, it is reported that A. S. Wiley, president of the Custer County Woolgrowers' Association near the turn of the century, says with regard to the Montana sheep industry: "It attained no considerable importance until the coming of the railroads."[2] This period of importance was initiated when the Utah Northern Railroad from Salt Lake City reached Silver Bow in the year 1880. It was firmly established in 1883 when the historically famous Golden Spike was driven in western Montana. This act united Montana by railroad with the market outlets of St. Paul, Minnesota in the East and Puget Sound on the West Coast.[3]

Up to and including the very last decades of the nineteenth century, no consideration was given to producing mutton from the sheep in Montana. Instead, the numerous bands of sheep were maintained exclusively for their annual wool clip. Wool was freighted, often by horse or mule drawn carts, to the nearest rail terminal where it was pressed into

---

1/ Myrick, D. C., Farm Flocks of Sheep on Irrigated Farms in Montana, Montana Agricultural Experiment Station Bulletin 512, Bozeman, Montana, June, 1955.

2/ Saunders, H. F., A History of Montana, Vol. I, The Lewis Publishing Co., Chicago, 1913, p. 320.

3/ Ibid, p. 296.

bales for shipment to the distant Boston wool markets. Shortly there-after the protective wool tariff was lowered, which permitted the wool from Austrailia and New Zealand to compete for and capture a significant amount of the domestic market. This forced the American woolgrowers to seek secondary products to help compensate for the loss in wool sales. These products were realized in the form of mutton and lamb. The rail connection with the eastern markets provided a ready outlet for these new products of the sheep industry in the West. From that time on there was a gradual change to a finer quality breed of sheep with less emphasis on wool production and more placed on obtaining an animal whose carcass would bring a high price for its mutton.

Still later in the process of market development and change in consumer preferences, there developed a demand for a highly finished lamb in contrast with mature mutton. To meet this new demand a lamb had to have the necessary conformation to give the size and quality meat cuts desired for urban small family consumption. This product, the fat lamb, was initially furnished in the following manner: The more desirable range lambs were sought out and channeled into midwestern feedlots for finishing. They were then either slaughtered locally and the carcass shipped to the concentrated population areas for consumption, or the fat lambs were shipped to the consumption areas and there slaughtered and channeled to the retail market. The fall in wool prices compared to lamb prompted sheep men to market their animals at a younger age. In turn, this led to stimulation in the demand of the market so that a premium price was paid for fat ewes and wethers.

By the beginning of the twentieth century, lambs in feedlots had already "caught on" in the midwest and had been established in the sugar beet growing areas of Colorado. Therefore, we should not be surprised that when the first sugar factory was introduced into Montana in 1906, the lamb feeding industry was concurrently established in a magnitude that was to take hold and develop into the present industry we know today. 1/

The areas of concentration for lamb feeding were found to coincide very closely with the areas supporting growth of sugar beets, alfalfa, and small grains. The reasons behind these area similarities are natural, both crop-wise and livestock-wise. Firstly, sugar beet production requires relatively flat land suitable for irrigation, and these requirements are necessary for the best yield of alfalfa. These two crops grown side by side provide an ideal feed supply for livestock. Concentration of these products is advisable from a farm management standpoint as well as providing a suitable feed source for lamb feeding.

It has been recommended that for best results in maximizing sugar beet yields, the beets should be grown in rotation with legumes and small grains. Potatoes, corn, or beans may also be inserted in the rotation. However, it is also suggested that sugar beets not follow legumes in the rotational procedure. This leads to a three-phase rotational practice that insures the farm unit of the three major increments necessary for his lamb feeding ration. These are sugar beets (both tops and pulp),

---

1/ Wentworth, E. N., America's Sheep Trails, The Iowa State College Press. Ames, Iowa, 1948. p. 374.

alfalfa for hay, and small grains for concentrates. 1/

These particular cropping characteristics are found in abundance in three specific areas in Montana. In their order of importance based on number of lambs fed, these areas are: (1) the Sidney-Fairview Lower Yellowstone area, (2) the Billings-Hardin area, and (3) the Missoula area. For the purpose of this thesis the two areas leading in lamb population will be studied and the data will be drawn from these areas. The reasons for excluding the latter area are due to the small numbers of sheep and lambs in the Missoula area and the fact that the trend in recent years has been downward. Today there is a small and relatively insignificant number of lambs fed in this area.

Lamb Feeding as it Constitutes a Part of the Feeding-Sugar Beet Growing Enterprise in Montana

Lamb feeding in Montana for the majority of cases is associated with farm enterprises engaging in sugar beet production. The production of these two products, fat lambs and sugar beets, compliment each other in providing efficient farm management practices. It should be further pointed out that lamb feeding is normally separate from other phases of the sheep industry such as sheep and lamb production, either on the range or farm flock level, and wool production.

Sugar beets are planted in the spring and require the time and labor of the farmer during the summer months for irrigation and cultivation of

1/ Martin, J. H. and Leonard, W. H., Principles of Field Crop Production, The Macmillan Company, New York, 1949. p. 971-972.

the growing crop. The period from the latter part of September to early October when the beets are being harvested corresponds with the late spring period when lambs are coming on to the market as feeder lambs. The demand for feeder lambs is highly seasonal and reaches its peak during and immediately following the sugar beet harvest. The reason for this is that in the lamb feeding cycle the lambs are first put on beet top pasture for their initial feeding ration. Therefore, it is most desirable to have at least one field of beets harvested in order to supply the lambs with feed upon arrival.

At the completion of the beet harvest it is possible for the farmer, or feeder, as he can now be referred to, to allot his time and effort to the feedlot operation. This is a most convenient combination from both an income maximization and time efficiency point of view.

As indicated above, the crops of alfalfa and small grains grown in the sugar beet rotation are suitably adapted in the feeding rations for fattening lambs. The labor requirements for growing alfalfa and small grains fit in with the labor requirements of sugar beets in such a way as to better fill out the work schedule of the spring and summer months. The total labor schedule of sugar beets, alfalfa, and small grains holds a similar relationship with the work requirements for lamb feeding in that their labor requirements do not interfere with each other; instead, they offer labor outlets which fulfill and round out the yearly work schedule of the farmer-feeder. The above described sequence of labor requirements is illustrated by Table I.

When the lambs are placed in the beet-top pastures, the ration is usually supplemented with a moderate amount of alfalfa hay fed when the lambs are brought into the pens for the night. This hay is made available to the lambs either in the late evening or early morning or, in some cases, both in the morning and evening. The lambs remain under this type of management until the beet-top supply is diminished to the point where the feeder is forced to supplement the feeding with a modified feedlot operation, or when weather conditions make it physically impossible for the lambs to obtain the beet tops from beneath the snow and a full-time feedlot operation is necessitated.

Normally, the lambs are brought into the feedlots to stay during the last week of December. Occasionally some lambs have put on enough gain and have acquired the finish desirable for fat lambs by the time they are brought in from the beet-top fields. When this occurs, the "top end" is immediately sorted out and shipped to the midwest or eastern markets for slaughter. From that time until the latter part of March, the lambs are marketed in the above described manner by topping off the heavy end and sending them to market in shipments of one or more carloads averaging 200 fat lambs per car. These lambs usually weigh about 105 pounds when sold. When lambs weigh much more than this, they usually are sold at a sharp discount as the consumer in the United States is prejudiced against retail lamb cuts from carcasses of lambs weighing more than roughly 105 pounds live weight.

TABLE I. ANNUAL WORK SCHEDULE OF MONTANA FARMER-FEEDER[1]

April	May	June	July	August	September
Seed bed preparation Drilling small grains	Sugar beet planting 1st cultivation of sugar beets	Thinning sugar beets 2nd cultivation of sugar beets 1st cutting of alfalfa	2nd cutting of alfalfa Grain harvest	3rd cutting of alfalfa (optional) Fall plowing	Sugar beet harvest Receiving lambs and pasture feeding
		Grain	Alfalfa		
		Beets Irrigation			
October	**November**	**December**	**January**	**February**	**March**
Pasture feeding Fall plowing	Pasture feeding gradually developing into feed lot feeding	Feedlot feeding Marketing of fat lambs	Feedlot feeding Marketing of fat lambs	Feedlot feeding Marketing of fat lambs	Marketing of fat lambs Machinery repair

1/ Information gathered by interview with Charles Simonsen of Sidney, Montana.

PART II. METHODOLODY [1]

Data Used

Secondary Data

During the initial inquiry stage of the regional research project, material and information regarding sheep and lamb marketing were sought out and evaluated in order to gain familiarity with the overall patterns in sheep and lamb marketing. Relatively little work has been done in this field during the last thirty years and only a meager amount of secondary material pertaining to lamb marketing is available. A listing of publications containing items of information and references used in this study appears in the bibliography.

Schedule

Data gathered by means of schedules through interviews furnished the bulk of the material for making this investigation possible. This schedule was originally designed by Mr. C. B. Brotherton, Assistant Professor, Montana State College. After field testing the schedule in the Billings-Hardin area by Mr. Brotherton and the author, the schedule was modified and its weaknesses corrected. The final schedule [2] was used in interviewing lamb feeders in the Sidney and Billings-Hardin areas. Information obtained from the feeders was at times very complete and orderly and could be secured for several past years. However, to find records of the above description was the exception rather than the rule.

[1] Based on procedure described by Larabee, H. A., Reliable Knowledge, Houghton Mifflin Co., New York, 1945.

[2] See Appendix A.

Research Problem

The research problem evolved from a Regional Project established under the Research and Marketing Act of 1946, in which six states are investigating marketing problems of sheep and lambs in the West. [1] The first phase of the Regional research was concerned with determining the shifts in channels of marketing sheep and lambs, and was subdivided into several phases of research in order that it might be treated in a more thorough manner. One of these subdivisions was defined as the study of the market alternatives which face the lamb feeders. Other subdivisions of the current phase of work on the Regional study with which we will not be directly concerned are the range lamb operations and the farm flock operations.

Actually, it is relatively insignificant as to the order in which the subdivisions of the Regional Project are treated in order to provide meaning and substance to the overall study. The particular order of work adopted, placing the problems of marketing feedlot lambs first, was chosen for the following reasons. At the time when the schedules were to be taken, consideration was given to the facts that lambs fed in 1954-55 had already completed the feeding cycle, and that 1955's fat lambs had been marketed. This gave a time convenience advantage to the feeder lamb study when compared to farm flock study because farm flock lambs were still on pasture and would not be marketed until the fall of 1955. And by the same line of reasoning, there was a time advantage in separating

[1] These states are Utah, New Mexico, Colorado, Idaho, Oregon and Montana.

the range operations into a later sequence of study.

Drawing the Problem from Problem Area

In narrowing a problem area to a particular problem, it is possible to treat the material in relatively precise detail. However, in this stage of the overall research project, the specific problem treated in this study will be broad enough in scope to enable more detailed problems within the research problem to be treated at a future date. It will also indicate particular directions in which future study may be channeled. At this time, keeping in mind the meager amount of work that has been done in the field, it is felt that the treatment of this problem will be large enough in scope to be meaningful and offer a contribution to the Regional Project, and not so small that it be hidden in depth and consequently contribute little to the Regional study.

Gathering Empirical Data

In order to determine in some detail the characteristics of both the buying and selling market which faced the lamb feeder, a schedule was prepared with major emphasis centered on information related to the market structure, the market changes, the monetary expenses and fees of markets, prices paid and received, and a physical description of the method in which the lambs were handled when arriving at the feedlots and when leaving the feedlots as fat lambs. In using the schedule for an observational technique, it was felt that an adequate representation of the universe would be obtained. The schedule tended to provide a clear picture of the problem and pointed to specific problems within the area which could be treated either within the research problem or resolved through assumptions.

The schedule form also provided a strong means for communicating data related to the problem from the feeder to the researcher with a minimum amount of distortion.

In determining what sample should be taken from the universe, the following statistical procedure was followed. As complete a list of lamb feeders as possible was compiled by consulting the Extension Service, agricultural agents of banks, the State Statistician, the Montana Woolgrowers' Association, and the sugar companies operating in the areas. The information obtained from the sources enabled a judgment selection to be made delineating areas of concentration. This judgment selection of areas was based on similarities in the buying, selling, and feeding of lambs. It pointed to a concentration of feeding operations in irrigated valleys where sugar beet pulp was readily available or easily obtainable as the main source of feed concentrate. Qualifying areas in Montana are listed below in their importance for number of lambs fed.

The Sidney and Lower Yellowstone River area has by far the largest concentration of lamb feeding enterprises, with the Billings-Hardin area rating second and the Missoula area third. However, the Missoula area is of little significance due to the small number of lambs currently being fed. Other states also found heavy concentration of lamb feeding by areas. The Technical Committee of the Regional Project decided, therefore, to divide the states into feeding areas. Separate samples were drawn from each feeding area.

After the selection of the area stratification to be used, it was decided on further analysis by the Technical Committee, with the aid of a statistician from the Colorado Agricultural Experiment Station that there should also be stratification by size or number of lambs fed by individual feeders. The following size strata were selected from which to pick a given percentage of random observations. The percentage of samples for the given sizes (measured by number of head put in the feedlot) are: 250-750 head - a 10% sample, 750-1500 head - a 20% sample, and 1500-3000 head - a 100% sample. It was left to the discretion of the individual state to select a heavier rate of sampling in any strata if it thought the number of possible observations in the particular strata was so small as to give poor representation of the strata and produce inadequate measures of deviations.

Hypotheses Development

Upon tabulating the data obtained in the schedules and from information obtained by interviews with various persons related to the industry such as commission men, auction personnel, growers, landlords on whose property lambs were being fed, and agricultural agents of banks, the various market alternatives were outlined and defined in terms of their similarities and differences. This material was instrumental in providing a basis of necessary information with which to formulate hypotheses.

Major Marketing Alternatives

The data obtained through the above described techniques of interview revealed the following major marketing alternatives:

A. Alternatives in obtaining feeder lambs

(1) Contracting lambs direct from the grower from several

months to several days before the date of delivery

(2) Commission men and local buyers

(3) Accepting lambs on a contract gain basis

B. Alternatives in marketing fat lambs

(1) Selling through terminal markets

(2) Selling to local buyers and commission men

(3) Selling direct to packers

(4) Disposing of the fat lambs under terms of feeding on gain contracts

Test of Hypotheses

The tests of these hypotheses are to be made on the basis of the marketing cost information obtained from the schedules. These costs are to include marketing fees and services, price differences, and differences in weight between alternatives. The different cost averages related to their respective marketing alternatives for the buying side of the market will be statistically compared with their alternative marketing methods. The average net return per lamb resulting from gross sales minus total marketing costs will be used as the factor for comparing the selling alternatives.

In order to clearly isolate only the variables of marketing costs through alternative channels, costs were defined as not being influenced by such factors as weight, grade, number, and transportation. This was accomplished by assuming or synthesizing the above factors as constants.

Drawing Conclusions and Inferences

If the tests of the hypotheses result in significant differences in the average costs of the buying alternatives and in the returns from selling alternatives, inferences can be made as to the least expensive market alternatives to be used to minimize marketing costs and maximize marketing returns. On the other hand, if the tests indicate no significant differences in market alternatives, it will be concluded that there is no alternative to be recommended above another on grounds of the data tested. In making these recommendations, it will be necessary to indicate the assumptions which were used to isolate the tested variables. This will enable the person making the final evaluation for his feeding operations to use his own value judgment in comparing his individual properties which correspond with those variables assumed as constant in the problem analysis.

Inferences and future related problems for study are forthcoming when the variables held constant by assumptions can be allowed to fluctuate. This would initiate new avenues for research which could be evaluated in more depth when drawing upon the material presented in this study as qualifying background.

PART III. RESEARCH PROBLEM

Problem Statement

Because there are several buying and selling market alternatives available to the lamb feeder, he is forced to choose the specific alternatives which he believes will net him the greatest return to his feeding, or feeding-farming operation. In so doing, he must evaluate the costs of the respective alternatives. This he may do on an opportunity cost basis by comparing the actual cost of services rendered, the price paid for feeder lambs, and the comparative weights of the lambs obtained through one alternative with the corresponding figures of other alternatives. In the same manner it is possible to evaluate cost differences in the selling alternatives by subtracting the above mentioned items from gross sales and comparing net returns.

Problem Situation in Alternative Methods for Obtaining Feeder Lambs

If an equal opportunity is offered the feeder to buy his feeder lambs through each of the alternative market channels, a condition of pure competition would exist in which we would expect to find the following "pure" price situation. The net price paid by the feeder through one market channel for his lambs would be equal, with exception for the cost of transportation, to the net price paid through any other alternative, assuming that identical services were offered in each case. The reason for this equal price is that if one supplier of feeder lambs charged a higher price, the feeder would avail himself of the opportunity to obtain lambs from another source. This in turn would force the price of the over-valued market alternative into line with the pure price, or equilibrium price, offered by other channels. From the feeder's standpoint, assuming that there is no collusion among the different market alternatives, he could buy lambs through the least expensive channel and thus determine the price for the other channels.

When the lower price offers a return insufficient to cover costs including reasonable profit returns, the price is below the pure price. This situation will be corrected either by the elimination of the firm with the lower price through economic inefficiency or this firm will increase its price to the point where returns equal costs.

There are two implications which may lead to a valid difference in the respective prices charged through alternative market channels. The first is that a channel may offer significant advantages and services in addition to those offered by its alternatives. The second explainable price difference could be contributed to a price policy by one or more of the suppliers or feeders. 1/ The possibility of collusion among feeders that is significant enough to affect price is improbable due to the difficulty in organizing large numbers of feeders and to their highly individualistic characteristics. However, that is not necessarily true in regards to possible collusion among the suppliers of feeder lambs after eliminating the alternative of obtaining lambs direct from the growers. The possibility of collusion and interaction on price policies is more susceptible to activities of the relatively few local buyers and commission men and to larger enterprises which contract lambs on a gain basis.

1/ McIsaac, A. M., Elements of Economic Analysis, Prentice-Hall Inc., 1950, p. 37-38.

The major ways in which feeder lambs are obtained for the feedlots will be described below and their similarities and differences will be pointed out.

Direct From Producer

The practice of contracting feeder lambs direct from the producer came into prominence with the development and specialization of the lamb feeders. Before the development of feeder specialization it was unnecessary to assure a supply of lambs through the contract method. The predominant benefit in contracting lambs is to assure the feeder that there are animals available for the pastures and feedlots at the particular time in which they are to fit into the farmer-feeder operation.

Through the years with the accumulation of experience in the feeding business, the feeder acquires a list of several producers from whom he may acquire feeder lambs. These sources are generally larger range producers from whom he may obtain all or at least a sizeable part of his feeding stock for the coming season. However, if the feeder is acquainted with farm flocks that offer a particularly desirable type of feeder lamb, he may often obtain his feeders from this source even though it may mean he has to contact more than one farm flock operator to obtain the desired number of feeder lambs.

The geographical location of the growing area and the climatic conditions during the growing season often constitute factors which determine the feeder's choice among the grower contacts. Several feeders commented that in dry years the spear grass was more dominant in and around the Miles City and the eastern Montana prairie area than in other areas.

They indicated the desirability of obtaining feeder lambs from other areas free of spear grass during these years of low moisture. A general preference was shown for "mountain lambs" in the majority of cases. The reason behind such a strong preference in obtaining lambs from the mountain areas is a direct result of the action by the packers in penalizing feeders for carcasses that show blue spots from spear grass when the lambs are slaughtered. The packers keep an accurate account of from whom the spotted carcasses were acquired, and this tends to make the packer or packer-buyer more selective the following year of whose lambs he buys and of what price he pays for the lambs to a feeder who had in the past year sold spear grass lambs. Similarly the feeder must go back one step further and select lambs from areas that are not questionable as to their quality in regard to spear grass.

Another reason why mountain lambs are preferred is the abundance of fresh water available in the mountains during the early part of the growing cycle for the lambs. This is in contrast to the "dead" water holes that are sometimes found as the only watering facilities in the prairie areas. Feeders have found lambs obtained from areas supplied with "dead" water in their early growing stage to be more susceptible to death loss in the change from their old water supply to the new supply, which is fresh water from the local irrigation project.

In 1954, contracting of Montana lambs by various buyers began in early April and lasted through September.[1/] The Montana feeders negotiate

[1/] Montana Department of Agriculture, Agricultural Statistics, Montana Crop and Livestock Reporting Service, April 12 and Sept. 13, 1954.

feeder contracts between late July and up to the time the lambs are actually delivered. This practice involves one and sometimes two trips to the site of the producer. If the lambs are contracted early in the season the feeder is present to bargain concerning the terms of the contract. He will also be present when the lambs are shipped. It is a general practice for the lambs to be weighed either at the ranch on which they are grown or when they are being loaded on cars at the rail terminal nearest the home ranch. Through custom and sound business practice the feeder is present when the lambs are weighed off the range and loaded for delivery to the feedlot. The feeder usually secures either a 3 to 4 percent pencil shrink or an overnight shrink in the bargaining with the producer from whom he acquires his feeder lambs.

Upon completion of the contract the lambs are earmarked for their respective destinations. The title of ownership is usually transferred at the time the pay weight is determined. Commonly this occurs at the ranch or rail terminal where the lambs are weighed and loaded on cars for shipment to the feedlots. The lambs at that time become the responsibility of the feeder and he stands any death loss which may occur in shipment. He also carries the burden of transportation costs.

Once the lambs have reached their destination by rail they are either trailed or trucked to the feedlot according to the distance involved. Typically, if the feedlot is only a short distance, one to three miles, the lambs will be trailed. When distances amount to three miles and over, it was found the feeder preferred to haul the lambs by truck. When possible this trucking will be done by the feeder. It is common to find several feeders helping each other and combining the use of their trucks to haul the lambs from the rail terminals to the feedlots.

Buyers

Several local buyers and commission men (either affiliated with a terminal market or not) operate in the concentrated areas of sheep ranching and lamb feeding. In the pages that follow this group of middlemen will be referred to as one marketing alternative and they will be called buyers. Buyers specialize in knowing the growers, the quality of lambs available, desirable conditions under which lambs may be contracted, and feeders willing to deal through a middleman in buying their lambs. As indicated above, these men are specialists in their field and spend a good deal of time investigating the market to determine where lambs may be obtained at the most desirable price, and at the same time, investigate areas where the demand is high enough to realize the greatest amount of net return for their services.

Specialization of this sort by middlemen is not necessarily harmful nor must it subtract from the net profits realized by the lamb feeder. It was intimated by one of the interviewees that the goal to higher profits would be achieved by "doing away with all those middlemen." This is in direct opposition to the economic doctrine that specialization trends toward greater efficiency. Even if a relatively high price is paid for services of specialization, they must justify themselves or they would cease to exist and feeders would independently perform all the functions of marketing as well as production. Perhaps in this particular case, if the buyers were not competing for the feeder lambs, other dealers in the market would be strong enough to influence price.

By receiving his lambs through a buyer, the feeder leaves the matters of contacting the grower and contracting in advance or buying near the time of delivery up to the discretion of the buyer. This method of obtaining lambs required the least effort and time on the part of the feeder. Here the buyer takes care of grower contacts and purchases as mentioned before in the direct-from-grower method. He usually brings the feeder lamb market into the very home of the feeder either by telephone or by personal contact. This market is most active shortly before and during the sugar beet harvest. Generally speaking, if the feeder is satisfied with the lambs obtained from one buyer, he will continue to acquire lambs from this particular source for several years in succession or until the quality of the product no longer meets with the specifications required by the feeder.

It was found that lambs bought through this marketing channel were transported both by the buyer and by the feeder. When the buyer paid the transportation costs the ownership of the lambs was not transferred until they reached their destination and were weighed off the cars. If the feeder paid the freight charges, the lambs changed hands when they were weighed and loaded on to the cars at the point of departure. In both cases, the feeders were present to supervise in the weighing of the lambs.

Feeding on Gain

Feeding on gain is an operational practice arising when a feeder tries to maximize his returns for privately controlled resources in combination with resources owned by others. The feeder has the physical plant, feedlot, pasture, labor, etc. available with which to feed lambs. The sugar companies have an abundant supply of beet pulp readily available for feed. In addition, they acquire large numbers of feeder lambs. Therefore, the combination of the sugar factory's feed and feeder lambs with the physical plant and labor of the feeder are combined to the mutual advantage of both parties concerned. This combination is made by so stating in terms of the contract the advantages each party is to receive and is carried out within the limits of each resource owner's substitution costs for the other commodity. 1/

With the exception of two cases every feeder interviewed and feeding on gain was found to have secured his lambs through the Holly Sugar Company. The sugar factories are centrally located in the feeding areas. This minimizes transportation costs to the feeder. The hauling of lambs from the sugar factory to the feedlot is conducted by use of the feeder's truck or a group of feeders pooling their trucks to help their neighbors for a reciprocal hauling favor in return.

The sugar factory has one or several men who operate in much the same way as the buyers. They begin their grower contacts in the late part of July and contract lambs for delivery to the sugar factories in late September to mid-November.

When the lambs arrive at the sugar factory they are tagged, vaccinated, marked, and occasionally shorn. It is the policy of the sugar

---

1/ Boulding, K. E., Economic Analysis, Harper & Brothers Publishers, New York, 1948. p. 29.

company to contract out for feeding on gain as many lambs as possible. This enables them to realize an income from the resale of the fat lambs at the end of the feeding season and it stimulates the market for their beet pulp, both wet and dry. This pulp contributes one of the main items in the feeder lamb ration.

The feeder contracts the feeder lambs under specified weighing conditions. This is usually a 4% shrink from the factory weight of the lambs. He is assured by terms of the contract of a predetermined amount of return for each pound of gain that he may add to the lambs during their feeding period. In the particular year studied, 1954-55, the basic rate for 30 pounds and over gain per lamb was 18¢ per pound. If the feeder was to put on a gain less than 30 pounds, the return per pound was decreased proportionately. For a gain of from 25-30 pounds, he would receive 16¢ per pound, from 20-25 pounds 14¢ per pound and from 1-20 pounds 12¢ per pound. In all cases studied the feeder did realize a gain of 30 pounds or over. [1] One contractor gave 20¢ per pound for a gain of 30 pounds or over per lamb.

The feeder is responsible for any death loss which may occur during the feeding period. He is bound by the contract to take reasonable care of the lambs while they are in his feedlots and see that they are full fed until fat and then returned in such numbers and dates as specified by the

---

[1] The practice of evaluating return on number of pounds gained is the method used in the cases observed by the author. However, it is recognized that the practice exists where return is evaluated on a premium quality basis.

contractor. He does not assume title of the lambs at any time.

This method of obtaining feeder lambs can work either in the feeder's favor or against him, depending upon the price level of the market at the end of the feeding cycle. If the price of fat lambs has gone up relative to the agreed amount to be paid the feeder on each pound of gain, the feeding on gain alternative could work to the disadvantage of the feeder when compared with heretofore mentioned methods of obtaining feeder lambs. However, if the selling price of fat lambs was to go down in comparison with the amount to be realized from the feeding on gain contract, this method could have a comparative advantage over its alternatives. Also, it eliminates costs other than risk of price changes, mainly cost of money or interest tied up in the feedlot inventory, transportation costs and commission fees.

Problem Situation in Alternative Methods for Marketing Fat Lambs

The average length of time lambs are owned by feeders is 135 days. During this time they gain an average of 34.23 pounds per head. In the process of the above changes the lambs acquire the quality, confirmation, and finish that designates them as "fat," ready to be marketed. The most desirable weight for the fat lambs is from 100 to 110 pounds. This weight desirability is indicated by one of the larger packers of lambs. They offer lower prices for lambs weighing over 108 pounds. In one particular case, lambs were docked at 50¢ per 100 pounds for weights over 108 pounds. 1/ This weight is desirable in providing convenient-size cuts of

1/ Data gathered by interview.

meat for the urban small family consumers. Of the 12,136,000 sheep slaughtered under federal inspection in 1949, 10,322,000 of 85% were slaughtered in the North Atlantic, North Central and Eastern regions. 1/

Feeders attempt to top off carload lots of 200 lambs at one time so they reach the market weight at approximately the same date. It is also the general observed practice for feeders to market carload lots in one to two week intervals between the first of January and the latter part of March. As mentioned before, the lambs are first put on an in-the-field beet top ration to begin their feeding cycle. When this source of feed is exhausted or when the weather necessitates a strictly feedlot operation, the lambs are put on a grain, beet-pulp concentrate ration for topping off at the desired finish. This practice is consistent with bringing the lambs up to the desired market weight at the time when the market for this type of feeder lamb is most active.

Terminal Markets

Terminal markets are considered as the number one outlet for fat lambs when evaluating the total number of feeders marketing through this channel. The predominant terminal markets listed in their order of importance and used by the Montana feeders are South Saint Paul, Minnesota and West Fargo, North Dakota.

Feeders generally shipped their lambs on Thursday and the lambs arrived at the market the following Sunday afternoon or evening. This

---

1/ American Stockyards Association, Twenty-Five Questions Answered by American Stockyards Association, Cleveland, Ohio, 1950. p. 17.

allowed the lambs to be rested and put on feed and water overnight. Monday and Tuesday are the two most active days of the week on the terminal markets. Therefore, it is to the feeder's advantage to have his lambs available for sale on those days. The feeders are responsible for transportation charges in shipping the lambs from the feedlots to the terminal markets. This includes trucking expenses from the feedlots to the rail terminal and rail expenses involving supplemental charges for feed and yardage to the market destination. Duties performed by the Public Livestock Markets are receiving, handling, feeding, watering, selling weighing, holding, delivering and shipping of livestock. Under certain conditions, some of these duties are taken over by market agencies associated with or operating on the terminal market.[1]

The costs associated with marketing lambs through public livestock markets are itemized according to the duties performed. Yardage, handling charges, and the per head commission charged by the specific terminal market through which the lambs are sold appear as the major items of cost. If the lambs are not sold as a result of the first day's bidding, the feeder can hold them (he pays a set fee for the service of holding) from one to several days in anticipation of the market going up and realizing a larger net return or minimizing the loss occurring from the delay in selling. But once the lambs are at a terminal market other than Billings, the feeder is forced to sell the lambs due to the prohibitive cost of return transportation. The prices paid for fat lambs are set by competitive

1/ Ibid, p. 15.

bidding from packer-buyers whose plants are located near the market, and dealers or traders buying with the intention of reselling at a profit either on the same market at a later date or at another market where the demand is more favorable.

Buyers

Buyers active in obtaining fat lambs from the feeders on an on-the-farm price are usually the same dealers who offer feeder lambs for sale in the fall of the year. The action of these buying specialists tends to foster a higher degree of competitive pricing for the fat lambs.

The services performed by these buyers eliminate the major market transportation cost and the final market destination decision from the marketing task of the feeder. In addition, the convenience of selling the fat lambs at the feedlot is a definite advantage for the feeder when considered as a time saving factor. Occasionally, the title of the lambs changes hands at the feedlot with this type of agreement. More commonly, though, the feeder retains the title and marketing cost responsibility up until the time the lambs are weighed and loaded on cars at nearby rail terminals. This leaves the feeder with the cost of transporting the lambs, usually by privately-owned trucks, from the feedlots to the rail terminal. The feeder may also incur a small cost in making contact with the buyers. However, this meeting is usually arranged as a result of the buyer's initiative. It is a common practice for the buyer to contact the feeder, inspect the lambs, and present terms of price, weighing conditions and shipment dates.

The following steps are the most common procedures followed by the buyer when obtaining lambs from the feeder. First he contacts the feeder either by telephone or in person and determines if the lambs are available for sale and if his bid will be taken under consideration by the feeder. If the feeder has contracted his lambs on a gain basis or made previous commitments for their marketing this first step also becomes the last.

However, if the lambs are available for sale, the buyer will inspect the lambs and present his terms for buying with particular emphasis on price, terms of weighing, and shipment dates. These terms may be readily accepted or modified to meet with specific desires of both buyer and seller. There is a point on the price scale that the buyer will not exceed. There is also a point on the price scale that the seller will not fall below. The price must be resolved to fall somewhere between the limits of these two reserve price figures.

The terms of weighing usually specify that the lambs must be held overnight without feed and that during the time of weighing they have a dry fleece. The shipment data must be understood in order to implement the above specifications.

Direct to Packers

Sales made direct to packers are either on a dressed weight, an off-the-car weight on arrival at the packers, or an on-the-farm price. In these cases the feeder, depending upon the terms of the sale, may or may not pay the transportation from the point of origin to the packer.

Contacts for direct-to-packer sales are made by the feeder by telephone to the packer (usually Swift and Company of South Saint Paul, Armour and Co., West Fargo, North Dakota, or George A. Hormel & Co., Austin, Minnesota.) The most typical direct-to-packer arrangement for Montana feeders is to receive an on-the-farm price for the lambs and have the title change hands when the lambs are loaded on freight cars at the origin of their journey. This arrangement relieves the feeder of an out-of-the-pocket transportation cost. When the lambs change hands at the feedlot origin, there is a local representative of the packer present to observe the weighing and loading for shipment. The second most prominent method of direct-to-packer sales is for the packer to assume the transportation charges and the feeder to receive payment on a dressed carcass weight. In the third and least significant method, the feeder carries the transportation costs and receives payment based on an off-car weight at the packers. 1/

The largest number of feeders included in the study sell their lambs direct to packers on an on-the-farm price F. O. B. at the point of loading. However, a greater total of number of lambs are sold on a dressed carcass weight with the packer covering the transportation costs.

Feeding on Gain

Although listed as one of the alternatives for disposing of fat lambs at the end of the feeding season, this method is predetermined when lambs are contracted to be fed at the beginning of the season. Nevertheless, returning lambs fed on gain is one of the ways in which fat lambs are moved from feeder to packer.

1/ Malott, D. W., and Martin, B. F., The Livestock and Meat Packing Industry. McGraw-Hill Book Company, Inc., 1939.

After the lambs have gained the minimum weight prescribed by the contract, it is at the discretion of the contractor when he will ship the lambs. In returning the lambs to the contractor, the feeder provides only the transportation from his feedlot to the point of concentration or the point of shipment. These procedures have been set forth in the feeding contract and generally provide that the feeder return the lambs to the sugar company yards for weighing. Weighing must be done with a dry fleece and a 2% shrinkage if the lambs are hauled 20 miles or more, or a 3% shrinkage if the lambs are hauled less than 20 miles.

PART IV. OBJECTIVES

The first objective of this study, with considerations for the meager amount of information available on lamb marketing, will be to obtain, assemble, and disseminate information descriptive of the market alternatives available to lamb feeders of Montana. The second objective is to determine through which buying channel the feeder can minimize his marketing costs in relation to the services provided. Thirdly, consideration will be given to a comparison resulting in acknowledgment of the selling channel that will net the greatest return to the feeder after total marketing costs have been subtracted from gross sales.

The final objective will be to discover and suggest topics for further research work which will enable lamb feeders to minimize marketing costs.

PART V. STATEMENT OF ASSUMPTIONS AND HYPOTHESES

Assumptions

In order to achieve a finer measure for comparison of only marketing cost variables, some of the following assumptions must be made so that certain independent variables can be held constant. In obtaining feeder lambs for the feedlots, it will be assumed that the grade and number of lambs obtained will be constant in each market alternative. Lambs fed in Montana are usually obtained from growing areas within the state regardless of the marketing channel through which they reach the feeder. Therefore, a fixed transportation cost will be assumed in the aggregate marketing costs of each market alternative considered.

A similar set of assumptions will be made for the selling side of the market. Here it will be assumed that the total number and grade of lambs disposed of through each market alternative shall remain constant. However, the actual transportation cost involved in the market outlet alternatives will be included in the respective aggregate marketing costs. The reason for this action is that there is a sizeable difference in transportation costs of local and mid-western market outlets.

Hypotheses

The hypotheses will be in the form of "null hypotheses" and will state there is no significant difference in the material to be tested. In testing these hypotheses a significant ratio of sample means will be computed and the probability of obtaining a deviation equal to or greater than that observed as a result of random sampling will be determined.[1] Since the hypotheses are to be tested by statistical means, it will be well to point out that they can never be proven or disproven by this treatment. The tests will only be able to cast much doubt (if the probability criteria is small) or little doubt (if the probability criteria is relatively large) on the hypotheses.

The null hypotheses to be used are two in number and deal with the buying and selling markets confronted by the lamb feeders. They are as follows:

1. There is no significant marketing cost difference to the feeder in obtaining feeder lambs through different market channels.
2. There is no significant difference in net return per head to the feeder in disposing of fat lambs through alternate market outlets.

1/ Croxton, F. E., and Cowden, D. J., Applied General Statistics, 2nd Ed., Prentice-Hall, Inc., New York, 1955. p. 637.

PART VI. TEST OF HYPOTHESES

Cost of Obtaining Feeder Lambs

The purpose of this test is to determine if there is a significant cost difference in the alternative methods for obtaining lambs. This has been accomplished by a general evaluation of the data obtained from survey and by a detailed statistical analysis of cost data.

The alternative of feeding on gain presented no appreciable costs other than truck transportation from the sugar factories to the feedlots. Considering this fact in the general evaluation of the data, it was decided that the alternative of feeding on gain would be compared with combinations of buying and selling alternatives. This comparison will be made in Part VI.

Qualifications of Data

A comparison of the two remaining alternatives, obtaining lambs direct from the grower or through a local buyer was accomplished through a test of aggregate costs in obtaining one lamb for each purchase transaction.

The feeders obtaining lambs directly from the grower incurred expenses of total purchase costs and interest on forfeit payment. 1/ A correction factor to equalize the weight of the lambs obtained was also introduced.

The total purchase cost is derived from the price paid per pound

1/ See Table II.

TABLE II. MARKETING COST DATA FOR LAMBS PURCHASED FROM GROWERS

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Cases Studied	No. Hd.	T. Wt.	T. Cost	Forfeit Payment 1/	Rail Cost	Trucking	Trailing	Date of Purchase	Commission Fees	$12.892368(I) ± III	Total Costs III-IV±X	Total Cost Per Lamb XI ÷ I
1	1,850	135,050	$ 23,132		$ 261	$ 0	$ 0	76	$ 140,600	+ $ 719	$ 23,851	$ 12.892432
2	1,255	91,238	15,391		867	0	6	87	109,185	+ 789	16,180	12.892430
3	550	40,920	6,903	P R T I	66	0	2	112	61,600	+ 188	7,091	12.892727
4	270	20,088	3,389	($405 6% 62 $4.19)	90	0	2	107	28,890	+ 92	3,485	12.907407
5	573	39,537	6,721		119	0	0	105	60,165	+ 666	7,387	12.891797
6	1,450	98,600	24,304		215	145	0	93	134,850	- 5,610	18,694	12.892413
7	400	27,200	4,352		45	0	0	108	43,200	+ 805	5,157	12.8925
8	400	27,300	4,352		45	0	0	108	43,200	+ 805	5,157	12.8925
9	800	62,400	11,232		300	0	0	104	83,200	- 918	10,314	12.8925
10	1,327	104,833	17,560	($327 6% 32 $7.08)	800	0	0	111	147,297	- 452	17,115	12.897513
11	2,200	141,830	22,786	($550 6% 30 $2.75)	400	0	0	104	228,800	+ 5,577	28,366	12.888636
12	1,350	111,556	19,207		0	170	0	103	139,050	- 1,802	17,405	12.892592
13	2,106	160,056	28,010		512	0	0	93	195,858	- 859	27,151	12.892212
TOTAL	14,531	1,060,608	$187,339	$14.02	$3,720	$315	$10		$1,415,895	0	$187,353	$167.617659

315
10
<u>4,045</u>
.2783/hd.

$\bar{\bar{X}}$ lb./hd. = 72.99; $\bar{\bar{X}}$ ¢/lb. = $.1766; $\bar{\bar{X}}$ cost/hd. = $12.892368

1/ Forfeit payment from date of contract to date of delivery if over 30 days. I = Interest (forfeit payment), P = Principal, R = Rate of interest T = Time in days. $PXRX\frac{T}{360} = I$

Source: Data gathered through interview by the author.

multiplied by the average weight of the lambs purchased and the number of head in the purchase.

Interest on forfeit payments presents a cost equal to the amount of interest that would be forthcoming if the same amount of capital were invested elsewhere. The interest rate of 6% was arbitrarily chosen to indicate this cost and consideration was given only to those forfeit payments that were made in excess of a one month time period.

A correction factor was derived from within each alternative to equalize the weights of the lambs obtained through their respective channels. This correction factor indicates the total purchase cost of all lambs from buyers divided by the total number of lambs purchased from buyers. This figure was then multiplied by the number of head purchased in each individual transaction and the difference of the number resulting and the total purchase cost was added to aggregate costs if larger than the total purchase cost and subtracted from the aggregate costs if smaller than total purchase costs. See Table II.

Costs incurred by obtaining feeder lambs from a buyer were similar to those related to the direct-from-grower channel with the addition to the commission cost. 1/ This is the actual amount paid per head to the buyer in addition to the purchase costs. Commission costs ranged from 10¢ per head to 25¢ per head.

1/ See Table III.

TABLE III: MARKETING COST DATA FOR LAMBS PURCHASED FROM BUYERS

	I	II	III	IV		V	VI	VII	VIII	IX	X	XI
Cases Stud-ied	No. Hd.	T. Wt.	T. Cost	Forfeit Payment 1/		Rail Cost	Commis-sion Fees	Date of Purchase	I(VIII)	12.56537(1) ± III	Total Cost III + IV +VI ± IX-	T Cost Lamb X ÷ I
1	1,100	90,200	$ 15,109			$ 740	$ 110	12 128	140,800	- $1,287	$ 13,932	$ 12.655454
2	1,700	112,400	20,808			228	425	88	149,600	+ 554	21,787	12.815882
3	325	22,750	3,868			40	81	98	31,850	+ 216	4,169	12.827692
4	1,200	88,800	14,208	P R T	I	0	180	101	131,098	+ 871	15,259	12.715833
5	200	14,800	2,200	($650 6% 35)	$3.79	0	30	105	21,000	+ 293	2,543	12.715
6	520	36,960	6,358			151	104	97	50,440	+ 176	6,644	12.776923
7	990	71,280	12,296	(1040 6% 34)	5.89	187	99	100	99,000	+ 144	12,539	12.66565
8	200	14,400	2,484			59	20	100	20,000	+ 29	2,533	12.665
9	1,000	72,000	12,420			354	100	100	100,000	+ 146	12,666	12.666
10	1,042	79,653	13,740			584	104	110	104,200	- 647	13,197	12.665067
11	800	65,600	10,824			400	160	93	74,400	- 771	10,211	12.76375
12	1,900	136,800	23,598	(1900 6% 58)	18.37	534	285	99	188,100	+ 277	24,178	12.725263
TOTAL	10,977	806,643	$137,933		$28.05	$3,277	$1,698		992,588	- 1	$139,658	$152.657514

$\bar{\bar{X}}$ lb./hd. = 73.48; $\bar{X}$ ¢/lb. = $ .171; $\bar{X}$ comm./hd. = $ .1547; $\bar{X}$ cost/hd = $12.56508

1/ Forfeit payment from date of contract to date of delivery if over 30 days. I = Interest (forfeit payment), P = Principal, R = Rate of interest, T = Time in days. $PXRX\frac{T}{360} = I$

Source: Data gathered through interview by the author.

Statistical Analysis [1]

The total marketing costs per lamb from the grower were compared with the total marketing costs per lamb from the buyer by means of a "t" test. [2] This test determines if there is a significant difference between the means of the samples in each alternative. If there is no significant difference, then the samples are from the same cost population. If there is a significant difference the samples are from two different cost populations.

Result

The calculated "t" resulted in .3167057. This value when compared with the table value corresponding to the specifications of the data indicated that 75.522388% of the time it would be expected that buying from a grower would be no more expensive than obtaining lambs through a buyer.

1/ Statistical tests used in this section were derived from material presented by Croxton & Cowden, op. cit., Chap. 24.

2/ Equations used in applying "t" test are as follows:

$$\sigma_{\bar{X}a - \bar{X}b} = \sqrt{\frac{(Na + Nb)\ (\Sigma x^2 a + \Sigma x^2 b)}{NaNb\ (Na + N_2 - 2)}} \qquad t = \frac{\bar{X}a - \bar{X}b}{\sigma_{\bar{X}a - \bar{X}b}} \qquad \Sigma x^2 = \Sigma X^2 a - \frac{(\Sigma Xa)^2}{Na}$$

$\bar{X}a$ = means of alternative a.
Na = number of samples in alternative a.
= standard deviation.
Nb = number of samples in alternative b.

Net Return for Marketing Fat Lambs

The alternatives of disposing of fat lambs were tested to determine through which channel the greatest net return per head could be realized.

The absence of costs in returning lambs fed on a gain basis eliminated this alternative from the statistical analysis.

The comparisons for return on lambs from the remaining three market channels are based on gross sales price minus aggregate marketing costs.

Qualification of Data

The marketing costs considered in selling fat lambs through a buyer include such items as transportation, interest on initial investment, and a correction factor for equalizing weight. 1/

Transportation costs appear as the amount indicated by the individual feeder when interviewed by the author.

Interest on the initial investment for the lambs is added as a cost in all alternatives except when feeding on gain. This constitutes a calculated amount considered to be equivalent to an interest return for an alternative investment. The rate of interest is set at 6%. The principal represents the weighted average price per lamb obtained through local buyers and commission men and direct from the growers, multiplied by the number of head sold in each transaction. Time is the number of days resulting from the difference of the weighted average date lambs were sold through buyers, terminal markets, and packers, and the weighted average date lambs were bought from buyers and from growers.

1/ See Table IV.

TABLE IV. MARKETING COST DATA FOR LAMBS SOLD TO BUYERS

	I	II	III	IV	V	VI	VII	VIII	IX	X
Cases Studied	No. Head	Wt.	Total Sales	Trans. Cost	Date Sold	I x (V)	Interest	20.68183(I) ± III Correction for Weight	III-IX-VII+VIII Total Net Returns	IX ÷ I Net Return per Lamb
1	578	62,979	$13,226.	$ 0	239	138,142	$166.	-$1,272.	$11,954.	$20.68166
2	606	57,358	10,136.	61	307	186,042	174.	+ 2,397.	12,533.	20.68151
3	217	25,606	4,737.	0	180	39,063	62.	- 249.	4,488.	20.682027
4	217	25,606	4,737.	0	192	41,664	62.	- 249.	4,488.	20.682027
5	217	25,606	4,737.	0	204	44,268	62.	- 249.	4,488.	20.682027
6	217	25,606	4,737.	0	216	46,872	62.	- 249.	4,488.	20.682027
7	217	25,606	4,737.	0	228	49,476	62.	- 249.	4,488.	20.682027
8	217	25,606	4,737.	0	240	52,080	62.	- 249.	4,488.	20.682027
9	217	25,606	4,737.	0	252	54,684	62.	- 249.	4,488.	20.682027
10	217	25,606	4,737.	0	264	57,288	62.	- 249.	4,488.	20.682027
11	352	36,833	5,702.	15.	258	90,816	101.	+ 1,578.	7,280.	20.681818
12	600	68,400	12,312.	0	110	66,000	172.	+ 97.	12,409.	20.68166
13	200	21,900	4,052.	0	194	88,800	57.	+ 84.	4,136.	20.68
14	222	24,296	4,616.	0	200	44,400	64.	- 25.	4,591.	20.68018
15	421	45,650	9,130.	0	210	88,410	121.	- 423.	8,707.	20.68171
16	200	21,600	4,212.	0	220	44,000	57.	- 76.	4,136.	20.68
17	400	43,200	8,424.	0	230	92,000	114.	- 151.	8,273.	20.6825
18	200	21,600	4,212.	0	240	48,000	57.	- 76.	4,136.	20.68
19	400	43,600	8,424.	0	250	100,000	114.	- 151.	8,273.	20.6825
20	350	37,800	7,371.	0	260	91,000	100.	- 132.	7,239.	20.682857
21	239	28,540	5,280.	79.	126	32,634	74.	+ 77.	5,357.	20.683397
22	400	45,600	8,208.	0	110	44,000	114.	+ 65.	8,273.	20.6825
TOTAL	6,924	764,204	$143,201.	$155.		1,489,639	$1,981.	0	143,210	$4,549.98508

$\bar{\bar{X}}$ price/lamb = \$20.68; $\bar{\bar{X}}$ lb./lamb = 110.37 lbs.; $\bar{\bar{X}}$ price/lb. = \$.1873.

Source: Data gathered through interview by the author.

The correction factor for weight was derived within each alternative by the same manner stated in the buying side of the market.

Selling lambs through a terminal market and selling direct to the packer included the above mentioned costs with the addition of yardage, feed, "others", and commission costs. 1/

Yardage and feed costs were incurred while the lambs were in transit and are in addition to the transportation cost. The costs recorded represent the sum stated by the interviewee.

Costs falling under the heading of "others" were in the form of weighing charges and insurance costs. Commission fees are the payments to commission firms operating on the terminal market or to local representatives of the packers.

Statistical Analysis 2/

The net return per lamb in each transaction for each market alternative was calculated from the above data. The returns per lamb in each alternative were compared with each other by means of an "f" test. 3/

1/ See Tables V and VI.

2/ Statistical procedure employed in this section was derived from Croxton and Cowden, op. cit., Chap. 24 and 25.

3/ Equations used in applying the "f" test are as follows:

$$f = \frac{\sigma_{bc}^2}{\sigma_{wc}^2} \qquad \sigma_{bc}^2 = \frac{\Sigma X_{bc}^2}{N_{bc}} \qquad \Sigma X_{bc}^2 = \sum_1^{kc}\left[\frac{\left(\sum_1^{N_c} X\right)^2}{N_c}\right] - \frac{(\Sigma X)^2}{N}$$

$$\sigma_{wc}^2 = \frac{\Sigma X_{wc}^2}{N_{wc}} \qquad \Sigma X_{wc}^2 = \Sigma X^2 - \sum_1^{kc}\left[\frac{\left(\sum_1^{N_c} X\right)^2}{N_c}\right]$$

σ_{bc}^2	=	variance between columns
σ_{wc}^2	=	variance within columns
N_{bc}	=	number of columns minus 1
N_{wc}	=	number of items in all the columns minus the number of columns
$\sum_1^{kc}\left[\frac{\left(\sum_1^{N_c} X\right)^2}{N_c}\right]$	=	the sum derived from the total of each column squared, divided by the number of observations in the respective column
$(\Sigma X)^2$	=	the value of the sum of each column squared
ΣX^2	=	the sum of each observation in the columns squared

TABLE V. MARKETING COSTS DATA FOR LAMBS SOLD THROUGH TERMINAL MARKETS

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Cases Studied.	No. Hd.	Wt.	Total Sales	Trans. Cost	Yardage	Feed	Other	Commission	Date Sold	I (IX)	Int.	$21.827(I) ± III	III-IV-V-VI -VII-VIII-XI ± Total Net Returns	XIII ÷ I Net Return per Lamb
1	210	23,443	$4,337	$ 275	0	0	$3	$33	194	40,740	$60	+ $60	$4,584	$21.828571
2	202	23,510	4,526	275	0	0	3	33	209	42,218	58	- 117	4,409	21.826732
3	200	23,021	4,489	275	0	0	3	33	223	44,300	57	- 124	4,365	21.825
4	198	22,474	4,439	275	0	0	3	33	232	45,936	57	- 127	4,312	21.777777
5	198	22,493	4,495	275	0	0	3	33	240	47,520	57	- 183	4,312	21.777777
6	414	46,017	9,433	550	0	0	6	66	260	107,640	119	- 397	9,036	21.826086
7	650	64,224	13,166	825	0	0	9	99	282	183,300	186	+1,022	14,188	21.82769
8	200	23,600	4,366	197	$32	$23	16	32	197	39,400	57	- 1	4,365	21.825
9	200	23,600	4,366	197	32	23	16	32	281	56,200	57	- 1	4,365	21.825
10	208	23,088	4,906	190	32	25	8	35	233	48,464	60	- 366	4,540	21.826923
11	233	25,164	5,410	400	0	0	0	0	218	50,794	67	- 324	5,086	21.828326
12	200	21,600	4,644	400	0	0	0	0	218	43,600	57	- 279	4,365	21.825
13	233	25,164	5,410	400	0	0	0	0	238	55,454	67	- 324	5,086	21.828326
14	233	25,164	5,410	400	0	0	0	0	258	60,114	67	- 324	5,086	21.828326
15	600	64,800	13,932	1,200	0	0	0	0	278	166,800	172	- 836	13,096	21.82666
16	217	22,447	4,938	215	0	0	0	0	237	51,429	62	- 102	4,836	22.285714
17	258	26,316	4,903	15	39	4	0	92	185	47,730	74	+ 723	5,626	21.806201
18	258	26,316	4,903	15	39	4	0	92	214	55,212	74	+ 723	5,626	21.806201
19	258	26,316	4,903	15	39	4	0	92	243	62,694	74	+ 723	5,626	21.806201
20	55	5,720	1,073	5	8	2	0	19				+ 127	1,200	21.81818
21	120	12,480	2,434	62	0	0	0	0	241	28,920	34	+ 185	2,619	21.825
22	200	24,250	4,486	20	0	0	0	0	202	40,400	57	- 121	4,365	21.825
23	409	44,990	8,098	0	0	0	0	0	177	72,393	117	+ 829	8,927	21.826405
24	409	44,990	8,098	0	0	0	0	0	198	80,982	117	+ 829	8,927	21.826405
25	225	24,750	5,198	686	0	0	0	56	220	49,500	65	- 287	4,911	21.826666
26	225	24,750	5,198	686	0	0	0	56	232	52,200	65	- 287	4,911	21.826666
27	225	24,750	5,198	686	0	0	0	56	244	54,900	65	- 287	4,911	21.826666
28	225	24,750	5,198	686	0	0	0	56	256	57,600	65	- 287	4,911	21.826666
29	225	24,750	5,198	686	0	0	0	56	268	60,300	65	- 287	4,911	21.826666
30	225	24,750	5,198	686	0	0	0	56	280	63,000	65	- 287	4,911	21.826666
TOTAL	7713	779,687	$168,353	$10,597	$221	$85	$70	$1,060		1,809,560	$2,197	+ $60	$168,413	$6,550.88497

$\bar{\bar{X}}$ price/lamb = $21.84; $\bar{X}$ lb./lamb = 101.08 lb; $\bar{X}$ price/lb. = $21.59

Source: Data gathered through interview by the author.

TABLE VI. MARKETING COST DATA FOR LAMBS SOLD DIRECT TO PACKERS

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		XIII	XIV
Cases Studied	No. Hd.	Wt.	Total Sales	Trans. Cost	Yard-age	Feed	Other	Commis-sion	Date Sold	I(IX)	Int.	22.277711 (I)+III Correction for wt. & price returns		III-IV-V-VI-VII-VIII-XI+ XII Total Net Returns	XIII ÷ I Net Return per Lamb
1	212	23,744	$4,630	$197	$32	$23	$ 4	$33	202	42,824	$61	+	$93	$4,723	$22.278301
2	212	23,744	4,630	197	32	23	4	33	223	47,276	61	+	93	4,723	22.278301
3	212	23,744	4,630	197	32	23	4	33	244	51,728	61	+	93	4,723	22.278301
4	212	23,744	4,630	197	32	23	4	33	265	56,180	61	+	93	4,723	22.278301
5	212	23,744	4,630	197	32	23	4	33	286	60,632	61	+	93	4,723	22.278301
6	200	23,400	4,680	0	0	0	0	0	187	37,400	57	-	224	4,456	22.28
7	400	46,800	9,360	0	0	0	0	0	209	83,600	114	-	449	8,911	22.2775
8	200	23,400	4,680	0	0	0	0	0	231	46,200	57	-	224	4,456	22.28
9	400	46,800	9,360	0	0	0	0	0	255	102,000	114	-	449	8,911	22.2775
10	200	23,400	4,860	0	0	0	0	0	275	55,000	57	-	404	4,456	22.28
11	200	22,200	4,940	205	32	23	25	35	217	43,400	57	-	484	4,456	22.28
12	300	33,600	6,216	30	0	0	0	0	244	73,200	86	+	467	6,683	22.276666
13	200	27,163	5,433	0	0	0	0	0	219	43,800	57	-	977	4,456	22.28
14	250	33,253	6,651	0	0	0	0	0	239	59,750	72	-	1,082	5,569	22.276
15	200	27,163	5,433	0	0	0	0	0	259	51,800	57	-	977	4,456	22.28
16	250	33,253	6,651	0	0	0	0	0	279	69,750	72	-	1,082	5,569	22.276
17	200	26,163	5,433	0	0	0	0	0	299	59,800	57	-	977	4,456	22.28
18	618	62,418	12,328	825	0	0	0	0	191	118,038	177	+	1,440	13,766	22.27831
19	1,000	105,000	19,425	100	0	0	0	0	208	208,000	287	+	2,853	22,278	22.278
20	200	20,800	4,784	175	0	0	0	0	231	46,200	57	-	328	4,456	22.28
21	300	31,200	7,176	262	0	0	0	0	273	81,900	86	-	493	6,683	22.276666
22	400	40,000	8,700	612	0	0	0	0	186	74,400	114	+	211	8,911	22.2775
23	200	24,400	4,941	0	0	0	0	0	204	40,800	57	-	485	4,456	22.28
24	200	24,400	4,941	0	0	0	0	0	219	43,800	57	-	485	4,456	22.28
25	200	24,400	4,941	0	0	0	0	0	234	46,800	57	-	485	4,456	22.28
26	219	26,718	5,410	0	0	0	0	0	249	54,531	63	-	531	4,879	22.278538
27	200	24,400	4,941	0	0	0	0	0	264	49,200	57	-	485	4,456	22.28
28	200	24,400	4,941	0	0	0	0	0	279	55,800	57	-	485	4,456	22.28
29	200	24,400	4,941	0	0	0	0	0	294	58,800	57	-	485	4,456	22.28
30	225	24,525	5,279	0	0	0	0	0	194	43,650	65	-	267	5,012	22.275555
31	225	24,525	5,279	0	0	0	0	0	211	47,475	65	-	267	5,012	22.275555
32	225	24,525	5,279	0	0	0	0	0	228	51,300	65	-	267	5,012	22.275555
33	225	24,525	5,279	0	0	0	0	0	245	55,125	65	-	267	5,012	22.275555
34	210	22,050	5,016	330	0	0	0	0	265	55,650	60	-	338	4,678	22.27619
35	210	22,050	5,016	330	0	0	0	0	282	59,220	60	-	338	4,678	22.27619
36	730	86,870	16,288	73	0	0	0	0	235	171,550	209	-	25	16,263	22.27808
37	300	31,800	6,430	4	0	0	0	0	249	74,700	86	+	253	6,683	22.276666
38	400	42,400	8,573	6	0	0	0	0	238	95,200	114	+	338	8,911	22.2775
39	200	21,200	4,287	3	0	0	0	0	227	45,400	57	+	169	4,456	22.28
40	400	42,400	8,573	6	0	0	0	0	216	86,400	114	+	338	8,911	22.2775
41	200	21,200	4,287	3	0	0	0	0	705	41,000	57	+	169	4,456	22.28
42	400	42,400	8,573	6	0	0	0	0	194	77,600	114	+	338	8,911	22.2775
43	220	23,700	4,503	0	0	0	0	0	219	48,180	63	+	407	4,910	22.318181
44	716	63,899	11,980	0	0	0	0	0	196	140,336	205	+	3,971	15,951	22.27793
45	211	23,726	4,567	0	0	0	0	0	209	44,099	61	+	134	4,701	22.27962
46	207	23,088	4,502	0	0	0	0	0	0	0	59	+	109	4,611	22.275362
47	458	48,927	10,030	0	0	0	0	0	0	0	131	+	173	10,203	22.27729
48	208	23,203	4,409	0	0	0	0	0	199	41,392	60	+	225	4,634	22.278846
49	209	23,827	4,646	0	0	0	0	0	220	45,980	60	+	10	4,656	22.277511
50	203	23,453	4,632	0	0	0	0	0	234	47,502	58	-	110	4,522	22.275862
51	212	23,086	4,848	0	0	0	0	0	248	52,576	61	-	125	4,723	22.278310
52	213	25,114	5,274	0	0	0	0	0	269	57,297	61	-	529	4,745	22.276995
53	440	47,885	9,816	0	0	0	0	0	383	168,520	126	-	14	9,802	22.277272
54	14	1,190	214	0	0	0	0	0	383	5,362	4	+	98	312	22.285714
55	34	3,393	628	0	0	0	0	0	191	6,494	10	+	129	757	22.264705
56	204	22,394	4,350	0	0	0	0	0	206	42,024	59	+	195	4,545	22.279411
57	207	28,342	4,590	0	0	0	0	0	224	46,368	59	+	21	4,611	22.275362
58	411	43,752	9,188	0	0	0	0	0	248	101,928	118	-	32	9,156	22.277372
59	205	22,037	4,683	0	0	0	0	0	262	53,710	59	-	116	4,567	22.278048
60	206	21,475	4,671	0	0	0	0	0	241	49,646	59	-	82	4,589	22.276699
61	198	19,288	3,944	0	0	0	0	0	285	56,430	57	+	467	4,411	22.277777
62	200	22,000	4,092	236	0	0	0	0	180	36,000	57	+	364	4,456	22.28
63	570	62,700	11,662	740	0	0	0	0	238	135,660	164	+	1,036	12,698	22.27719
	7493	1,946,150	$389,704	$4931	$192	$138	$45	$200	14389	3,902,885	$5,010	+	$12	$389,716	1,403.451488

$\bar{X}$ date bought = (ΣBuyer VIII + ΣGrower IX) ÷ (ΣBuyer I + ΣGrower I) = 94; $\bar{X}$ date sold = Σ date sold (I) ÷ ΣI = 229;
$\bar{X}$ days owned/lamb = 135; Interest = ($\bar{X}$ price/lamb bought) (6%) (135/160) (No. lambs)
$\bar{X}$ price/lamb = $22.27007746; X lb/lamb = 111.25
Source: Data gathered through interview by the author.

This test serves as an indicator in revealing whether or not the classification of different alternatives is a valid classification. The test measures the ratio of the variance between alternatives and the variance within alternatives. The result of this ratio is then compared with a table value of calibrated probability levels and sample sizes consistent with the tested data.

Result

The calculated value of the "f" resulted in 497.6634. The table value of "f" corresponding to the size of the samples tested and at the .1% probability level is 7.38. Therefore, the probability of this not being a valid classification is less than .1%.

To further refine the results, a "t" test was applied to each combination of two selling alternatives. Each "t" test resulted in probability levels less than .1% that the average returns were taken from the same cost population. This verified the separate characteristics of each alternative within the general classification.

PART VII. CONCLUSION

Evaluation of Hypotheses

The hypothesis stating there is no significant cost difference to the feeder in obtaining feeder lambs through different market channels is accepted as a valid hypothesis. Although the "t" test indicated that approximately 75% of the time there will be a difference in the marketing costs of the alternatives, this level of probability is not substantial enough to reject the hypothesis. Therefore, it is concluded that there is little difference in the cost of obtaining lambs either from local buyers and commission men or direct from the growers.

The hypothesis stating there is no significant difference in net return per head to the feeder in disposing of fat lambs through alternate market outlets is rejected as false. This is done on the grounds of the "f" and "t" tests indicating probabilities of less than .1% that the groups of data were not taken from different cost populations.

Recommendations Based on the Findings of This Study

Obtaining Feeder Lambs

It is recommended that the feeder, when considering the source through which to obtain his lambs, evaluate other than direct out-of-the-pocket expenses. The results of this study indicating that there is no appreciable cost difference between alternatives should resolve direct costs to a minor factor of consideration. Emphasis should be stressed on the non-monetary values of conveniences and services offered with the marketing channel. For example, if the buyer is willing to contact the feeder at his home and eliminate the travel involved in grower contact, it would be a factor in favor of obtaining lambs from a buyer. On the other hand, if the owner is a particularly dependable type of person who consistently furnishes high quality type lambs, preference could be weighed in favor of this channel above others. A particularly favorable distance for delivery resulting in minimum transportation costs could place one or the other alternative as first choice.

Selling Fat Lambs

Feeders apparently receive greater net returns for their fat lambs when selling direct to a packer. The second largest return per lamb is realized when selling through a terminal market. Those feeders selling through local buyers and commission men realize the smallest net return per lamb in the cases studied. The recommendation for marketing fat lambs would be in the order of alternatives mentioned above. This recommendation is made on the basis of the tests in PART V and reflects only comparative cost relationship.

As described in the buying side of the market, non-monetary conveniences and services may enter into the decision of choosing the alternative to be used. If the convenience of selling on the farm to buyers more than compensates for the additional return realized in selling direct to packer or through a terminal market then the buyer choice is validated on grounds other than the cost analysis presented in this study.

Feeding on Gain [1/]

Those feeders contracting lambs to be fed on a gain basis realize an average return of $6.36 per lamb. Feeders buying from a grower and selling direct to a packer realize $9.36 per head, if selling through a terminal market $8.95 per head, and selling through a local buyer $7.79 per head. Buying through a buyer and selling direct to packer, through a terminal market, and to a local buyer realizes $9.71, $9.27, and $8.11 respectively per head.

Feeding on gain is at a disadvantage with the other alternatives when compared in the above manner. If, however, the feeder is unable to provide the capital or obtain credit to purchase feeder lambs, this alternative may be the only method of feeding lambs available to him.

Suggestions for Further Research

During the process of interviewing lamb feeders there were a number of comments concerning the lack of a standard grading system for lambs being marketed off the range. It is suggested that an investigation be made as to the possibility of establishing a grading system to fulfill this desire. Grading lambs off the range would facilitate a more efficient market environment for growers, middlemen,, and feeders.

A second suggestion for further research initiated by a subject of concern to many feeders is to determine the minimum number of pounds gain the feeder can be limited to and still realize an economic feeding enterprise. During the last few years the feeder lambs have been arriving at

---

[1/] See Table VII.

TABLE VII. MARKETING DATA FOR LAMBS FED ON GAIN

Data for Lambs Arriving at Feedlots

Gain No. Hd.	Total Wt.	Total Cost Truck C
398	33,432	$ 62
532	44,688	63
800	65,800	210
1,500	103,680	120
1,532	114,900	160
850	69,700	55
1,500	108,000	0
7,112	540,200	$670

Data for Lambs Leaving Feedlots

I	II	III	IV	V	VI
No. Hd.	Wt.	Gain	Total Sales	6.358251(I) + III	Total Cost III + IV
200	24,400	7,800	$ 1,560	- 288	$ 1,272
200	24,400	7,800	1,560	- 288	1,272
200	24,400	7,800	1,560	- 288	1,272
193	23,546	7,527	1,505	- 278	1,227
1,450	163,680	55,680	10,022	- 803	9,219
1,514	161,998	49,205	8,857	+ 769	9,626
260	27,518	8,798	1,584	+ 69	1,653
590	62,446	19,966	3,594	+ 157	3,751
200	23,000	8,000	1,440	- 168	1,272
300	34,500	12,000	2,160	- 253	1,907
200	23,000	8,000	1,440	- 168	1,272
400	46,000	16,000	2,880	- 337	2,543
400	46,000	16,000	2,880	- 337	2,543
916	684,888	18,060	3,612	+2,212	5,824
7,023	1,369,776	242,636	$44,654	- 1	$44,653

$\bar{X}$ price/lamb = $6.358251; $\bar{X}$ lb/lamb = 112.148; $\bar{X}$ price/lb. = $.0599/lb.

the feedlot at a heavier weight. The maximum weight limit is set for fat lambs at from 108-110 pounds and maintained by consumer demand and discriminatory pricing policies by packers. This gives the feeder a diminishing margin of gain which he may add to the lambs.

The findings of this thesis provoked several questions that bear consideration for further study. They are as follows:

1. Is the buyer offering a desirable and beneficial service to feeders through his specialization in knowledge of the feeder lamb market?
2. Is the result of the tests of the first hypothesis indicative of a trend which could result in buyers being able to supply feeder lambs to the feeder at a lower marketing cost?
3. If buyers were to control the feeder lamb market, where would be the balance of equilibrium between the beneficial tendencies of market efficiency obtained from specialization and the harmful considerations of monopolistic control of a one-buyer (alternative) market?
4. Is the packer able to offer a higher net return per lamb to feeders due to the economic efficiency in this particular market structure?

APPENDIX

WESTERN STATES SHEEP AND LAMB MARKETING PROJECT
--Confidential--

Schedule No. ____________

Date ____________

Enumerator ____________

Fattening Lamb Schedule

Name ______________________ Address ______________________

State ______________________ Area ______________________

Location of Feedlot ______________________

General Information:

Buying ______________________

____

____

Feeding ______________________

____

____

Selling ______________________

____

____

What characteristics do you look for when selecting lambs for fattening? ______________________

What is your preference for lambs from different areas?

____

How many years have you fed lambs? ____ Number fed in 1953-54 ________
1952-53 ____ 1951-52 ____ 1950-51 ____ 1949-50 ____

Have you ever fed cattle for slaughter? ____ Most recent year you fed cattle _____.

RECORD OF INDIVIDUAL PURCHASES OF FEEDER LAMBS

Record No. ____________

	Purchase No. ___	Code	Purchase No. ___	Code
Name and Address of Agency lambs were purchased from or through 1/				
State and Area of Origin				
Number Purchased				
Date Purchased or Contracted				
Date Received				
Date in Feedlots				
Average Price per Pound				
No. of Cutbacks Purchased				
Cutback Price per Pound				
Forfeit Payment (Dollars)				
Purchase Cost (Dollars)				
Weighing Information: Where Weighed				
Purchase Wt. (Total Pounds)				
Purchase Wt. of Cutbacks				
Average Weight Per Head				
Maximum Weight Allowed				
Minimum Weight Allowed				
Weighing Conditions: Pencil Shrink Allowed:				
Miles Hauled				
Miles Trailed				
Overnight Shrink				
Other				
Transportation: Truck (Miles)				
Rail (Miles)				
Marketing Costs: (Dollars) Transportation Railroad				
Feed-in-transit Privileges				
Truck				
Commission				
Feed, Yardage and Other				

1/ If contract is for custom feeding, what are terms of contract? ________

SALES OF FAT LAMBS

Record No. ____

	Sale No. __	Code	Sale No. __	Code
Kind of Feed:				
Farm Pasture				
Feedlot				
Combination				
Name and Address of Agency Lambs were sold through or to				
Market				
Date Shipped				
Date Sold				
Class of Sheep (Wooled or Shorn)				
Number Shipped				
Sale Weight (Total Pounds)				
Price (Dollars)				
Gross Value				
Marketing Charges:				
Transportation				
Yardage				
Feed				
Commission				
Other				
Total				
Method of Transportation:				
Truck (Miles)				
Rail (Miles)				
No. of Feed and Rest Stops				
Days on Feed at Market				
Local Sale:				
Where Weighed				
Time Weighed				
Weighing Conditions:				
Pencil Shrink Allowed				
Miles Hauled				
Miles Trailed				
Off Feed and Water (Hours)				
Other				
Wool Shorn:				
Pounds Sold				
Price				
Value				

BIBLIOGRAPHY

American Stockyards Association, 25 Questions Answered by American Stockyards Association, American Stockyards Association, Cleveland, Ohio, 1950.

Boulding, K. E., Economic Analysis, Harper & Brothers Publishers, New York, 1948.

Croxton, F. E., and Cowden, D. J., Applied General Statistics, 2nd Ed., Prentice-Hall, Inc., New York, 1955.

Larrabee, H. A., Reliable Knowledge, Houghton Mifflin Co., New York, 1945.

Malott, D. W., and Martin, B. F., The Livestock and Meat Packing Industry, McGraw-Hill Book Company, Inc., 1939.

Martin, J. H., and Leonard, W. H., Principles of Field Crop Production, The Macmillan Company, New York, 1949.

McIsaac, A. M., Elements of Economic Analysis, Prentice-Hall Inc., 1950.

Montana Department of Agriculture, Agricultural Statistics, Montana Crop and Livestock Reporting Service, Helena, Montana, April 12, 1954.

Montana Department of Agriculture, Agricultural Statistics, Montana Crop and Livestock Reporting Service, Helena, Montana, September 13, 1954.

Myrick, D. C., "Farm Flocks of Sheep on Irrigated Farms in Montana," Montana Agricultural Experiment Station Bulletin 512, Bozeman, Montana, June, 1955.

Saunders, H. F., A History of Montana, Vol. I, The Lewis Publishing Co., Chicago, 1913.

Wentworth, E. N., America's Sheep Trails, The Iowa State College Press Ames, Iowa, 1948.