

Marketing Hay in Arizona.



Agricultural Experiment Station

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MARKETING HAY IN ARIZONA

by

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INTRODUCTION

Arizona is one of few states in the West which produce an annual surplus of hay, and one of two states in the western region where more than 50 per cent of the hay produced is sold by the producer. This report is intended to discuss some of the marketing problems encountered by Arizona hay producers. The research was done in connection with Western Regional Marketing Project WM-20, "The Economics of Marketing Hay and Feed in the West."

Eighty-five hay producers were interviewed during the summer of 1957 in an attempt to gain additional knowledge of marketing practices and problems. Most of these producers were located in the Salt River Valley and Yuma County, although producers were also interviewed in Pima and Cochise counties. Additional information concerning feeding practices was obtained through a mail questionnaire sent to feedlot operators. Of the 183 feeders receiving questionnaires, 93 returned the information requested.

A complete record of truck shipments of hay through inspection stations on the Arizona border was obtained from the Arizona Highway Commission. This includes both imports and exports of hay. Similar records were obtained from the California Department of Agriculture concerning shipments of hay into California. Secondary data from various other sources were also utilized where necessary.

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Production and Utilization

Hay production in Arizona reached an all-time high of 780,000 tons in 1955, then decreased slightly in 1956. The ten-year (1947-1956) average was 664,000 tons. The trend in production over that ten-year period is shown in Figure 1. Production has been increased an average of 11,000 tons per year since 1947. While hay production was increasing 29 per cent between 1947 and 1956, the number of animal units fed in Arizona increased 70 per cent. Although the increase in hay production was relatively constant from year to year, nearly 80 per cent of the increase in animal units occurred after 1953 (Figure 1). The major part of the increase in livestock numbers was made up of cattle in feedlots. There were approximately 85,000 head in Arizona feedlots on January 1, 1953. By January 1, 1956 this number had been increased to 205,000 head.

Arizona has produced an average surplus of 225,000 tons of hay per year for the past ten years. However, with the increase in cattle feeding in recent years, the size of this surplus has declined somewhat. The surplus was only 136,000 tons in 1956.^{2/} In addition, only 40 per cent or less of the hay produced in the state is fed on the farm where it is produced. This means a commercial hay crop in excess of 450,000 tons per year was sold during the past two years. At current prices this hay is worth well over 10 million dollars to Arizona farmers. This is the part of the total hay crop with which we will be concerned in this report.

Marketing Practices

According to our survey of hay producers, 37 per cent of the 1956 hay crop was fed on the farm where it was produced (Table 1).^{3/} Of that part of the crop sold, 35 per cent was sold to other farmers and feeders, 53 per cent to hay dealers, and 12 per cent to independent truckers. On the average, the highest price (\$25.80 per ton) was obtained for hay sold to dealers. This is explained partially by the fact that, in general, dealers purchase hay of higher quality than that sold elsewhere. In addition, sales to hay dealers are spread more evenly over the crop year than those made directly to other farmers. While 72 per cent of the hay sold to feeders and truckers was sold during the four month period from April through July, only about 55 per cent of the sales to dealers was made during that period. Many feeders who purchase hay directly from producers apparently buy a sufficient quantity at harvest time to carry them through to the next crop year. Most dealers probably do not have facilities for handling a quantity adequate to satisfy their total yearly demand, and must purchase additional hay throughout the year. Because of the seasonal price increases discussed below, this makes the annual average price paid by dealers somewhat higher than that paid by feeders who buy directly from the producers. This price differential averaged \$1.22 per ton for those producers who were interviewed concerning the disposition of the 1956 crop.

^{2/} 90,000 tons were exported, the remaining 46,000 tons were added to carry-over stocks.

^{3/} Although the sample included only about 10 percent of the total hay produced, this figure is in close agreement with data released by the U.S. Department of Agriculture.

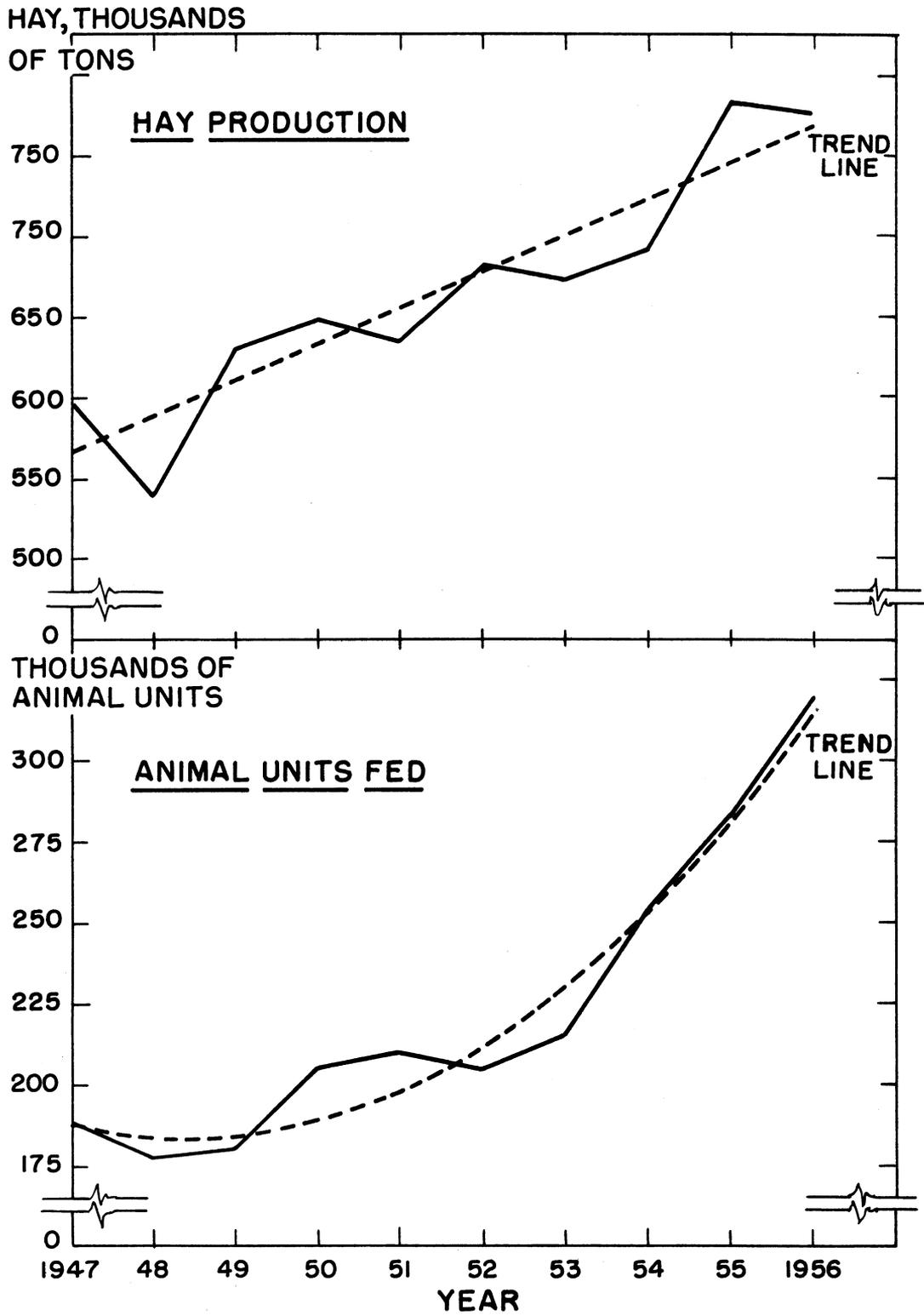


Figure I.- Trends in Arizona hay production and animal units fed, 1947-1956.

Table 1. Disposition of 1956 Arizona Hay Crops, Sample of 85 Hay Producers.

County	Fed Where: Pro- duced:	SOLD						
		Other Far- mers	Price Per Ton	Dealers Tons	Price Per Ton	Truckers Tons	Price Per Ton	Average Price Per Ton All Outlets
	Tons	Tons	Dollars	Tons	Dollars	Tons	Dollars	Dollars
Maricopa	5784	6049	26.20	12736	26.51	---	-----	26.41
Pinal	830	2989	23.00	5608	25.00	463	23.90	24.30
Yuma	10780	3103	22.79	2211	23.39	4308	23.85	23.40
Cochise	60	1428	24.76	241	28.90	---	-----	25.36
Pima	5825	----	-----	----	-----	---	-----	-----
State	23279	13569	24.58	20796	25.80	4771	23.86	25.14

Sales of hay directly to independent truckers were confined almost entirely to the Yuma area. The average price received for hay sold in this manner was nearly \$2.00 per ton below the average price for all hay sold in the state. However, the price received for all hay sold in the Yuma area, whether to dealers, feeders, or truckers, averaged \$1.75 per ton below the average for the state as a whole. For hay sold in Yuma county, the price received from truckers was about the same as that received from hay dealers, and over \$1.00 per ton higher than the price received from feeders. Thus the price differential must be viewed from a geographical standpoint, rather than on basis of type of buyer. Although hay sold for nearly \$3.00 per ton more in the Phoenix area than in Yuma, this difference in price appears inadequate, on the average, to cover the cost of transporting hay between the two points.^{4/} However, the relationship changes from month to month.

It is even more interesting to note the variations in price within counties included in the survey. Prices reported in the sample of hay producers varied from \$17.00 to \$34.00 per ton in Maricopa county, \$19.00 to \$28.50 in Yuma county, \$21.00 to \$28.50 in Pinal county, and \$20.00 to \$30.00 in Cochise county. Part of this variation in price can be explained by "normal" seasonal price movements. But, based on the seasonal pattern discussed below, only \$6.00 to \$7.00 of the total variation can be attributed to seasonality. This means that in Maricopa county there was a range of \$10.00 per ton in the prices received by producers for their hay, even after allowing for seasonal price changes.^{5/}

^{4/} The estimated cost of trucking hay from Yuma to Phoenix via commercial truck lines is \$7.00 per ton.

^{5/} None of the prices quoted include delivery charges.

An interesting comparison can be made at this point between some of the results of the producer survey shown above and information obtained from cattle feeders in various parts of the state, as shown in Table 2. Feedlot operators reportedly paid \$1.61 per ton less for hay they purchased than the state average. The difference was even larger in Maricopa county, where most of the hay was purchased. This can be partially explained by the fact that feeders purchased hay in relatively large lots. The average feeder purchasing hay in Maricopa county purchased 1584 tons at \$23.74 per ton, while the average producer sold 648 tons at \$26.41 per ton. Thus a feeder making a relatively large purchase apparently is able to buy at a somewhat lower price.

In this survey of cattle feeders, 61 per cent of the hay fed in feedlots is produced by the feeder. The 226,492 head of cattle fed by respondents to the questionnaire represent about 57 per cent of the cattle fed in Arizona in 1956. This would seem to indicate that cattle feeders purchased only 82,682 tons, or about 18 per cent of the 450,000 tons of hay sold by producers in 1956, in spite of the fact that this is the largest single use made of hay in Arizona. Total utilization in feedlots was about 397,000 tons, or 62 per cent of the total hay consumed by livestock in 1956, an increase of over 100 per cent since 1953. Of 325,000 tons of hay fed on the farm where it was produced in 1956, over 300,000 were produced and fed by feedlot operators. The dairy industry, as the second largest user of hay, apparently represents the largest single market for hay in Arizona. Dairy farmers have been feeding an estimated 170,000 tons of hay per year in recent years. If the data used here are correct, most of this must have been purchased.

The only significant price differential (by type of seller) indicated in the survey of cattle feeders was between brokers and other types of sellers. Hay purchased through brokers cost \$1.60 per ton more, on the average, than hay obtained from other sources. However, this represented only about 15 per cent of the total hay purchased, and involved only four transactions. Although no information was obtained concerning the seasonality of purchases, it is not unlikely that these few cases represented instances in which a feeder ran short of hay between harvest periods and had to rely on a broker to locate additional supplies.

Quality-Price Differentials

A certain amount of variation in price can be expected because of differences in quality. Where quality-price differentials are based on U.S.D.A. grades, the difference in price between the highest and lowest grades usually runs between four and five dollars per ton.^{6/} In Arizona, however, almost no hay is sold on the basis of established grades. None of the producers interviewed sold hay on this basis. The more common practice is for buyer and seller to come to some agreement concerning quality. This might be based on experience as to appearance, smell, or other criteria established by feeding experience. Where hay is sold in this manner there is no firm basis for establishing quality-price differentials, and these differentials are likely to be larger than where a mutually acceptable set of grades and standards are available. According to answers received to questions concerning grades, this is one of the most serious problems faced by Arizona hay producers. Also, when asked for suggestions for

^{6/} "Alfalfa Market Semi-Annual Summary", Federal-State Market News Service, Los Angeles, California.

Table 2. Sources of Hay Fed, 1956, Sample of 93 Arizona Cattle Feeders

County	Number of Feeders	Number of Cattle Fed	Hay Fed								
			Produced	Purchased				Total Purchased	Average Price		
				From Producer	Price	Through Broker	Price			From Dealer	Price
Tons	Tons	\$/Ton	Tons	\$/Ton	Tons	\$/Ton	Tons	\$/Ton			
Maricopa	55	163,258	48,138	23,226	23.45	7,125	25.12	6,081	23.22	36,432	23.74
Pinal	12	29,242	7,980	3,030	25.94	---	---	---	---	3,030	25.94
Yuma	17	16,265	12,529	2,767	21.63	150	26.00	750	26.00	3,667	22.70
Graham	2	8,175	200	3,500	20.00	---	---	---	---	3,500	20.00
Cochise	1	400	150	----	---	---	---	---	---	---	---
Navajo	1	200	400	----	---	---	---	---	---	---	---
Santa Cruz	2	3,352	1,500	----	---	---	---	---	---	---	---
Pima	3	5,600	1,900	500	25.00	---	---	---	---	500	25.00
State	93	226,492	72,797	33,023	23.18	7,275	25.13	6,831	23.52	47,129	23.53

improving the market structure for hay, one of the most common answers given by producers was that a more meaningful set of grades should be established to facilitate pricing on the basis of quality.

The Yuma County Farm Bureau Growers Association, a hay marketing cooperative, together with the Arizona Milk Producers Association, has had a pilot project in which they are attempting to price hay on the basis of protein and moisture content. The base price is 90 per cent of the Los Angeles price for U.S. No. 1 alfalfa hay. Premiums or discounts are added or subtracted from this base price, depending on moisture and protein content. Hay with 16 per cent moisture is taken as the optimum. One per cent is added to the base price for each percentage point under 16 per cent moisture; the same amount is subtracted from the base price for each percentage point of moisture over 16 per cent. For protein content, 18 per cent is used as the base. An adjustment of \$1.50 per ton is made for each percentage point above or below 18 per cent. Thus, if the Los Angeles price quotation is \$31.50 per ton, hay containing 8 per cent moisture and 19.6 per cent protein would be priced in Phoenix as follows.^{7/}

Base price: 90% of \$31.50	\$28.35
Add 8% for low moisture:	2.27
Add 1.6 x 1.50 for protein:	2.40
Phoenix price	<u>\$33.02</u>

On the day for which these prices applied (September 10, 1957) the price for similar quality hay delivered in Phoenix and sold outside this program was \$33 to \$34 per ton.

Experience with this program has been too limited to allow a critical evaluation, but the fact that it is being continued would seem to indicate that it has gained a certain amount of acceptability. There has also been some discussion concerning a procedure which would price hay on the basis of T.D.N. (total digestible nutrients), rather than on moisture and protein content. To the author's knowledge, no such program has yet been tried in Arizona.

The major problem encountered with chemical testing of hay is that of obtaining a representative sample for use in the tests. Experience by some buyers in California indicates that protein tests may vary from 12 to 25 per cent in samples taken from the same load of hay, and that moisture may vary from 15 to 25 per cent.^{8/} Despite these shortcomings, however, it appears that grading procedures such as these might eventually lead to more efficient marketing than is possible with the present set of grades and standards.

^{7/} This example was furnished by Ralph W. Phillips, manager of the Yuma County Farm Bureau Growers Association, as was much of the other information concerning this program.

^{8/} "A Look at Alfalfa Marketing", Farm Management magazine, page 30, September, 1957.

Market Information

If any one problem were to be singled out as the most serious encountered in marketing Arizona hay, it would be that of obtaining adequate market information. It is believed this, more than any other factor, is responsible for the wide range in prices discussed above. When interviewed, producers who sold hay stated, almost without exception, that more information was needed concerning current conditions in the local market. Many of them felt they were not doing a good job of marketing because they did not have up-to-date information as to supplies and local demand. In Yuma county, where much of the hay is sold to independent commercial truckers hauling hay to the Los Angeles market, producers thought they were being taken advantage of by truckers who played one producer against the other in driving prices down. This was believed done by giving a producer faulty information concerning the prices his neighbors quoted.

Asked to list sources of market information commonly used, producers most frequently mentioned "word-of-mouth" from neighbors, buyers, truckers, etc. Seventy-five per cent of the producers who sold all or part of their hay crop listed this as one, or perhaps the only, source of market information. The fallibility of this type of information is obvious. Suppliers of this type of information will tend to give personal gain or prestige first consideration.

Other sources mentioned in the survey included, in order of the number of times mentioned, newspapers, hay dealers, radio, Los Angeles market reports, and U.S. Department of Agriculture reports of various kinds. No one of these sources was mentioned by more than 15 per cent of the producers interviewed.

The most frequent suggestion, in addition to more current market information, was that a marketing cooperative, or association, be formed to market all the hay in the area. This would enable producers as a group to bargain much more effectively. Much additional investigation should be made, however, before such an organization is encouraged. To be effective, it would have to include a large proportion of the local producers in its membership. A survey of all hay producers in a given area would be necessary to determine the number who would be willing to market their hay through an association. It is beyond the scope of this report to discuss the problems involved in organizing and operating a cooperative association, except to say that these problems should receive serious consideration before such a project is undertaken. There are a number of research publications available which deal with factors underlying success and failure of cooperative marketing associations. These factors should be related to local conditions in evaluating the probability of establishing a successful association. A small hay marketing cooperative has already been organized in the Yuma area. Although this organization is only about a year old, it apparently has enjoyed some degree of success and is hoping to expand its membership.

Price Movements

There are two types of price movements of interest to hay producers. One involves trends and variations in average annual prices. The other involves monthly variations in price, and is referred to as seasonal variation. The factors which cause these two types of price movements are quite different in nature, and are discussed separately.

Average Annual Prices

The average annual price which Arizona hay producers receive for their crop is influenced by a number of factors in addition to the ever-important general price level. During the past five years, Arizona producers have shipped an average of over 100,000 tons of hay to Southern California. Thus, demand in that area has been at least as important in determining price as are local conditions. The nearest major market for hay is located in Los Angeles. Figure 2 shows the relationship between the price in that market and Arizona hay prices. Until the 1952-53 crop year, when the cattle feeding industry in Arizona began its most rapid growth, the difference between the Los Angeles and the Arizona price averaged \$6.55 per ton. Since that time, the margin has decreased markedly, reaching a low of \$.96 during the 1956-57 crop year. This again reflects the growing importance of the cattle feeding industry in Arizona and its effect on the local demand for hay. The average farm price for hay in Arizona from 1947 through 1951 was \$26.35 per ton, compared with \$32.90 per ton in the Los Angeles market. The 1952-1956 average in Arizona increased by \$2.15, to \$28.50 per ton, while the average Los Angeles price decreased \$1.80, to \$31.10 per ton. This narrowed the average price differential by a total of \$3.95, from \$6.55 to \$2.60 per ton. Shipments of hay from Arizona, primarily from Yuma, totaled 190,000 tons during the 1952-53 crop year, but had been decreased to 34,000 tons by 1954-55. Although shipments have increased slightly during the past two years, they are still well below the five-year average.

The current charge for trucking hay from Yuma to Los Angeles is about \$9.00 per ton. The charge from Phoenix is slightly higher, but little hay is shipped from that area to points in California. Assuming, as was indicated by our survey, that the average price for alfalfa in the Yuma area is about \$2.00 per ton below the average for the state, certain conclusions can be drawn relative to the marketing of Yuma hay in California. This \$2.00 can be added to the margin between Los Angeles and average Arizona prices to obtain the average margin between Los Angeles and Yuma prices. From 1947-48 to 1951-52 this margin averaged \$8.55 per ton, which was nearly equal to the transportation charge between the two areas. Since 1951-52, however, the differential has decreased to an average of \$5.62 per ton, \$3.40 per ton below the current trucking charge.

During the 1956-57 crop year, hay of average quality would have had to sell for \$20.00 per ton, f.o.b. Yuma, if it were being moved to the Los Angeles market, where the average price was about \$29.00 per ton. The only exception would be for hay of sufficiently higher quality to command a premium in the Los Angeles market. Accordingly, only hay of the highest quality could be trucked from Yuma to Los Angeles.

Hay sold to truckers in the Yuma area in 1956-57 brought an average of \$23.85 per ton. This hay would have had to sell for \$32.85 per ton in Los Angeles to cover the cost of transportation. The average price paid in Los Angeles for hay of the highest quality (U.S. No. 1) during the 12 months ending March 31, 1957 was \$31.18 per ton. Thus it does not appear that it was possible to profitably ship hay from Arizona to Los Angeles during the 1956-57 crop year. Yet some 88,000 tons of Yuma hay were sold in the Los Angeles vicinity during that period.

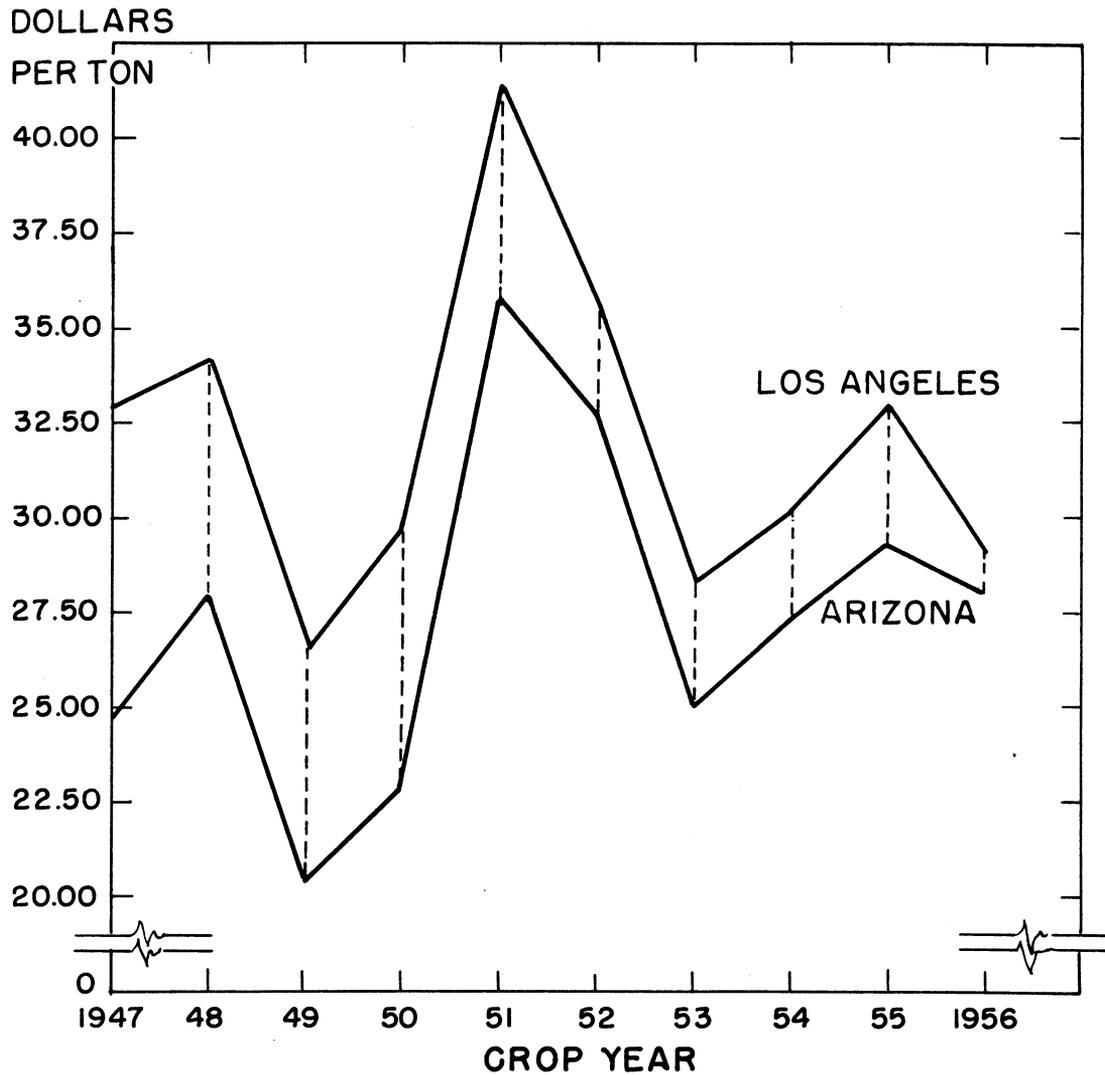


Figure 2.- Average annual farm price for baled alfalfa hay in Arizona, and for No. 2 green leafy alfalfa in Los Angeles, 1947 to 1956.

There is one possible explanation for this phenomenon. As was shown above, our survey of hay producers indicated that over half of the hay sold in the Yuma area is sold directly to truckers. The \$9.00 trucking charge used above is the rate charged by commercial carriers. If this rate is sufficiently higher than the actual cost of operating a truck between Yuma and Los Angeles, then an independent trucker can operate on a closer margin than can a producer or dealer who hires a commercial trucker to haul hay to Los Angeles. Thus if the actual cost of trucking hay to Los Angeles were \$6.00 per ton, for example, a trucker who purchased hay in Yuma for \$23.85 per ton would need only \$29.85 per ton to break even, compared to \$32.85 per ton under the commercial rate. If he is able to sell at a price higher than \$29.85 per ton, or if he is able to purchase the hay for less than \$23.85 per ton, then he realizes some return for his enterprise. This is why truckers attempt to drive the purchase price down as far as possible. It should be remembered, however, that the average price differential between Yuma and Los Angeles has narrowed considerably in recent years, and the trucker must realize some return over operating costs if he is to remain in business. He is assuming all of the price risk involved in moving the hay from Yuma to Los Angeles, in addition to devoting his time and labor to the enterprise.

One further consideration comes to mind concerning the 88,000 tons of hay sold in California during the 1956-57 crop year. If, as was indicated above, there was a surplus of hay in Arizona, these 88,000 tons could not have been sold locally without driving the price down. This price decline in the local market might well have cost hay producers as a group more than the sacrifice which they had to make, price-wise, to sell their hay in California. Thus, even if a part of the annual crop must be sold outside the state at a lower price, total revenue probably will be higher than if an attempt were made to sell the entire crop locally.

This can be illustrated graphically, as in Figure 3. It is unlikely that the relatively small quantity of Arizona hay sold in California will have any significant effect on the California price. Therefore, the Los Angeles price in section (A) of Figure 3 is assumed to be constant at \$20.00 per ton. This is the 1956-57 average Los Angeles price, minus \$9.00 per ton for hauling. The Arizona price, on the other hand, can be expected to vary inversely with the quantity of hay marketed. The degree of this variation, based on available supply and price data, is represented by the demand curve (DD) in section (B) of Figure 3. As the quantity of hay offered for sale in the state increases, the price decreases.

If the 88,000 tons of hay shipped to California sold for \$20.00 per ton, f.o.b. Yuma, the revenue from this part of the crop would amount to \$176,000. The 450,000 tons sold in Arizona at an average price of \$25.14 resulted in \$11,313,000 of revenue, for a total of \$11,489,000. But if the entire crop had been sold in Arizona, the average local price would have fallen to approximately \$20.00 per ton, and total revenue would have been only \$10,760,000. Thus, by selling a relatively small part of the crop in California, total revenue was increased by \$729,000. Although the demand curve shown in Figure 3 is based on limited data, and therefore is only approximate, it serves to illustrate the point.

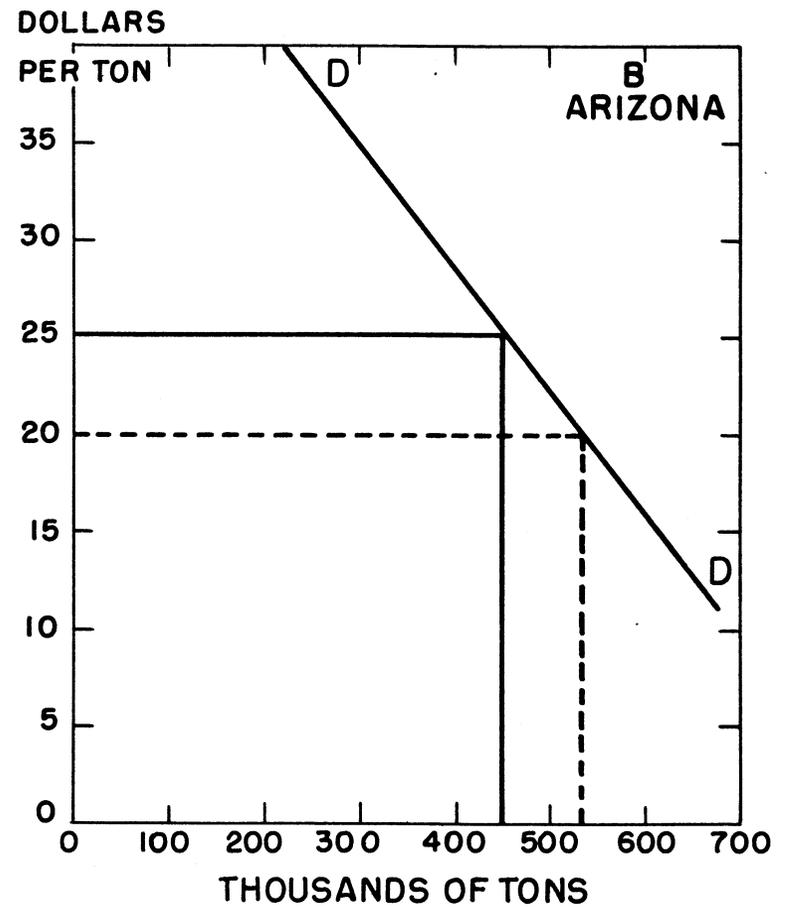
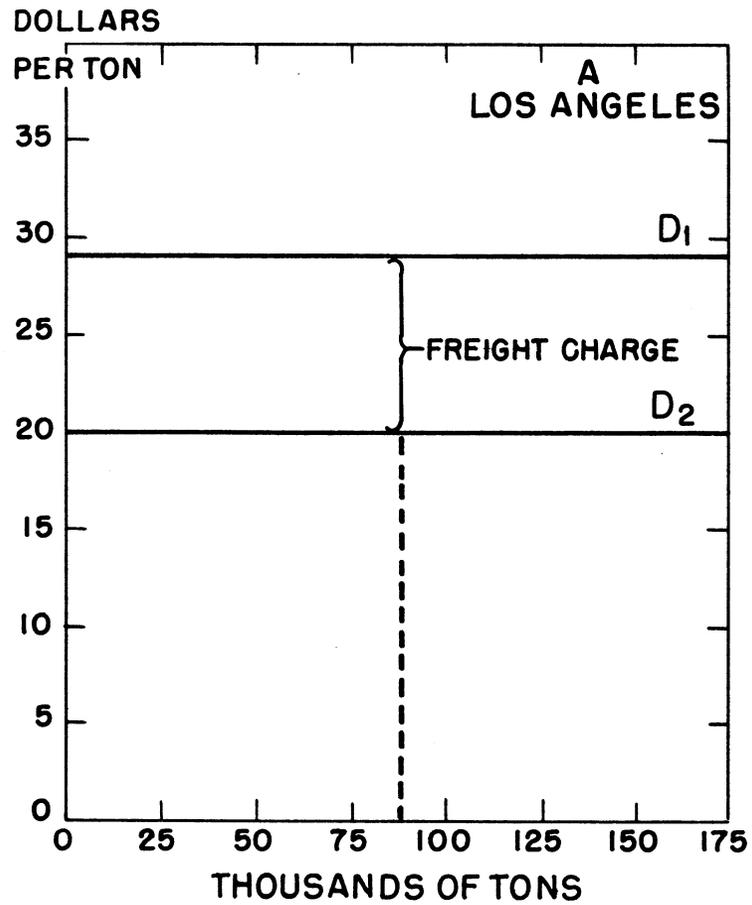


Figure 3.- The effect of the quantity of hay sold in California and Arizona on the price received for hay in Arizona.

Seasonal Price Movements

In addition to changes in annual average prices, hay producers and feeders need to be concerned with monthly price movements. Price changes of this type are brought about primarily by changes in the quantity of hay available from one harvest season to the next. The seasonal price pattern for alfalfa hay in Arizona is shown in Figure 4. April was chosen as the starting point because the new crop begins to come on the market at this time.

The bulk of the Arizona hay crop is marketed during the five-month period from April through August, with the peak occurring in June (Figure 4). Prices begin their seasonal decline during March or April, reaching their lowest point in July. Thus the seasonal peak in the quantity marketed appears to precede the low in prices by about one month. The monthly price falls below the annual average price in May and remains there until October or November when it climbs above the annual average until the following May. These price movements are very closely related (inversely) to month-to-month changes in the quantity marketed. Another factor which contributes to monthly price movements is the change in the quality of hay harvested at different times during the season. First and second cutting alfalfa is generally highest in protein. Quality declines through the summer months, but picks up again in early fall.

The dollar magnitude of seasonal price changes is illustrated by Figure 5, which shows average monthly prices for two periods, 1947-48 to 1952-53 and 1953-54 to 1956-57. During the earlier period there was a difference of \$8.13 per ton between the seasonal low in July and the high in February. This differential increased slightly, to \$8.50 per ton during the more recent period, an average increase of 31 per cent during the crop year. Even after adjusting for an estimated 10 per cent shrink during the year, the price rose \$5.73 per ton. Of course this price differential has to be weighed against the cost of holding the hay off the market and the need for cash income at harvest time. Unless something other than open stacks are used for storing the hay, in which case the cost of storage facilities must be considered, the primary consideration in holding the hay until later in the year is the cost of insurance, risk of spoilage and/or deterioration in quality.

A comparison of monthly price changes in Arizona and the Los Angeles market should be of interest to hay producers in the Yuma area. As indicated in Figure 5, the largest price differential exists during the period from May through August, reaching a high in June. Although the seasonal price pattern is quite similar in these two areas, the variation in Los Angeles prices is less marked. During the more recent period shown in Figure 5, the Los Angeles price varied \$5.25 per ton during the year, compared to \$8.50 per ton in Arizona. Prices in both areas begin their seasonal decline in March or April, and reach a low in July, but Los Angeles prices do not fall as far as do prices in Arizona. The June price differential has averaged \$5.30 per ton in recent years, compared to \$7.50 per ton during the earlier period. The differential in May, the month in which Arizona shipments to California reach their peak, has averaged \$4.43 per ton for the past five years. This differs from the June average by only \$.87 per ton, which would have made a difference of \$15,720 in the revenue from the 18,000 tons of hay shipped to California during May of 1957. The importance of this amount depends upon the number of individuals involved. While it may be insignificant when divided among a large number of shippers, it would add appreciably to net returns if there were only a small number shipping hay at this time.

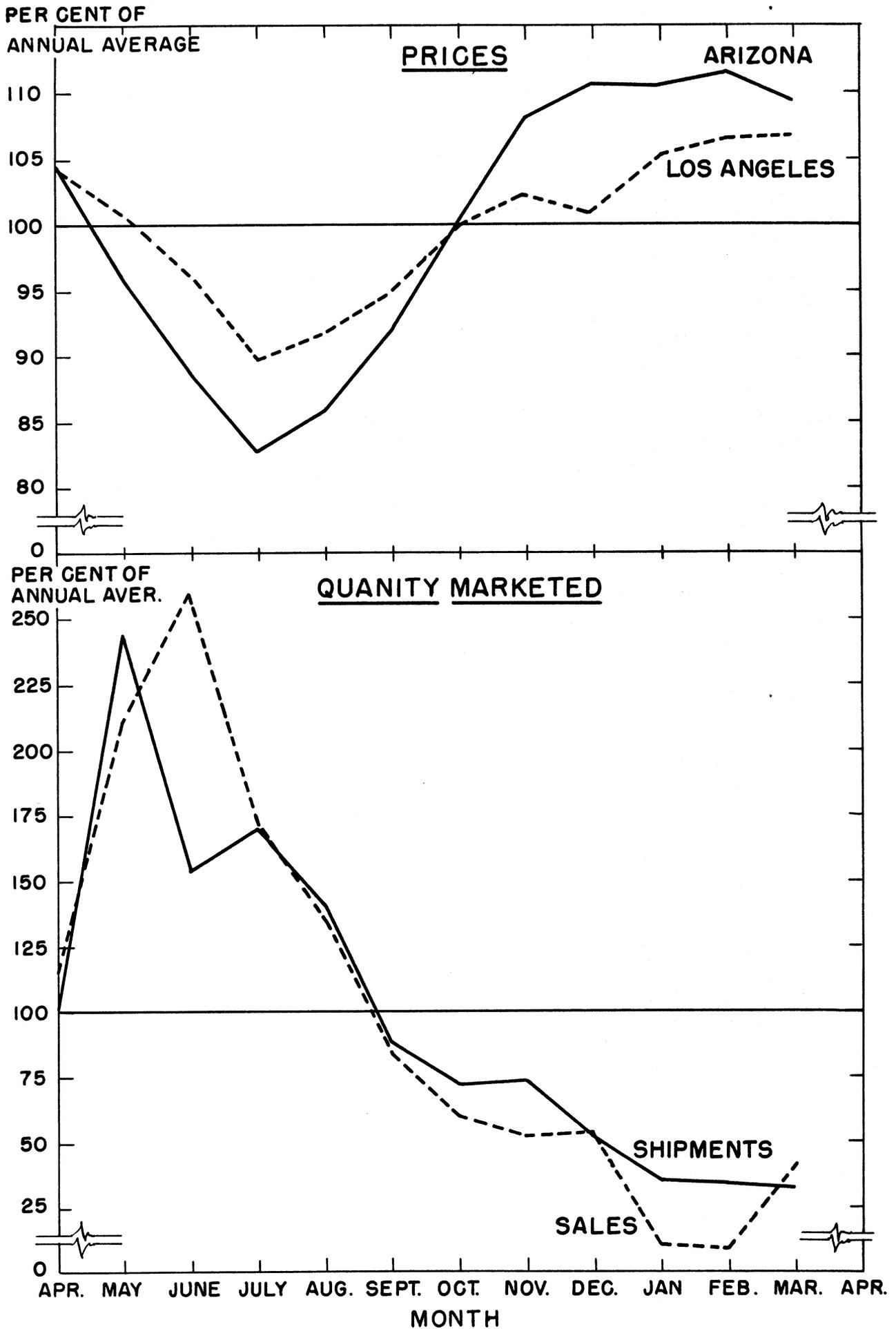


Figure 4.—Monthly variations in prices and quantity marketed, alfalfa hay, average 1947-1956.

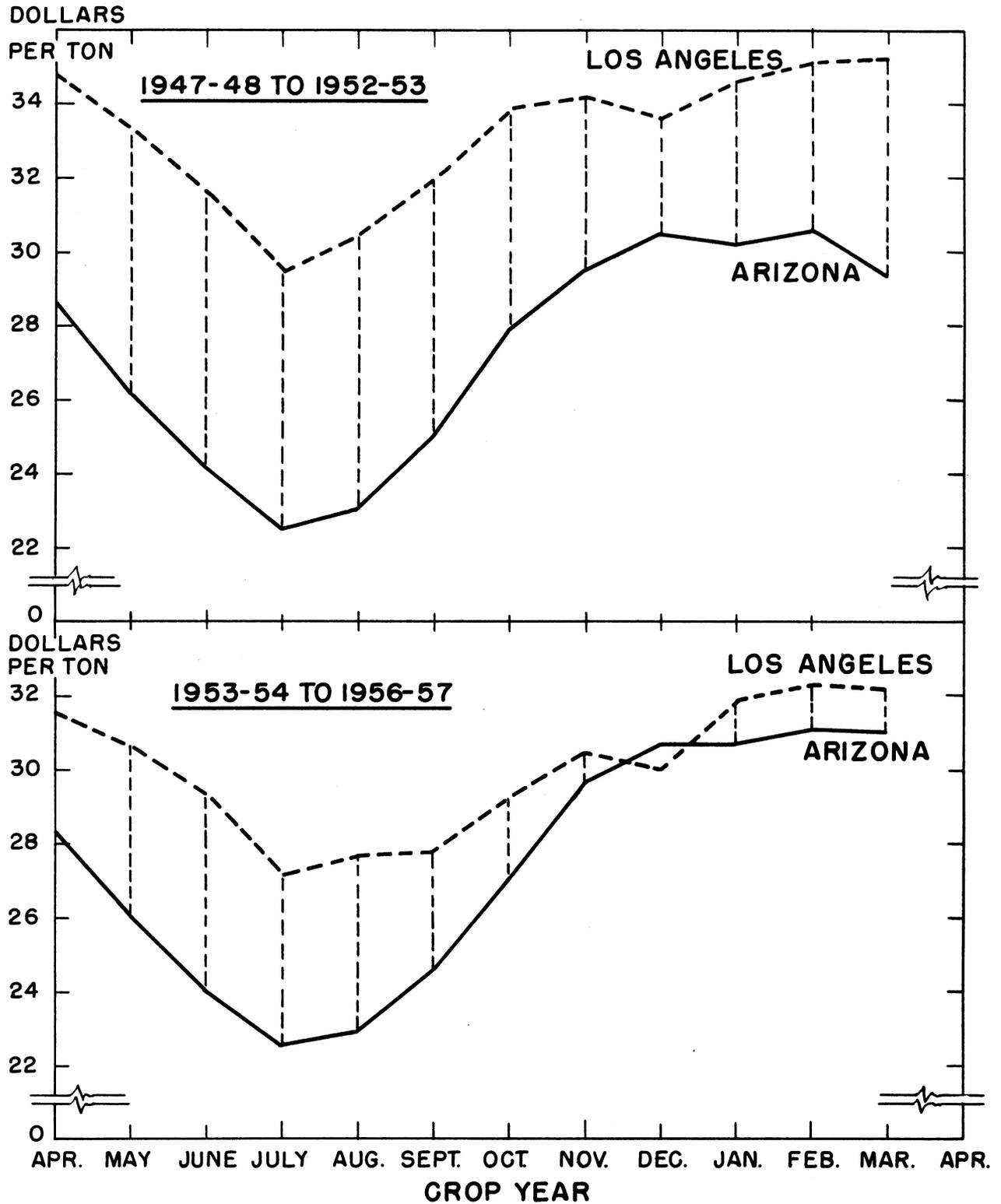


Figure 5.- Average monthly prices for baled alfalfa hay in Arizona and Los Angeles, 1947-48 to 1952-53 and 1953-54 to 1956-57.

The price differential between Arizona and Los Angeles is smallest in December, and has narrowed during the fall and winter months until the December price in Arizona actually exceeds the Los Angeles price. This again emphasizes the growing importance of the cattle feeding industry in Arizona. The number of cattle on feed is highest during the late fall and winter months, greatly increasing the local demand for hay. This feeding industry is centered around Phoenix and the Salt River Valley. Since it costs \$2.00 per ton less to ship hay from Yuma to this area than to the Los Angeles area, Yuma county might profit by holding back a larger part of the crop for the late fall and winter market in the Phoenix area. Also, based on our survey, the price differential between Yuma and Phoenix appears to be largest during this period. Large quantities of hay are shipped to Phoenix from Blythe, California from October through December. The distance from Blythe to Phoenix is nearly the same as that from Yuma to Phoenix.

Interstate Movements

The following data are based on records obtained from the Arizona Highway Department and the California Department of Agriculture. These records supposedly account for every truck load of hay which enters or leaves the state.

Arizona exported an average of over 100,000 tons of hay per year during the past five years, and nearly 90,000 tons during the 1956-57 crop year. Over 90 per cent of this was shipped from the Yuma area. Figure 6 shows the direction and volume of major shipments in 1956. Probably the most striking fact about these figures is that Blythe imported 7736 tons of hay from Yuma and Ehrenberg, then shipped 4735 tons to Phoenix. The total distance from Yuma to Phoenix via Blythe is 274 miles, compared to 183 miles by direct route. In addition, smaller quantities of hay were shipped to Phoenix from Los Angeles and the Imperial Valley. Nearly all of the shipments to Phoenix from Blythe, Imperial, and Los Angeles were made during the late fall and early winter, a period of relatively high prices in Phoenix. The October-December price in Arizona averaged \$32.00, while the May-July price in Los Angeles averaged about \$27.00 per ton. Furthermore, trucking hay to Phoenix costs only \$7.00 per ton, compared with \$9.00 to Los Angeles, making a total price differential of \$7.00 per ton. Although the actual quantity of hay shipped from California points to Phoenix in 1956 was relatively small, the difference in total revenue to Yuma producers, had they held this amount of hay for shipment to Phoenix later in the season, would have amounted to more than \$33,000. Since the demand for hay in the Phoenix area is likely to continue to grow, these facts should receive serious consideration by Arizona hay producers in general and by Yuma county producers in particular.

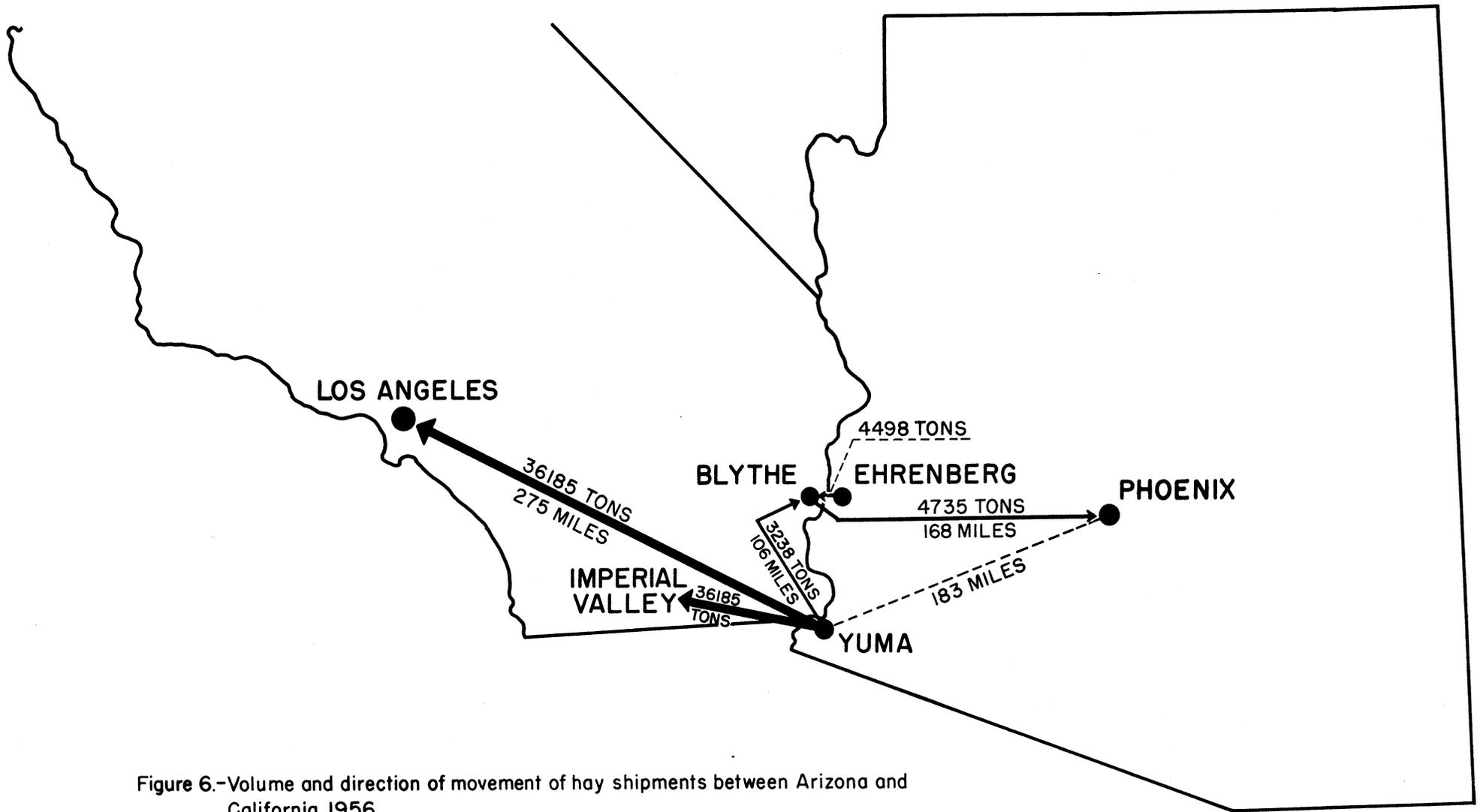


Figure 6.-Volume and direction of movement of hay shipments between Arizona and California, 1956.