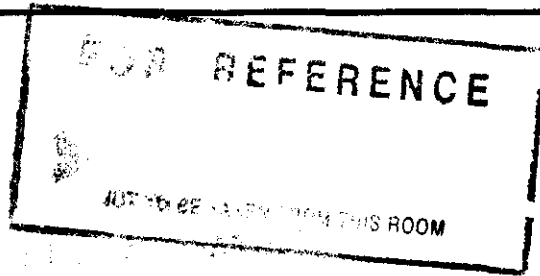


# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
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PAGE



## LOCATION PROBLEMS OF MEAT PROCESSING INDUSTRIES

by

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14

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For the Degree of  
MASTER OF BUSINESS ADMINISTRATION

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# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

## CONTENTS

	<u>Page</u>
<b>Introduction</b>	1
<b>Marketing Forces Affecting Physical Distribution</b>	6
Demand Characteristics	6
Product Characteristics	25
Marketing Channels and Distribution	33
<b>Transportation</b>	49
General Survey of Possibilities	49
Selection of Mode of Transportation	54
Transportation Costs and Rates	57
<b>General Plant Location Factors</b>	64
Least Cost Location Factors	64
Profit Maximizing Location Factors	76
Intangible Location Factors	77
<b>Supply of Meat</b>	81
Calculation of Meat Supply	84
Study of Current Systems of Supply	92
Study of Livestock Population	109
<b>Locations of Meat Processing Industries</b>	113
<b>Conclusion</b>	127
<b>Bibliography</b>	130



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# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

1

## Introduction

The main raw material used in meat processing industries is Livestock, especially sheep, goats, and cattle.

Important products obtained from livestock can be summarized as follows:

1- Products consumed as food

a) Meat and meat products

b) Milk and milk products

11-Products not consumed as food

a) Animal food-stuff

b) Skin, intestines, parts used in medicine

Among these products the most important is meat. The richest source of animal protein is meat and because of this, it is an essential material for human nutrition. Man from the beginning of history has utilized meat as his food. Early man was a hunter. After the invention of fire, fried meat was introduced to human society. This is important, for in this way it was possible to preserve meat for a long time.

Studies of ancient societies show that all the powerful nations which have created great cultures always consumed

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

2

meat; the main food of armies of different nations was also meat. The weak body frames of Far Eastern people are explained by their meat-lacking diet.

According to modern rules of nutrition, the amount of animal protein consumed daily must be 1/3 of the whole protein intake which means 35 gr. Of animal protein daily. On the other hand, in Turkey, today, only 16 gr. of animal protein is consumed per person.<sup>1</sup> (On the attached study it is proved that there is every possibility to increase the amount of meat consumed per person per year in Turkey, even using the present livestock population.)

Turkey is one of the leading countries in livestock population which is the main source of animal protein. Because of lack of efficiency, this potential is not fully utilized. Necessary measures must be taken to raise the productivity per unit from this high potential.

While trying to increase productivity per unit we must also try to eliminate unnecessary loss in transportation. Modern methods must be used in marketing. Their use increases the efficient flow of products to the consumer, eliminates the noises in the channels, and gives an incentive to producers.

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<sup>1</sup>

Dev. Planlama Teş., Et ve Et Mamulleri sanayii, pp.1.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

3

There are great benefits both to producers and consumers in the development of meat processing industries and increasing utilization of side products of meat. The vital problem here is the location and physical distribution problem of meat processing industries. By proper location of such industries at strategic points with proper establishments it is possible to solve most of the transportation, distribution and marketing problems. Our aim is to make meat available for the convenience and satisfaction of different users. For this we will be concerned with the special arrangement of plant locations so that movement costs are cut to a minimum, availability possibilities are raised to the maximum, while marketing requirements of the industry are satisfied. "The problem of location revolves around the selection of production units and their locations, the determination of the geographic arrangement of warehouse facilities and the choice of the transportation methods employed."<sup>1</sup>

While solving location problems, export possibilities must also be considered. By proper location it is possible to supply meat for internal consumption with enough stock at any time of the year and also to have some extra meat for export to foreign countries.

Following the above points, and using the information obtained from various sources, this study tries to

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<sup>1</sup>

Snykay, Physical Distribution Management, pp.4

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
4

reach a satisfactory solution of the location problem of meat processing industries. To solve this problem all the possibilities are studied, deficiencies of the present system are shown, and recommendations for a new system are made.

## Limitations

In the preparation of this thesis mostly secondary data were used, and these were insufficient. It was very difficult to find information and when some information was obtained it was very inaccurate. No two sets of data about the same subject agree with each other. There are only two studies made on the location problems of meat process industries, one prepared by an American firm in 1949 and the other prepared by State Planning Office in 1967. Both of these studies lack a scientific approach to location theory.

Because of these reasons, in this study a qualitative approach instead of a quantitative one is used. A large part of the analysis depends on marketing location theory, which up to now has not been applied in Turkey, in this field.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
5

The lack of proper data shows itself especially in the calculation of demand for meat. It was necessary to make some buying power and income effect calculations to find the amount of meat that is needed for consumption. The amount of meat consumed in a year per person does not depend only on availability of meat but is also related to consumer disposable income. No satisfactory data to give an idea about the affect of income on meat consumption in Turkey could be found.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
6

## 1- Marketing Forces Affecting Physical Distribution

### A- Demand Characteristics

Markets are formed by persons who, by the exercise of their individual wills, spend income. Important quantitative measures of markets are, therefore, the number of people and the amount of money at their disposal.

Variations in the level of demand for particular products are a function of the quantitative elements of population and income modified by qualitative influences. Among the qualitative influences are age, sex, education, social status, cultural influences, regional characteristics, and others.

### 1- Population

Population figures and the increase in population are given in the following tables.

#### Population increase

<u>Years</u>	<u>Population</u>	<u>Increase</u>	<u>Percent Increase</u>
1927	13,648,270	--	--
1935	16,158,018	2,509,748	2,13
1940	17,820,950	1,662,932	1,98
1945	18,790,174	969,224	1,05
1950	20,947,188	2,157,014	2,29
1955	24,064,763	3,117,575	2,97
1960	27,754,820	3,690,057	2,90

Cillov, Turkiye Ekonomisi, pp.50

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

7

## Population Density

<u>Years</u>	<u>Pop. in Km<sup>2</sup></u>	<u>Years</u>	<u>Pop. in Km<sup>2</sup></u>
1927	18	1950	27
1935	21	1955	31
1940	23	1960	36

Cillov, pp.75

Densities show a large difference between the cities. The city with highest population density is Istanbul where there are 329 persons per Km.<sup>2</sup>. Following Istanbul, come Trabzon (114), Izmir (88), Ordu (78). The lowest density is in Hakkari (7).

## Population Density according to Geographic Distribution

Black Sea shore	55 persons
Marmara and Egean Sea shore	56 persons
Mediterranean shore	35 persons
European part	95 persons
Western Anatolia	31 persons
Middle Anatolia	29 persons
South Eastern Anatolia	31 persons
Eastern Anatolia	20 persons

Cillov, pp.77

The density of population in Turkey is very low when compared with that of developed European Countries. The population density in Germany is 217, in Belgium is 301, and in Italy is 73 persons.

The settlement of population in Turkey is very interesting and shows great differences in different districts.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
8

Some part of the population is not permanently settled in one spot. These people are called "Göçebe" and live in middle and eastern Anatolia. They shift their settlements in different seasons and they earn their living by animal husbandry, as they are not engaged in agriculture, are not fastened to the land. Yörük's with their herds climb to the Toros plains in spring and in winter come down to Aydın Denizli, Antalya, Adana, and Urfa pastures. Alongside those Turkish speaking Yörüks there are Kurdish and Arabic speaking tribes (Aşirets) which move along the borders of Iraq and Syria. They also do animal feeding. Their language is Arabic of Kurdish.

The complete non-settled population is assumed to be around 30.000. Other than Yörüks who engage only in animal husbandry, there are some parts of the population which engage in both agriculture and animal husbandry. They are called Yaylacı. In summer they go to plains and in winter come back to their willages.<sup>1</sup>

A study of settled population in Turkey gives us the following results.

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<sup>1</sup> Darkot, B., Türkiye İktisadi Coğrafyası, pp.56

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
9

<u>City Name</u>	<u>Population in one Km<sup>2</sup></u>	<u>Number of villages in 100 KM<sup>2</sup></u>
Ankara	43	4
Ağrı	19	5
Bitlis	19	5
Çanakkale	35	6
Muş	20	6
Konya	21	6
†znir	89	2
Tokirdağ	44	5
Erzincan	20	5
Rize	64	7

## Size of Villages

<u>Population</u>	<u>Number of villages</u>
0 - 50	152
51 - 100	743
101 - 150	1735
151 - 200	2794
201 - 250	3172
251 - 300	3200
301 - 750	17041
751 - 1000	3111
1001 - 2000	2324
2001 - 3250	432
3251 - more	134

Cillov, pp. 75 - 78

Towns with population around 3.000 deal mostly with agriculture and animal husbandry. In places where population is higher than 10.000 a new type of living appears. People living in such large towns mostly deal with industry, commerce, transportation an service jobs.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
10

## Ratio of city population to general population

<u>Years</u>	<u>City population</u>	<u>Village population</u>
1927	25	75
1935	24	76
1940	24	76
1945	25	75
1950	25	75
1955	29	71
1960	32	68

## Population distribution according to work branches

<u>Work Branches</u>	<u>Amount</u>	<u>Ratio to whole pop.</u>
Agriculture and animal husbandry	9,737	35.1
Mining	77	0.3
Production	864	3.2
Construction	290	1.0
Water, gas.	16	0.1
Commerce, insurance	404	1.5
Transportation	247	0.9
Services	677	2.4
Undefined	661	2.4
Not working	3,335	
Below 14 -	11,427	12.0

Cillov, pp.77-95

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

11

## City population

<u>Name of city</u>	<u>Population</u>
Adana	903 812
Adiyaman	267 794
Afyon	502 416
Ağrı	245 957
Anasya	285 348
Ankara	1 637 483
Artvin	209 882
Antalya	486 709
Aydın	524 929
Balıkesir	709 705
Bilecik	139 004
Bingöl	148 701
Bitlis	154 509
Bolu	385 807
Burdur	194 862
Bursa	756 283
Çanakkale	350 661
Çankırı	251 504
Çorum	485 847
Denizli	463 082
Diyarbakır	476 374
Edirne	306 288
Elazığ	323 829
Erzincan	258 974
Erzurum	628 856
Eskişehir	415 285
Gaziantep	509 055
Giresun	427 664
Gümüşhane	263 486
Hakkari	83 961
Hatay	504 961
İçel	510 510
İsparta	266 399
İstanbul	2 302 438
İzmir	1 230 515
Kars	606 521
Kastamonu	441 608
Kayseri	536 912
Kırklareli	258 052
Kırşehir	194 775
Kocaeli	337 621
Konya	122 377

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
12

<u>Name of city</u>	<u>Population</u>
Kütahya	398 214
Malatya	452 478
Manisa	746 476
Karag	412 326
Muöla	335 135
Mug	119 215
Nevşehir	201 812
Niöde	361 915
Ordu	543 871
Rize	281 261
Sakarya	402 994
Samsun	752 701
Siirt	263 054
Sinop	266 410
Sivas	705 077
Tekirdaö	286 714
Tokat	495 857
Trabzon	595 416
Tunceli	154 830
Urfa	449 853
Uöak	191 062
Van	269 111
Yozgat	438 359
Zonguldak	643 901

Dev. Planlama Teö., Et ve Et Mamulleri Sanayii, pp.65-66

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

13

## 2- Consumption Expenditures and Income<sup>1</sup>

Studies of consumption expenditures and income of the Turkish population are very limited. The following tables obtained from different sources give an idea about income distribution among districts and consumption expenditures on different items.

	<u>Increase in Prices (Yearly average) - (percent)</u> (1963=100)		
	<u>1962</u>	<u>1965</u>	<u>1966 index</u>
Wholesale goods price index	5.7	4	117.7
Foods and foodstuffs	8.8	9.4	118.5
Industrial rawmaterial and half products	--	2.0	115.7
Ankara cost of living index	3.8	5	121.6
Istanbul cost of living index	3.8	9	122.0

The above table shows that price increase in foods and foodstuffs is higher than the increase in wholesale goods' price and industrial products' price.

### Commodity consumption in physical quantities (Average per-week per consumption unit)

<u>Commodity</u>	<u>Rural</u>	<u>Urban</u>	<u>Nation</u>
Beef	.012	.038	.020
Lamb	.097	.338	.213
Goat	.063		

<sup>1</sup> This part is taken from Agriculture in Turkey, by Palmer, Robert College.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
14

Total expenditure for food, weekly consumption per consumption unit

<u>Region</u>	<u>Number of units</u>	<u>Total</u>	<u>Cereals</u>	<u>Meat EGGS</u>	<u>Fats oils</u>
Erzurum	535.23	16.337	6.241	.865	3.476
Çat	408.30	15.611	4.818	1.168	1.291
Tarsus	631.25	15.624	5.381	1.692	1.530
Polatlı	547.73	21.089	7.154	1.026	3.650
Zeytinburnu	679.00	23.642	5.273	3.406	1.937
Total or average	2797.73	18.768	5.781	1.744	2.370
Percent		100.	30.8	9.3	12.6

<u>Region</u>	<u>Dairy Goods</u>	<u>Vegetables</u>	<u>Fruits</u>	<u>Sweet goods</u>
Erzurum	2.209	.778	.196	.942
Çat	1.224	2.403	3.232	.346
Tarsus	.756	2.260	2.123	.609
Polatlı	2.823	2.263	.919	1.136
Zeytinburnu	2.156	3.997	2.225	1.216
Total or average	1.844	2.420	1.707	.884
Percent	.98	12.9	9.1	4.7

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
15

**Total food expenditures, weekly consumption per consumption unit. (Five rural regions, in T.L.)**

<u>Adjusted monthly income per unit</u>	<u>All Food</u>	<u>Cereals</u>	<u>Meat EEE</u>	<u>Fats oils</u>	<u>Dairy goods</u>
— 63.1	12.162	5.260	.560	1.640	1.175
63.1- 86.2	13.813	5.407	.610	2.093	1.616
86.3- 117.9	15.752	5.976	.831	2.293	1.906
118.0- 161.3	17.694	6.116	1.375	2.616	1.695
161.4- 220.6	18.906	5.932	1.438	2.522	1.966
220.7- 301.6	21.648	5.477	2.375	2.610	2.140
301.7- 412.5	25.804	5.603	4.322	2.136	2.218
412.6- —	30.075	5.705	4.730	2.107	2.841

<u>Adjusted monthly income per unit</u>	<u>Vegetables</u>	<u>Fruits</u>	<u>Sweet goods</u>	<u>Miscellaneous</u>
— 63.1	.831	.322	.715	1.592
63.1- 86.2	1.324	.796	.587	1.380
86.3- 117.9	1.638	1.193	.769	1.676
118.0- 161.3	2.653	1.743	.798	1.346
161.4- 220.6	2.450	2.018	.852	1.728
220.7- 301.6	3.243	2.008	1.090	2.705
301.7- 412.5	4.223	2.484	1.333	3.485
412.6- —	4.783	3.293	1.639	4.977

**Weekly consumption of meat per consumption unit in five rural regions**

<u>Adjusted monthly income per unit</u>	<u>All meat EEE</u>	<u>Beef</u>	<u>Lamb</u>	<u>Goat</u>
— 63.1	.567	.092	.155	.201
63.2 - 86.2	.610	.082	.201	.162
86.3 - 117.9	.831	.023	.238	.343
118.0 - 161.3	1.375	.054	.538	.470
161.4 - 220.6	1.435	.105	.548	.486
220.7 - 301.6	2.375	.123	1.476	.276
301.7 - 412.5	4.322	.029	3.338	.056
412.6 - —	4.730	.217	3.409	.124

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
16

## Urban meat consumption

<u>Year</u>	<u>Meat from slaughter house</u>	<u>Other city meat (thousand tons)</u>	<u>Total city meat consumption (thousand tons)</u>
1948	75.3	15.1	90.3
1949	80.0	16.0	96.1
1950	88.8	17.9	106.5
1951	98.0	19.8	118.7
1952	102.2	20.4	122.6
1953	106.1	21.2	128.3
1954	121.5	24.3	145.8
1955	137.4	27.5	164.9
1956	153.2	30.6	183.8
1957	157.6	31.5	189.1
1958	135.0	27.0	162.0
1959	143.6	28.7	172.4
1960	161.5	32.3	193.8
1961	177.7	35.5	213.3
1962	181.1	36.2	217.3
1963	178.2	35.6	213.8
Average 1959-'63			202.18

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

17

## Rural Meat Consumption

<u>Year</u>	<u>Village meat consumption thousand tons</u>	<u>Per-capita village meat consumption kg.</u>
1948	99.7	6.54
1949	104.0	6.80
1950	114.9	7.31
1951	123.5	7.76
1952	122.9	7.51
1953	123.1	7.55
1954	135.8	8.07
1955	147.7	8.62
1956	160.2	9.16
1957	160.1	8.97
1958	131.9	7.32
1959	137.5	7.41
1960	149.7	7.92
1961	159.3	8.27
1962	157.3	8.02
1963	190.1	7.52
Average 59 - 63	150.78	7.828

## Income elasticity coefficients, based on adjusted income

<u>Commodity</u>	<u>Coefficient</u>
Meat, eggs	1.068
Beef	.219
Lamb	1.722
Goat	-.286

## Comparison of Urban and Rural income elasticity

	<u>Coefficient</u>	
	<u>Urban</u>	<u>Rural</u>
Meat, eggs	.856	1.068
Beef	.374	.219
Mutton, lamb, goat	.754	1.722

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
18

## Yearly changes in animal and meat prices

<u>Types</u>	<u>Animal prices</u>				<u>Meat prices</u>		
	<u>'61</u>	<u>'62</u>	<u>'63</u>	<u>'64</u>	<u>'63</u>	<u>'64</u>	<u>'65</u>
Sheep							
Karahan	340	339	388	409	762	808	746
Damlig	309	318	377	378	757	782	802
Kivircak	256	266	327	361	739	806	822
Lamb	330	333	386	456	758	911	863
Goat	181	187	225	233	595	574	
Ox	216	233	259	292		622	520
Bull	261	266	297	337		530	
Cow	198	211	251	277		542	658
Buffalo	182	193	198	246	454	547	519

### 3- Demand Forecast

If we study the slaughter of animals in cities, the city meat demand can be shown as such

<u>Years</u>	<u>City population</u>	<u>Yearly meat production</u> <u>Ton</u>	<u>Meat per person per year. Kg.</u>
1955	6,927,343	137,418	19.7
1960	8,947,525	161,512	18
1965	10,808,869	215,873	19.9

Dev. Plan. Teş. Et Sanayii, pp 141

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
19

The study of the table shows that during the years 1955 - 1960 the increase in meat production was 3,4 percent, but during these years population increased 2.8 percent and the movement of population from rural areas to urban areas has shown an unbalanced flow during these years. So the production per person has fallen. In 1965 this flow took a smooth form and production per person reached the level of 1955 production.

## 1958 - 1965 meat produced in city slaughter houses

<u>Years</u>	<u>Slaughter house meat production (ton)</u>
1958	134,983
1959	143,639
1960	161,512
1961	177,714
1962	181,078
1963	178,293
1964	206,718
1965	215,873

Et Sanayii, pp.52

According to the table given above, 1972 city meat demand is given in the following tables.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
20

## Demand forecast

<u>Years</u>	<u>City population meat demand forecast (Ton)</u>
1966	225,300
1967	235,000
1968	244,700
1969	254,400
1970	264,100
1971	273,800
1972	283,500
1973	293,200

Et Sanayii, pp.361

City meat demand in 1972 is assumed to be 283,500 tons. City population is estimated to increase in 1972, 2.6 percent and population movement toward cities during the same year is assumed to show 1 percent increase. So, city population in 1972 will reach 13,081,308.

## Meat consumed per person per year by city population

<u>Year</u>	<u>Population</u>	<u>Meat production estimate</u>	<u>Meat per person per-year</u>
1972	13.081.308	283.500	21.7

Et Sanayii, pp.361

Meat consumption in villages and rural areas is estimated to be low as compared with that of cities. If it is assumed that meat consumed in rural areas amounts to 10 Kg. per person, today's demand is 205.823 tons.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
21

If we estimate that meat consumption in rural areas per person per year is 13 Kg. then demand for meat in 1972 will reach (24 million x 13) 313,000 tons.

Demand estimates made in the second Five-year Plan is given in the following table.

## Meat demand estimates of Second Five-year Plan

Meat	<u>1962</u>	<u>1967</u>	<u>1972</u>	<u>Index 1972</u> <u>1967 = 100</u>
000/Ton	401	463	596	5.2
000000/Ton	2 442	2 835	3 702	5.4

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
22

## 4- Demand Variations

In the nutrition of communities national income per capita is one of the main factors as a determinant of food consumed. When national income per capita is low the tendency of consumption is toward those goods which makes the stomach full, such as cereals and sweet goods which lose nutritional value after some elaborate processing. The change of consumption pattern of meat and cereals according to income is shown in the above tables.

Spending on food items is closely correlated with changes in income. In high income earning countries 25 per cent of income is spent on food items, and in countries with medium income this percentage is 40-50 percent; in low income earning countries 65 - 75 percent of income is spent on food items. Turkey is among the last group.

Although income spent in Turkey on food is high because of the low income of the majority, spending for animal products is very low. The important thing to the Turkish population is to fill the stomach not to get the proper nutrition.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
23

In Turkey, meat consumption in Urban areas is greater than the consumption in rural areas. This is caused partly by knowledge and culture and partly by the relatively high income of the urban population.

In the consumption of meat there are different types of consumption characteristics changing with different locations. Consumption habits change with different groups and even within the same group according to districts.

Following incomes, tradition and climate are the main factors affecting the consumption of meat.

a) Climate: Hard conditions of climate force people to consume more meat. People living in high places and cold climates consume more meat than ones living in mild climates. Sound and good health of people living on mountains are explained by high consumption of meat among those people.

b) Religion: Religious beliefs play a high role in food consumption, especially meat. People of Anatolia, mostly muslims, do not like to consume "sausage, hot-dogs". They suspect that hog or horse meat is mixed within it. Although little pork and horse meat are consumed in Turkey, the animals can be bred for export purposes.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
24

c) Quality: Quality is stressed only in highly educated, high income groups. Others consider price more important than quality. Fear of being cheated always influences the meat consumption in Turkey. To prevent this a good control system is needed. A well organized grading system can be helpful for control. With good and safe packaging, and dependable grading ( especially for meat pieces ) meat consumed, without doubt, increases considerably.

d) Continuity in demand and supply: Although there is a continuous demand for meat, the supply, as will be explained later in detail, is not continuous. Especially towards the end of winter, during the breeding season there is a decrease in the supply. The excess in demand is not met by fish and other sea products in areas near to shores and by poultry in other areas. This shortage of supply is partly caused by the consumption of lambs at an early age.

e) Social life: Social life is one of the important factors of meat consumption. Especially in areas where working people are in the majority (especially women) meat is largely consumed. That is why meat is consumed in Urban areas as where women have limited time to prepare food, and meat is easy for immediate consumption.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
25

## B- Product Characteristics

Meat production in Turkey is very poor both in quality and quantity. Under today's economic conditions meat production in a year is around 360.000 tons. There is a need for more meat because of the poor meat produced per animal. Meat production centers in Turkey are generally placed in animal clustered places which are generally located in Central and Eastern Anatolia.

The consumption centers are, on the other hand, located generally in Western Anatolia along the coasts of Turkey.

In the production of meat two products are obtained from the raw material (animal):

- 1- Products available as human food
  - a) Meat and side products of meat
  - b) Milk and side products of milk
- 2- Products not available as human food
  - a) Animal food stuff
  - b) Hair, drugs, and textile industry products

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
26

Because of the high nutritional value and its role played in industry as a good with many by products which are produced during the regular production of meat, meat is a valuable product among the agricultural products.

## 1- Products useful in Human Nutrition

The developments in diet programing assert that animal proteins have higher value than vegetable proteins. Animal protein helps both mental and physical development of the human being. In order to supply society with enough protein, use of meat as a regular food must be developed to its upper limits.

In developed countries where women and men work, the necessity of supplying ready or easy-to-make products with high nutritional value is everpresent. The meat industry must be arranged to meet these requirements. This development can make possible the use of meat which can not be used otherwise because of low quality and taste. The products such as sousage and "hot-dogs" must be developed. The meat used in that way decreases the loss in the production of meat from the animal and increases the amount available for consumption.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

27

New types of foods that are used in foreign countries can also be introduced to our market and further use of products can be made possible.

Most of the products that are not used as food can be used in pharmaceutical industries as drugs.

In Central and Northern Anatolia animal fats are being used in cooking and by melting those fats in large amounts greater use of fats in cooking can be made possible.

## 2- Products used as animal food

Animal protein can be used in animal feeding with great success, and this is being done in developed countries. Well fed animals are one of the valuable sources of a nation's economy. Blood of slaughtered animals which is very rich in protein can be used by mixing it with other organs which are usually wasted during the slaughter.

The procedure is very profitable, and it consists of using the parts of animals that are rich in protein, but not used by humans as food, in animal feeding. Such

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
28

feeding yields increased meat, and eggs, which again increase national income respectively.

We must not forget that in food industries, more than half of the expenses are for feeding of animals, and the use of the parts of the animals in animal feeding reduce these expenses.

### 3- Products Used in Different Industry Branches

Hides and skins creates a new industry and these industries indulge mainly in export of salted sheep skin. Also, textile industry and the shoe industry of Sumerbank use these products.

Melted and frozen fats are used in the soap industry. Endocrinal glands of animals are largely used in drug industry. Because of the collection and distribution facilities and difficulty of preservation, these products are not sufficiently used in the pharmaceutical industries.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
29

## By products of a sheep (ten year average meat weights of 4 industry centers)

Live weight                      44,5 Kg.  
Meat weight                      21,8 Kg.

	<u>Weight (gram)</u>
Head (with tongue and brain)	2.000
Feet	900
Liver	700
Lungs	700
Heart	200
Spleen	150
Fat (loose)	800
Blood	3.000
Glands	250
Tail	3.500
Hide	3.000
Intestines	2.000
Contents of stomach (tripe)	2.000

Et Sanayii, pp.360

As is seen in the above table, by products amount to 25 - 35 percent of the weight of an ordinary sheep.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
30

## Products other than meat obtained from animals

<u>By products</u>	<u>Organs used</u>	<u>Pieces used</u>
Blood		Drug - Paint and skin industry - Animal food-stuff Manure - Hotdogs
Bone and horn	Skeleton	Production of small gift items - Manure knife handles - Steel industry - Sugar industry
Manure	Blood - Bone other nonedible parts	Agriculture
Jelly	Horn - Bone - Skin	Sugar - Paper industries
Glue	Hair - Skin - Blood Nerves	Paper production
Hair	Hair	Brush- Hard cloths Blanket
Hide	Skin	Sport goods - Leather apparels - Furniture Gift items - Bags - Book covers
Fat	Fat	Cooking
Gliserin	Loose fat	Dynamite - As melting agent - as preserver
Tail Fat	Tail	Candle - Oil - Soap
Olee oil	Fat	Oleo margarine production

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

31

In 1962 in the slaughter houses of Turkey 5.319,380 small and 1.319.553 large animals were slaughtered. If the following products from the slaughtered animals had been used properly, 20.000,000 TL. would have been added to national income.

<u>Side products</u>	<u>Amount</u>	<u>Today's sale price</u>
Meat - Bone flour	4.944	4.944.000 TL.
Bone flour	20.000	7.000.000 TL.
Rendering fat	1.153	2.241.000 TL.
Blood flour	6.592	4.945.000 TL.
Liver flour	46	<u>690.000</u> TL.
		20.000.000

#### 4- Production Techniques

Meat production is unorganized in Turkey. They are officially slaughtered in slaughter houses which are divided into four different types in Turkey (kanera, salhane, mezbaha, kombina) By Municiple Law Article 1580, responsibility to establish slaughter houses are given to municiple authorities. The rights of establishing meat processing centers are on Meat and Fish Organization.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

32

A large proportion of the animals are slaughtered in the open this is very dangerous for both human health and for the surrounding as the carcasses are suitable places for the development of bacteria and spores

Perishability of meat changes according to the slaughter place. Open slaughtered animals are exposed to bacteria and flies. The meat becomes spoiled even during the dressing of the carcass, and the life of the meat is shortened considerably. That kind of meat can not be stored for a long time, and is not proper for further processing.

In slaughter houses the carcass after slaughter is placed on a spreader, known as "beef tree", where it is disembowled, the hide removed entirely, and the back split. An endless chain conveys the sides of beef through a set of washers to the coolers. The time required for dressing a carcass is less than 40 minutes generally. The beef remains in the coolers from one to two weeks before it is ready for the market, the temperature being kept at about 38°F. Side products are much more difficult to store and preserve than prime meats. They can not be preserved, even in refrigerators for more than 10 days.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
33

## C- Marketing Channels and Distribution

### 1- Distribution Channels

Production of animals for meat purposes is generally done by small or medium size producers. There are some large production units such as animal farms of Central and Southern Anatolia; and there are some unsettled tribes which also deal with large scale animal husbandry. Their numbers are few and among these tribes (aşirets) the most famous ones are Britanli and Aydınli tribes. They feed their animals in summer on eastern mountain plateaus and in winter they come down to Urfa, Gaziantep and Hatay pastures.

Other than these producers there are some animal merchants (celep) who themselves are not producers of animals, but collect them in spring after breeding season and feed them on their own or rented pastures to sell during winter. These men are called feeders (besici).

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

34

Animal producers usually sell their stock to animal merchants (celep) in small towns. Sometimes in Ankara and İzmir there can be direct sales to retail butchers. The slaughter houses in Turkey are provided for public service and in these plants slaughter of animals is done according to health and hygiene rules. There are no profit considerations in slaughter houses. Producers can use these places for slaughter of animals and then hand their stock to retail butchers.

The main animal producing districts are the eastern parts of Turkey, and in these districts there are no properly working animal markets (pazar vs. panayırlar) as there are in the Aegean and European parts of Turkey. Theoretically there are ten organized exchanges in Turkey, situated in Denizli, İstanbul, İzmir, Kars, Erzurum, Konya, Mersin, Osmaniye, Aydın Ankara. Among these only Ankara and İstanbul exchanges (borsa) work satisfactorily. Other selling and buying transactions are made in villages individually, especially in Central and Eastern Anatolia. The sale of animals, outside of the above mentioned exchanges is made by peasant producers to:

a) Collectors of each village who have their own pak-

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
35

tures. (Village chiefs with capital)

b) Animal merchants (celepler)

Collectors and merchants travel to villages in spring and arrange for the collection of one year old lambs. To guarantee for the collection they give some credit as a prepayment at the beginning of the winter and this is either in terms of money or in terms of goods. Sales of stock are in spring and in autumn.

Collectors and merchants feed animals in their pastures till the end of summer, then sell their stock to animal merchants during winter months. There are some big collectors who sell directly to commissionmen in Istanbul or Ankara.

Merchants are first hand middlemen if they buy animals from the producer, and are second hand middlemen if they buy stock from collectors. Generally, winter stock is in the hands of collectors.

There are some producers who have their own pastures and do summer feeding in their fields and they sell their

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

36

stock to merchants. In this case not all sales are in terms of money. Merchants in many cases pay in kind to the producer. For this reason the animal merchants usually have their own shops and sell different items and goods, mostly apparels and food stuffs.

Merchants are usually connected with certain commissionmen in Istanbul and other big cities. They transport their stock to these commissionmen when the price is suitable. Although, it is possible for merchants to sell their goods directly to city markets, they usually use commissionmen. Commission are in control of big city markets. In big cities 95 percent of sales are made by these men. But this does not eliminate the unorganized supply fluctuations in large markets.

Meat must pass through the following units while being transfered from animal producer to meat consumer.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
37

Breeder

Collector

Animal Merchant

Commissioner

Animal exchange

Live

Wholesaler

Slaughter house

----- Carcass

Retail butcher

Commissioners: There are different groups of commissioners for Eastern Anatolia, Aegean and Marmara districts. The number of commissioners in Istanbul are probably not more than 10 - 15 persons. They are in a sense helpers of large animal merchants. As a payment for their services they get 4 percent commission. Commissioners work in animal exchanges.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

38

**Wholesalers:** They buy animals at animal exchanges from commissioners, from collectors, or from animal producers directly. Wholesalers bring the animals to the slaughter house and have them slaughtered by their own men. Then carcasses are sold by wholesalers to the retail butcher. There are some wholesale butchers who are at the same time are retail butchers, and some wholesalers are commissioners for animal merchants. In Istanbul there are 100 - 120 wholesale butchers.

**Retail butchers:** Animals that are slaughtered by wholesalers at slaughter houses are bought by retailers after a short debate with wholesaler about the price. There is 3 to 5 percent deduction from the price for losses in weighing.

**Meat and Fish Organization:** This organization is a buyer of animals from producer and consumer markets. Collectors bring stock to the meat packing houses.

The border lines of each function are not clear and anyone can perform any function at any time. For example, sometimes a consumer skips all these middle men and buys animals from a breeder and slaughters them.

# THESIS

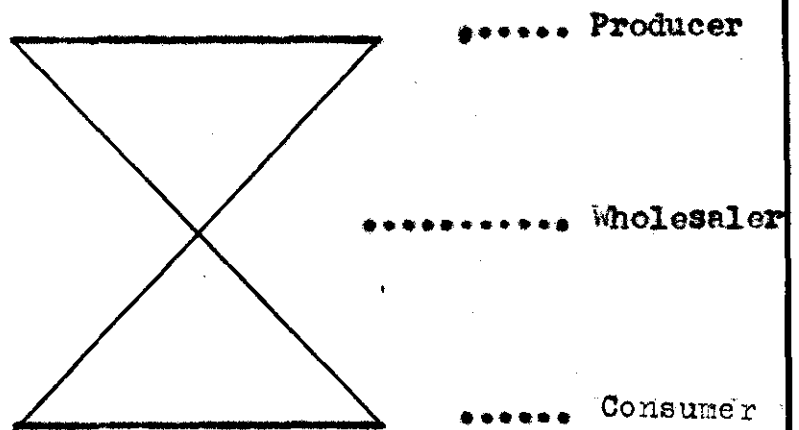
ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
39

at his own house (during bayrams)

In certain situations, in animal markets, the sellers are producers, collectors and merchants the buyers are wholesale butchers. In meat market, sellers are wholesale butchers; the buyers are the whole consumer population. The limited number of wholesalers makes the flow in channels very difficult.

The whole market can be described by two triangles put corner to corner. Channels are narrowed at wholesaler level and this creates a bottle neck



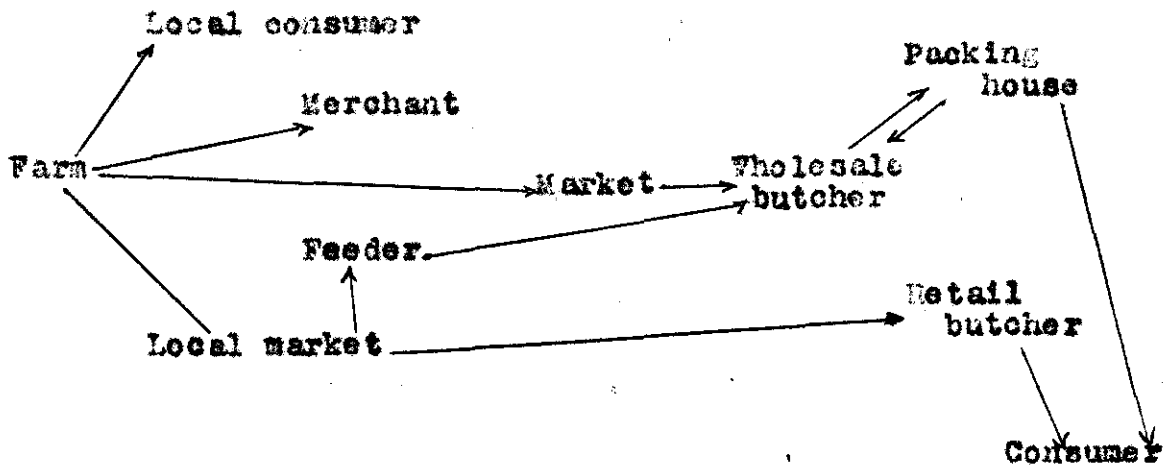
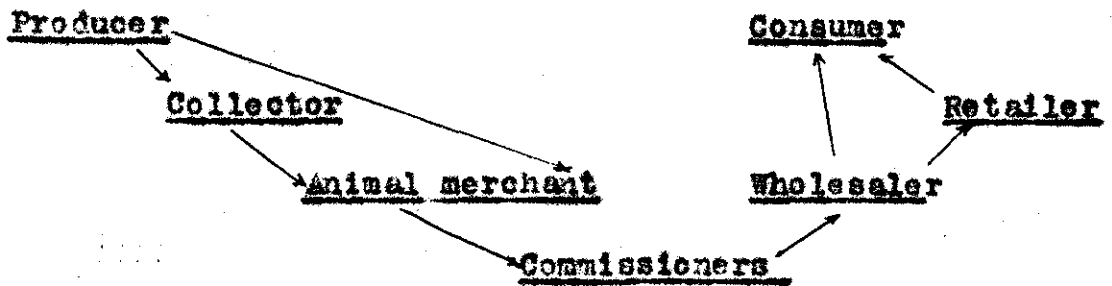
# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

40

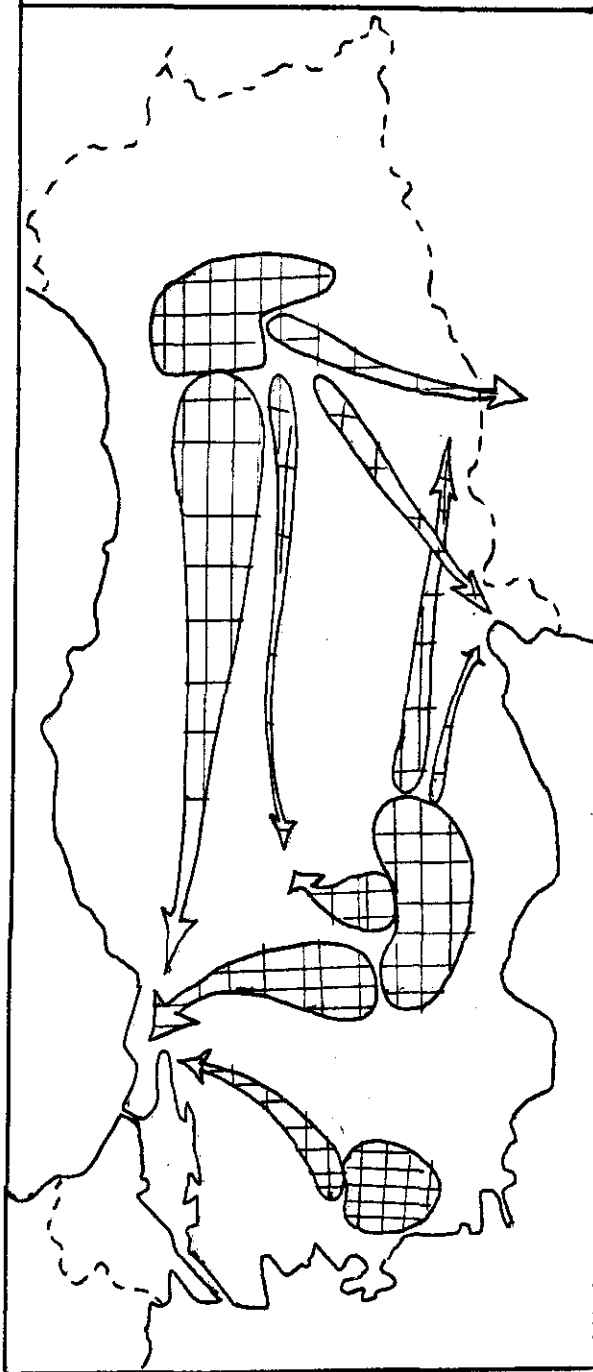
## Channels of distribution



# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
41

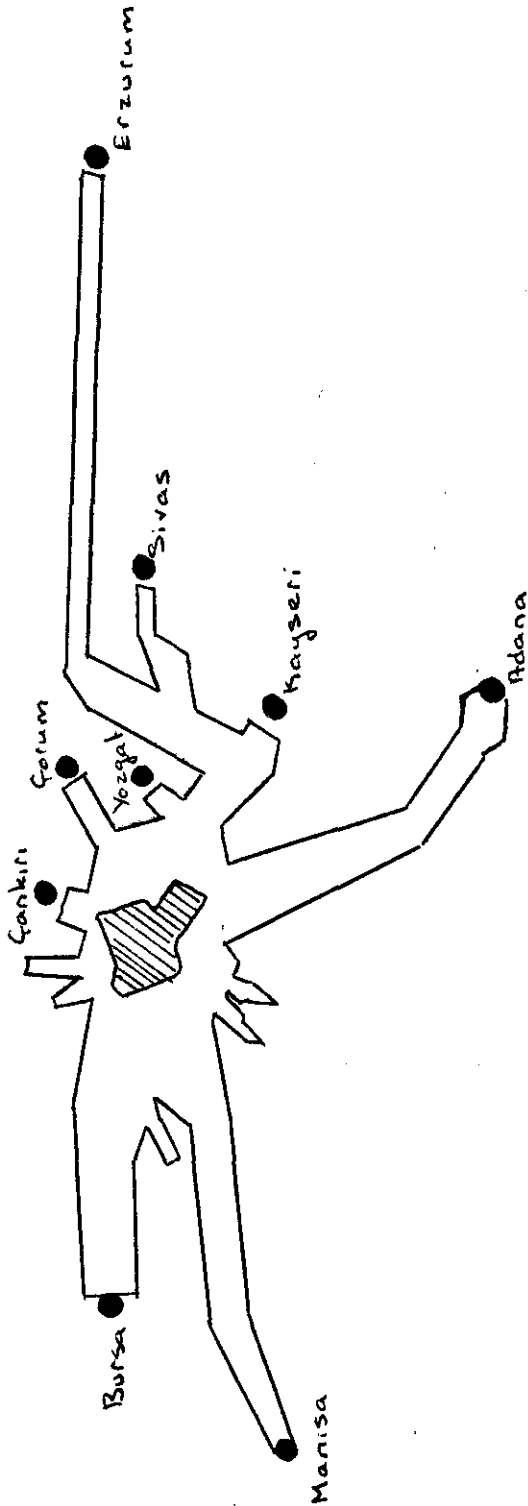


Live-stock distribution directions

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
42



Places from where Ankara gets livestock

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

43

## 2- Pricing Policy

Formation of meat price structure at different points of distribution channels are given below

### a) Price structure between collectors and breeders:

This price is not very high, and it depends on

- Price of animal food-stuffs of that year
- Climatic conditions
- Loss due to natural forces

The relative values of payments in kind given by collectors to the producers are also a dominant factor in price determination.

b) After the collection of animals, factors affecting the price structure till the herds are brought to the consumer market are;

- Shepherd costs
- Feeding costs at pastures
- Feeding costs on road
- Harbour fees
- Shipment costs
- Shipment commission

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
44

- Freight
- Custom Duties
- Unloading costs
- Transportation cost
- Animal exchange fee

c) Factors affecting price structure between commissioners and wholesalers are

- Season
- Supply and demand of that day

After the determination of price according to the qualities of animals the following deductions are made from that price,

Loss: The following deductions are made from animals for extra weights incurring from feeding and watering before weighing.

Sheep	...	5 percent
Lamb	...	3.5 percent
Cattle	...	10 percent

Deductions: In herds the quality of feeding is not the same even within the same herd. So to eliminate the los-

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
45

ses due to weak animals, 20 - 25 Kr. deduction is made per animal head.

Service and extra quality: After losses and deductions are calculated, the following percentages are taken per animal head for the differences of quality of animals and for the services performed.

Kivircik and Karakaya . . .	45
Karaman	60
Bağlıç	50

Commission and instant payment ratios: For commissions 2 - 4 percent and for instant payments 1 - 2 percent difference is accepted.

As a sum, a seller, selling 200 heads of shepp (kızıl karaman) from 100 kr. per kg., is paid according to the following calculations.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
46

200 heads, 100 kr. per Kg. Average weight of each animal is assumed as 50 Kg.

Sheep	200 Heads
Live weight	<u>50</u>
	10.000 Kg.
5 percent deduction from live weight for loss of weight	<u>500</u>
	9.500
100 Kr. per Kg.	<u>100</u>
	950.000
Deductions for quality service and so on. (60 Kr. per animal, 12.000 Kr. for 200 animals	<u>12.000</u>
	938.000
2 percent comission and 1 percent cash discount	<u>28.140</u>
	909.860

An animal producer selling his 200 sheep at 100 Kr. per Kg. earns 909.86 Kr. That is the breeder earns 90.98 Kr. per Kg. instead of 100 Kr. per Kg.

d) Price formation at wholesale level: After the slaughter of animals (skin, intestines and other parts being left to the wholesaler) the carcasses are sold to retailers. Here the price of meat fluctuates greatly. To the cost of meat, slaughter house fees are added.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
47

e) Price formation at retail level: Following factors determine the price at retail level

- Loss (3 percent)
- Transportation
- Loss of meat at retail store
- Store cost
- Profit margin

Affects of above factors on meat prices as a whole are studied in the following tables.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
48

## Marketing and distribution margins for live stock and meat

15 head of cattle

Transported by truck from Yozgat to Ankara

Sold in Ankara

Slaughtered by Meat and Fish Organization plant

	<u>Total</u>	<u>Percent</u>
Producer's share from consumer (TL)	8633.53	56.89
Marketing costs	939.82	6.19
Slaughter fee	724.60	4.77
Wholesale margin	2014.35	13.27
Retail margin	2862.76	18.86
Total value of animals when sold	15175.06	
Total distribution margin from producer to consumer	<u>6541.53</u>	
Producer's share	8633.53	

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
49

## II- Transportation

### A- General Survey of Possibilities

One of the main constituents necessary for an adequate understanding of physical distribution principles is a knowledge of transportation. The accompanying maps show the transport networks for two major forms of transportation: highway and railway. The maps show that a great number of separate points are served by some form of transport. They also suggest that several modes of transport may be necessary to complete a distribution network for the industry. A distribution network must almost always consist of the integrated use of all modes of transport according to the cost and service characteristics of each. Availability of different transportation means for meat are discussed below.

Railroad advantages: Railroads are equipped as mass movement carriers, moving shipments between cities in large quantities. So, for large bulks of processed meat railroads are proper ways of transportation.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
50

Railroads are economical ways of transportation for meat in large volume on intermediate and long hauls. Meat being transported in refrigerated cars is not affected by adverse weather conditions. Railroads are also proper ways for live animal transport.

Railroad disadvantages: Transport of meat by rail for short distances and for less than carload lots is uneconomical. Transportation by railroads takes longer than do other forms. But, these are not disadvantages for meat. Because it is mostly transported by carloads and immediate distribution is not necessary. Only some by-products need immediate distribution.

Motor carrier advantages: Motor carriers are most efficient and economical on short and intermediate distance hauls. Motor carriers are useful for transport of some valuable side products of meat which are highly perishable. Trucks can give door to door service from shipper to receiver. Handling of loading is reduced and requires less exacting packing. The stock to the merchandise is reduced to a minimum especially on good roads.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
51

**Motor carrier disadvantages:** Motor carriers are uneconomical for long hauls of meat and for the mass movement or transport of bulky meat carcasses.

**Airline transportation:** Airline transportation is economical only for goods that possess a high unit value; it is unprofitable and inefficient for meat and meat product transfer.

**Water carrier advantages:** Water carriers have the capacity to handle large tonnages. Their cost of transport is low and they are especially good for live animal transport

**Water carrier disadvantages:** Water carriers are slower in movement and this creates the feeding problem of live animals.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
52

## Selection of mode of transport

<u>Selection factors</u>	<u>Motor carrier (LTL)</u>	<u>Motor carrier (TL)</u>	<u>Rail (LCL)</u>	<u>Rail (CL)</u>	<u>Water</u>
<b>Size of shipment</b>					
Large					
TL Min-CL Min		X		X	X
Over CL Min				X	X
<b>Nature of the goods</b>					
Weight-density					
(Low)	X	X	X	X	X
Fashion (Low)	X	X	X	X	X
Perishability	X	X	X	X	X
<b>Geog. Distrib. of Shipments</b>					
Large number					
Concentrated		X		X	X
Dispersed	X		X		
Small number					
Concentrated	X		X		
Dispersed	X		X		
<b>Channel of distribution</b>					
Mfgd. Consumer goods					
M-R-C	X	X	X	X	X
M-A-R-C	X	X	X	X	X
M-W-R-C	X	X	X	X	X
M-A-W-R-C	X	X	X	X	X
<b>Transportation Characteristics</b>					
Cost					
100-1000 Km.					
Low		X		X	X
Medium			X		
1000 Km and over					
Low		X		X	X
Medium	X		X		
Speed					
100-1000 Km.					
Medium	X			X	
1000 Km and over					
Medium	X	X	X	X	

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
53

## Selection of mode of transport

<u>Selection factors</u>	<u>Motor carrier (LTL)</u>	<u>Motor carrier (TL)</u>	<u>Rail (LCL)</u>	<u>Rail (CL)</u>	<u>Water</u>
Type of warehouse operations					
Storage		x		x	x
Break-bulk	x		x		
Transfer	x		x		
Time pattern of demand					
Regular					
Continuous	x	x	x	x	x

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

54

## B- Selection of Mode of Transportation

Transportation must be studied from two different angles: Livestock transport and meat (carcass) transport.

In livestock transportation usually the following ways are used.

a) Animals are brought to nearby markets, to collection and distribution centers on foot

b) For short or medium distances trucking is a good way of transport and with increase in highways it becomes more popular everyday. Although, cost is a little bit high, because of its speed, the loss in live weight is small and there are more service possibilities.

c) Railways are a traditional way of transportation for large animal groups for domestic and foreign markets. By rail transport, it is possible to reach large consumption centers by traveling 1300-200 Km.; to export centers by traveling 837 Km. for Erzurum-İslahiye and by traveling 943 Km. for Erzurum-İskenderun. All these transportations take 2-4 days. Loss in railway transportation is very large.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
55

In developed countries livestock transportation is left out. It is a costly and risky way of transportation. This is important especially for countries like Turkey, where animal husbandry is underdeveloped and there is deficiency in meat consumed. As is seen from the tables, a railway car can carry 2000-4000 Kg. live weight which means 1000-2500 Kg. meat weight (50 percent efficiency). On the other hand, a refrigerated rail car can carry 16000 Kg. meat, that is, such a car can do the job of 6-10 cars carrying live weight. There are also great losses of weight while animals are waiting for loading and this period of waiting can take days.

Transportation of dressed meat as carcasses also can help to prevent the spread of animal diseases. As long as live stock movement is not prevented, this spread of diseases will continue.

Transportation of meat is being done by Meat and Fish Organization, but this is not a continuous and organized transportation.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
56

## Cars that are used in D.D.Y. (State Railway Organization ) transportation.

<u>Amount of animals</u>				
<u>Area (m<sup>2</sup>)</u>	<u>Cattle</u>	<u>Steer</u>	<u>Sheep-Goat</u>	<u>Lamb</u>
18	12	45	72	90
20	14	50	80	100
22	15	55	88	110
24	17	60	96	120

According to Transportation Regulation No.2845, to a 1 m<sup>2</sup> surface it is calculated 1 cow, 2 steers, 4 sheep, 5 lambs.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
57

## C- Transportation Cost and Rates

Factors affecting transportation costs are:

- 1) Loss in weight during transportation
- 2) Loss in number due to injuries and deaths
- 3) Sale and transportation costs

1) There is a certain amount of loss of weight in animals during the transportation due to undigested food in the stomach of the animal. The percent deductions from weights of the animals for these losses are; 5 percent for oxen, 6 percent for cattle, 5 percent for sheep and 2 percent for lambs.

Other than the above loss of food that is not digested there is a loss of meat weight which is also very important. This loss depends on

a) Length of transportation: Loss due to length of the transportation changes not only with distance but also with the carrier that is used. These losses are studied in the following tables.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
58

## Average loss due to length of transport (Km)

<u>Distance</u>	<u>(Train)</u> <u>Loss (percent)</u>	<u>(Truck)</u> <u>Loss (percent)</u>
Cattle		
Less than 100 miles	7.5 - 8.9	3
100 - 200	6.8 - 7.1	3
200 - 300	7.2 - 9.1	4
300 - 400	8.6 - 10.4	4-6
400 - 500	8.7 - 8.9	7-10
Sheep		
400 miles	4 - 6	2-3
1000	6 - 8	2,5-3,5
2000	7 - 10	-

## Average loss due to length of transport (Hour)

Truck	
24 hours	2-4 percent
24-36 "	3,5-5,5 percent
36-72 "	4-6,5
72 "	4-7 percent

b) Conditions of transportation: The comfort of animals during transportation is very important for the degree of loss and quality of meat. Animals must not be crowded into the cars more than their capacities, which is the main cause of deaths and injuries.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
59

c) Quality of animals at the time of loading: Before shipment, normal food and water requirements of animals must be provided. There must be feeding and watering places for animals in stations on the way

## d) Climate

2) Injuries and deaths: The causes of injuries and deaths are too much feeding, too little feeding, crowded positions, putting small animals among big ones and too hot or too cold cars.

### Injury rates

	<u>Rail</u>	<u>Truck</u>
Cattle	0.030	0.068
Steer	0.126	0.288
Sheep	0.034	0.093

### Death rates

	<u>Rail</u>	<u>Truck</u>
Cattle	0.018	0.028
Steer	0.085	0.190
Sheep	0.083	0.324

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
60

## Wound and death rates according to causes

Collision	14 percent
Club strike	10 " " "
Horn breaks	3 " " "
Rush and push	66 " " "
Other causes	7 " " "

In a year there are 1.350.000 big and 150.000 small animals transported to Istanbul by rail. From this transportation 2 percent of big and 1.8 percent of small animals are lost because of deaths on the road. Other than these, the skins of the majority of animals are damaged and there are great losses of value from these skins. If one thinks about the loss in the whole country because of the transportation of livestock, the effect of such transportation on national wealth can be understood more clearly.

With the elimination of livestock transportation,

- Spread of infectious diseases from one district to the other will be prevented
- Death of animals during transport will be prevented.
- Meat loss during transport will be prevented
- Damage to the skin of animals will be prevented
- Some of the transportation costs will be saved.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

61

In the transportation of animals the following points are important

Animals must be checked before loading for their health. Each class of animal must be transported in its own cell with animals of equal weight and size. Animals must be placed in cars neither too close nor too separate. Temperature of cars must be adjusted. Loading and unloading must be done without hurry and with care. There must not be any broken boards or prodding nails.

3) Sale and transport costs: The transportation of animals is mostly by rail. It is possible to study the rates of transport by rail (D.D.Y.)

## Railway transportation charges (Krs)

From Erzurum to İstanbul, Karaağaç slaughter house

	<u>per sheen head</u>	<u>per cattle head</u>
Freight	7.73	30.92
Service	26	1.05
Fees and taxes	5	1.52
Losses	5.70	18.00
Loading, feeding, unloading	0.90	3.25
Death and injury	1.70	5.00

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
62

These costs are 10 percent of the cattle price and 9 percent of the sheep price.

For the transportation of meat as dressed carcass, there is only one organization, Meat and Fish Organization which transports meat in its own refrigerated cars. Meat that is processed in packing houses of Konya, Erzurum, Ankara and Zeytinburnu is transferred to consumption centers. The Main transport of meat is from Erzurum to main consumption centers like İstanbul and Ankara. There is also intercity transportation changing according to the need.

## The vehicles of Meat and Fish Organization

48	Thermos truck
14	Refrigerated truck
64	Large rail car
20	Small rail car

## Capacities of thermos rail cars

Ton	Volume	Fresh meat ton	Frozen meat Ton	Side product
		Large rail cars		
3	53.5	9 - 10	15.5	20
		Small rail cars		
13	35	6.4	8.5	13

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

63

## Capacities of refrigerated trucks

Ton	Volume (m <sup>3</sup> )	Fresh meat (Ton)	Frozen meat (Ton)	Side products (Ton)
Group A				
20	30.6	4,6 - 6	7,5	9
10	26	4 - 5	6,5	8
Group B				
7	19	3 - 4	4,5	6

Rail cars and refrigerated trucks are used for long distances while thermos trucks are used for transportation within the cities and towns.

According to D.D.Y. (State Railway Org.) the transportation cost of 1 Kg. of meat is as follows.

In cars of D.D.Y.	.....	25.08 Krş
In cars of Meat and Fish Organization	...	20.18 Krş.

The average amount of meat which can be transported in one car is around 20 000 kg. In live stock transportation transport costs are around 12-29 Krş per Kg. of live weight. The amount of livestock transported per car is around 2 000 - 5 000 Kg.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
64

## III- General Plant Location Factors

### A- Least Cost Location Factors

Location costs can be divided between transfer costs and production costs. Transfer costs are defined as the costs which result from the movement of raw materials to the proposed plant site and those which are incurred by shipping finished products to market. Production costs include all costs related to plant operation. To achieve the least-cost location, the sum of all transfer costs and production costs must be minimized.

1- Transfer Costs: Transfer costs frequently are a dominant element in plant location and are especially important for industries such as meat because distribution throughout country is the main problem.

Alternative methods of transfer of livestock and meat are discussed in chapter II, Transportation. The combination of transfer methods and resultant costs can be materially altered by the geographic point at which the production plant is located. Consequently, in selecting a plant loca-

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

65

tion, it is necessary to isolate the one best geographical point from which service requirements may be satisfied at the lowest transfer cost.

Transfer costs may be divided into two components. These are the costs associated with accumulation of raw materials and those related to product distribution. Accumulation costs result from the movement of raw materials to the point of manufacture. Distribution costs are derived from shipment of finished products to the final market through all intermediary steps. A particular plant location may be pulled toward the market or toward the source of raw materials, depending on which location minimizes the sum of accumulation and distribution costs.

A plant in a particular industry may be located near the source of raw materials because of the unique location of raw materials or because of the great weight loss in the process of production. Extractive industries such as meat processing industries must be located at the point where raw materials are available in economic quantities.

Meat industries, in which, because of the nature of the product, great weight loss is experienced in production

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
66

(30 percent loss in weight) tend to locate plants near the source of raw materials. The net result of such location is to reduce total transfer costs because the weight shipped to the market is significantly less than the weight of raw material.

A third element causing plants to be located near the raw material source is the perishability of the raw materials. In the case of the meat industry, as is shown in chapter II, losses in livestock transportation are very large compared with meat transportation. This location factor is strengthened by the improvement in transportation equipment, such as, refrigerated cars and trucks.

In summary, several major forces influence the transfer costs for meat industries, thereby making the point of least transfer cost one in close proximity to the source of raw materials. These forces are: 1) Great loss of weight in raw materials (livestock) during processing; 2) Availability of raw materials for extractive industries; 3) Perishability of raw materials during transportation.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
67

Today animals are bred in Eastern Turkey, and are transported to large consumption centers and export cities. Goods that are transported are mostly livestock. The amount of livestock transported only to consumption centers is 250,000 cattle and 1,500,000 sheep. According to experience in livestock transportation;

- After 24 hours of transportation, 3-7 percent of live weight,

- after 48 hours of transportation, 7-14 percent of live weight,

- after 72 hours of transportation, 14-18 percent of live weight is being lost on the road. We have to add to these figures the loss in weight due to under-nourishment while waiting at stations for loading (which sometimes can take 2 or 3 days) and deaths on the way to market.

If we consider 3 days of transportation, the total losses of weight from live stock are:

Cattle ..... 12,500,000 Kg.

Sheep ..... 15,000,000 Kg.

by transferring this amount in terms of meat weight (according

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
68

to 48 percent efficiency) we obtain a large number such as 13,200,000 Kg. This means 410 gr. of meat per person per year. As an average 500 gr. of meat per person per year is being wasted during transportation of livestock the money value of that amount of meat is,

Cattle	... 6.000.000 x 8 - 48.000.000 TL.
Sheep	... 7.200.000 x 9 - <u>64.800.000 TL.</u>
Total	112.800.000 TL.

**Production Costs:** Production costs consist of all expenses necessary to convert raw materials into finished products. The production costs related to any given manufacturing process are geographically variable. Such geographical differences may be directly traced to forces of immobility. To the extent that any factor necessary for production of a product is mobile it will tend to move to the geographical area of greatest reward. From the view point of production costs, the most economical location is one which combines the cheapest critical immobile factors with the necessary array of inexpensive mobile factors.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
69

Major production costs may be grouped into three categories each of which are, in varying degrees, important location factors. These are: a) rent, b) labor and c) power.

a) Rent: Land prices reflect wide regional differences. In Turkey, normally land cost diminishes as distance increases from city centers and from the shores. Also there are lower prices in Eastern Anatolia. The price of a parcel of a parcel of land must, therefore, be considered in the light of other location advantage it may provide, such as adequate transport supply and a more flexible labor market.

For meat processing establishments there are two classes of plant sites. First, sites with existing structures which can be enlarged for a developed meat processing plant with a low cost. The second alternative is to purchase vacant land.

In every city there are some slaughter plants which with some additions can better serve their purpose. At least the cost of land is less than that required for the construction of new plants.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

70

In case of purchase of new land for new process plants, there is not much problem of high land costs. Meat industries are usually constructed and placed at outside areas where there is large space for stores and warehouses. Packing plants will be placed mainly in Eastern Anatolia, so land prices will again be low.

Cost of land is not a great problem in case of location selection for meat processing industries.

b) Labor: Variations in labor tend to pull the location of particular industries toward the geographical point which will best satisfy labor requirements. In meat industries the amount of labor used is rather small and wages pay are low.

In meat production there is the need of high quality labor. The durability of processed meat is greatly influenced by skillful processing during the production stages. There are not enough skilled laborers ready for such processing industries, and the present low quality of meat is caused by unskilled labor working in slaughter houses. It is necessary to train the new workers and retrain the existing ones according to the needs of the new meat processing industries to be established

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
71

## Number of men employed in slaughter houses

<u>City name</u>	<u>Workers</u>	
Adana	12	3
Adana	6	2
Afyon	13	15
Ağrı	8	2
Amasya	13	12
Ankara	457	102
Antalya	13	-
Artvin	2	1
Aydın	40	6
Balıkesir	57	10
Bilecik	4	-
Bingöl	2	-
Bitlis	3	-
Bolu	24	-
Burdur	4	-
Bursa	191	66
Çanakkale	23	6
Çankırı	4	4
Çorum	16	2
Denizli	16	5
Diyarbakır	38	4
Edirne	22	12
Elazığ	17	1
Erzincan	15	1
Eskişehir	53	3
Erzurum	24	7
Gaziantep	39	6
Gümüşhane	7	1
Gresun	6	1
Hakkari	-	-
Hatay	26	3
İçel	11	3
İsparta	23	3
İstanbul	928	219

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

72

## Number of men working in slaughter houses

<u>City name</u>	<u>Workers</u>	
İzmir	272	60
Kars	10	4
Kastamonu	14	79
Kayseri	39	15
Kirklareli	24	1
Kırşehir	11	2
Kocaeli	16	2
Konya	16	12
Kütahya	11	3
Malatya	32	8
Manisa	54	15
Maras	6	1
Mardin	6	4
Muğla	14	2
Muş	9	3
Nevşehir	5	2
Niğde	15	1
Ordu	-	-
Rize	29	-
Sakarya	40	6
Samsun	10	-
Siirt	1	2
Sinop	7	1
Sivas	36	3
Tekirdağ	21	7
Tokat	29	4
Trabzon	21	1
Tunceli	5	-
Urfa	11	9
Uşak	10	1
Van	12	-
Yozgat	10	3
Zonguldak	62	10
<b>Total</b>	<b>3085</b>	<b>716</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

73

c) Power: The cost of power, in meat processing industries, as a percentage of total cost, is small. Electricity and water are two requirements for meat process industries. Also fuel is needed for furnases and for scorching the meat.

Technological developments have greatly altered the location influence of both power and fuel. Meat processing industries, on the other hand, in general, are not power oriented industries.

The yearly amounts of electricity and water used in slaughter houses are shown in the following tables.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
74

## Yearly amount of electricity and water spend in slaughter houses

<u>City name</u>	<u>Water</u>		<u>Electricity</u>	
	<u>m<sup>3</sup></u>	<u>T.L.</u>	<u>Kw.</u>	<u>T.L.</u>
Adana	3,600	1,800	3,600	1,500
Adiyaman	--	--	--	--
Afyon	76,555	150	5,601	--
Agrı	3,650	1,825	1,500	10,500
Amasya	8,000	6,400	8,208	6,411.93
Ankara	302,995	11,972	1,742,150	17,729.12
Antalya	9,377	4,251.50	207,960	56,850.48
Artvin	1,998	555	5,475	-- -- --
Aydın	29,735	14,351	80,991	11,079.20
Balıkesir	161,060	30,508	12,456	5,919.52
Bilecik	-- --	-- --	135	121.50
Bingöl	350	-- --	-- --	-- --
Bitlis	-- --	-- --	-- --	-- --
Bolu	9,126	4,505.50	2,657	1,607.98
Burdur	-- --	-- --	-- --	-- --
Bursa	5,180	15,562	32,672	48,468
Çanakkale	2,146	147,373	1,841	78,188
Çankırı	1,600	9,225	3,024	1,626
Çorum	8,275	4,083.50	2,221	1,386.02
Denizli	1,130	534	50	20
Diyarbakır	12,400	1,300	200	100
Edirne	2,000	4,750	3,361	1,790
Elazığ	-- --	-- --	22,921	10,487
Erzincan				258
Eskişehir	160	5,060	360	
Erzurum	450,445	525	6,000	
Gaziantep	3,350	3,944.80	15,312	13,796
Gümüşhane	950	600	700	350
Giresun	730	264	150	-- --
Hakkari	-- --	-- --	-- --	-- --
Hatay	2,400	530	9,991	3,312
İçel	7,560	2,899	8,820	2,124
İçel	2,770	898	3,534	1,370
İsparta	45,557	68,012	19,182	296,712
İsparta				

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
75

<u>City name</u>	<u>m<sup>3</sup></u>	<u>T.L.</u>	<u>Kw.</u>	<u>T.L.</u>
İzmir	144,476	78,542	226,911	509,906
Kars	6,660	5,650	2,373	1,730
Kastamonu	1,000	300	140	229,80
Kayseri	1,820	-- --	18,650	-- --
Kırklareli	2,300	2,300	3,792	2,514.28
Kırşehir	3,000	1,800	600	360
Kocaeli	12,396	8,508	282,743.40	59,994.04
Konya	76,680	8,208	5,567	1,893
Kütahya	-- --	-- --	-- --	-- --
Malatya	500	200	14,830	3,595.28
Manisa	14,905	7,448	20,821	8,224.3
Maras	13,057	3,271	2,285	622
Mardin	-- --	-- --	-- --	-- --
Muğla	802	367.60	1,800	1,314
Muş	435	220	1,200	420
Nevşehir	9,839	5,122	2,762	1,472
Niğde	720	540	4,320	1,728
Ordu	-- --	-- --	-- --	-- --
Rize	2,167	1,871	3,150	700
Sakarya	683	590	68,161	22,099.78
Samsun	28,708	-- --	11,027	6,724
Siirt	-- --	-- --	-- --	-- --
Sinop	1,100	711.20	339	302.88
Sivas	400	-- --	6,752	2,237.98
Tekirdağ	6,605	6,610	4,367	1,640
Tokat	6,557	90,021	10,063	14,285
Trabzon	600	300	5,484	250
Tunceli	170	120	-- --	-- --
Urfa	3,025	1,144	3,582	2,463
Uşak	-- --	-- --	-- --	-- --
Van	1,516	6,915	143	17,879
Yozgat	2,573	1,126	765	384
Zonguldak	2,340	250	6,314	837
<b>Total</b>	<b>1,517,436</b>	<b>565,393.10</b>	<b>2,910,015.40</b>	<b>1,249,410.4</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

76

## B- Profit Maximizing Location Factors

The final location should represent the geographical point allowing the highest spread between total cost and total revenue. This location is referred to as the profit maximizing location for a given plant. For large industries, such as meat packing, adjustments to market service requirements may require the location of branch plants or warehouses. Under conditions of erratic demand, one profitable alternative for meeting market requirements may be a small local slaughter house with a small storeroom located within the market area. This is especially good at consumer points near the sea where the demand for meat is competing with demand for sea products. Demand for meat varies inversely with the supply of fish.

Quality of the product may influence plant location. Demand for perishable products is closely related to their ability to reach consumers prior to product deterioration. This is especially important for more perishable parts of meat, such as internal organs. Refrigerated warehouses are very important in this part of marketing.

Finally, the mere fact that markets are geographically

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

77

variable in terms of income and population density means that some markets have inherent location appeal.

In summary, the force of market fertility is an important determinant of a profit maximizing location. In most industries this requirement of close contact with consumer centers is met by refrigerated warehouses and storerooms, and local extra demand can be supplied by local slaughter houses.

Warehouse and branch plant installations tend to reduce costs, while at the same time allowing increased customer service. Warehouses normally are justified on the basis of cost reductions achieved by consolidated shipments into a market area.

## C- Intangible Location Factors

Intangible factors also influence site selection. Intangible location factors affect decisions in considering the alteration of the ideal economic locations for any particular plant. These factors may only be

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

78

influential in selecting between communities located within close proximity to each other. These factors can be summarized as costrevenue influencing factors and personal preferences of managers. The consideration of these factors has least importance for a location selection covering all of Turkey. They are important only for minor details.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
79

As a summary, we can list the main factors affecting the location of meat processing industries

- 1) Meat processing industries must be situated at large animal production centers.
- 2) These centers must produce extra meat over local demand.
- 3) Sites must have the necessary capacity to be enlarged in future with increasing demand.
- 4) Plants must process meat and its by products with developed technological means. Plants must be large enough to make good use of by-products and offset the loss in weight due to dressing of the carcass.
- 5) Transportation of meat in place of livestock must be achieved.
- 6) Processing industries must be located at livestock-smuggling centers. By creating a ready market for animal producers the smuggling of animals can be prevented at least in part.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
80

7) Plants must be placed at points of export, near the borders.

8) Plants must be located at transportation junctures.

9) Refrigerated warehouses and stores must be located far away from production centers and in the middle of the consumption markets.

10) There must be varehouses at export points.

11) Ice factories must be located alongside the main transportation roads to supply ice for cars and refrigerated trucks.

12) Climate of location points must be considered, especially for the centeres processing highly perishable by-products

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
81

## IV- Supply of Meat

Turkey is a country which is largely dependent on agriculture. Among the agricultural products, live stock is at least as important as any other soil product produced. Meat, milk and side products obtained from milk are produced from live stock, likewise wool and hides.

Meat is one of the essential materials to be consumed daily from the point of view of nutrition. 1/3 of our daily protein intake must be animal protein and this is obtained mainly from meat. This means 35 gr. of animal protein daily. While trying to meet this need for meat we must also consider the 2.6 percent increase in population.

Although there is a great deficiency in meat consumption in Turkey this country is among the leading nations in livestock production.

A very large section of the Turkish population is forced to carry on animal husbandry, partly because of the topography and partly because of the climate of the country.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
82

The pastures cover 36 percent of the country's surface. The same percentage, in 1960, in France was 24 percent: in Germany, 28 percent: in U.S.A., 33 percent: in England, 51 percent.

The portion of animal husbandry in agricultural income was 37.8 percent in 1950: then it increased to 39 percent in 1960, and decreased to 26,3 percent in 1963. The same percentage in France is 59 percent, in England is 67 percent and in Germany is 71 percent. If we consider that Turkey is one of the leading nations in animal population, the above figures show that live stock production in Turkey is not efficient and productive. This is mainly because of the poor agricultural methods applied.

The meat obtained from live stock is very important in our economy, and is essential to the nutrition of the population. In Germany, meat obtained from a sheep is 25 Kg. and from a cow is 259 Kg. These figures in Turkey are 15 Kg. and 100 Kg. This small amount of meat produced per animal causes a small amount of meat consumption per person. The yearly meat consumption, per

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
83

person, in Turkey, is assumed to be arround 16 Kg. This amount, in 1960 - 61, in Franse was 74 Kg. in England, 71 Kg: in U.S.A., 95 Kg. in Yugoslavia, 27 Kg.

If we compare the live stock population of Turkey with that of other countries and also compare meat consumed per person in Turkey with meat consumption in the same countries, we see that there must be something wrong with the distribution of meat to population. We are one of the leading nations in livestock production, but also the least meat consuming nation.

In the second five year plan it is claimed that meat consumption per person will increase 15 percent in the coming period. So, it is assumed that in the coming five year period meat consumed per person will reach  $16 + (.15) \times 16 = 18.4$  Kg. Even this amount is not satisfactory.

By using 1963 livestock population figures it can be proved that the meat consumed per person can be easily increased by proper manipulation of present stocks.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
• BEBEK, ISTANBUL

PAGE  
84

## A- Calculation of Meat Supply

While calculating the animal side products produced like milk and wool, we can find the figures by using our old experience in production of these items and depending on the animal population on hand at that time. After the side products are gathered the sources of the products, that is, animals themselves, are still on hand ready for further production. Whereas, in meat production the problem is entirely different. To produce meat we have to slaughter animals and sacrifice the source. So, we have to use animals in such a way that the capital present must not decrease.

The important points for such considerations can be summarized as follows.

- a) Age of the animals to be slaughtered
- b) Amount of young animals that will replace the slaughtered ones
- c) Average yearly loss due to unexpected conditions
- d) Holding constant the economic age of the herd

The meat supply of a herd of 100 cattle, following the above points can be calculated easily.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

85

Lets take a cattle herd of 100 cows and 3 bulls. It is assumed that the amount of cows that will not breed are around 30. So at the end of a breeding period we will have newly born 35 cows and 35 bulls. When the cows are 1 year old there has been a loss of four (10 percent): so, at the end of the first year we have 31 one-year-old calves. When they are 2 years old a loss of two more is assumed (5 percent of the 31): so, at the end of the second year we have 29 cows. When they are three years old there has been a loss of one more (5 percent of the 29): so, we have 28 three - years old cows. By eliminating 3 of them for unexpected loss and adding the remaining 25 three-years-old cows to the herd, we have 125 cows at the end of the third year. Now we can sell, from the herd, 20 old cows that will not breed anymore, and also deduct the 5 loss estimated from the remaining. So, at the end of the third year the quantity and the quality of the cattle herd will be kept the same as before. (25 useless old cows are replaced by 25 young, ready to breed, cows.)

When the newly born bulls are over their suckling period, 25 of them will be sold, and 10 one-year-old bulls will be left. When they are 2 years old they give one loss (10 percent). So, there will be 9 bulls at the end of

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
86

the second year. 6 of them are taken for slaughter or as working animals. The remaining 3 three-years-old bulls are added to the heard in place of the 3 old bulls.

In such constructed herd the amount and age of the animals will be constant, and meat will be supplied from animals that are send for sale.

Calculations show that one cow gives 26.25 Kg. meat in a year. We have also some extra meat obtained from such a herd, from bulls. The meat obtained from male animals of a heard of 100 cattle is around 1275 Kg. So, meat obtained per animal is around 12.75 Kg. Adding this to cow meat, we get 38.9 Kg. of meat per animal.

The mutton production is calculated in the same way. In a sheep herd of 100 animals it is possible to sell 3 old sheep and 40 lambs without changing the amount and age of the sheep in the herd. So, the meat obtained from one sheep is around 6.424 Kg. Also, rams give 1.525 Kg. meat per ram. As an arerage, one sheep gives 7.950 Kg. of meat in a herd of 100 sheep and 3 rams.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
87

It is possible to calculate the meat supply of goats and Buffalos following the same method. Calculations show that an ordinary goat gives 7 Kg. of meat in a year an Angora goat gives 5 Kg. of meat, and a water buffalo gives 32 Kg. of meat in a year.

If we add to the above figures the 10 percent of Oxen used as working animals in agricultural fields and also add the castrated sheep and goat meat, we obtain 162,325,225 Kg. of extra meat.

The above figures give the total meat supply. Dividing this by the 1960 population we obtain 36.1 Kg. of meat for personal consumption.

Figures show that the possibility of increasing meat consumption per-person is very great in Turkey, greater than that expected by the planners. The amount of meat supply that is not consumed per-person is around 20.1 Kg.

There is enough meat in Turkey to satisfy the demand. The potential supply of meat that is not consumed is more than the meat that is presently consumed. If proper meas-

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
88

ures are taken, meat consumed per-person can reach 36.1 Kg. which is a satisfactory figure. ( This figure does not allow for stock increases.

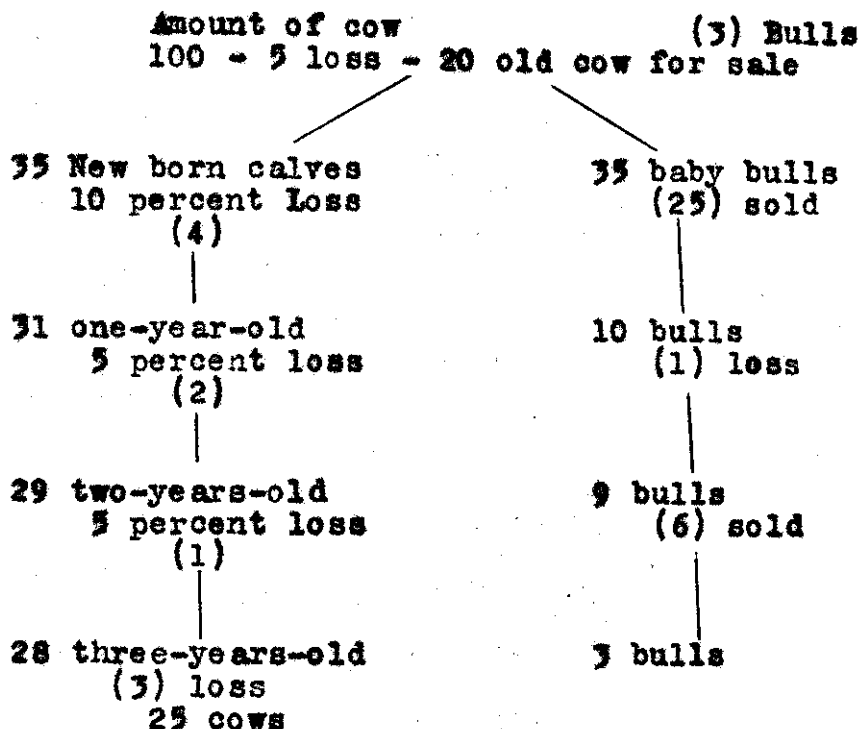
The difficulties of producing enough meat for proper nutrition are not caused by complicated problems. The most dominant cause seems to be the lack of proper animal husbandry and distribution organization.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
89

## Meat Production From Cows



Old cows	15 x 250	- 3750 Kg.
Baby bulls	25 x 60	- 1500 Kg.
Livestock weight		<u>5250 Kg.</u>

Meat weight	<u>5250</u>	-2625 Kg.
	2	

Yearly amount of meat supplied by one cow 26.25 Kg.

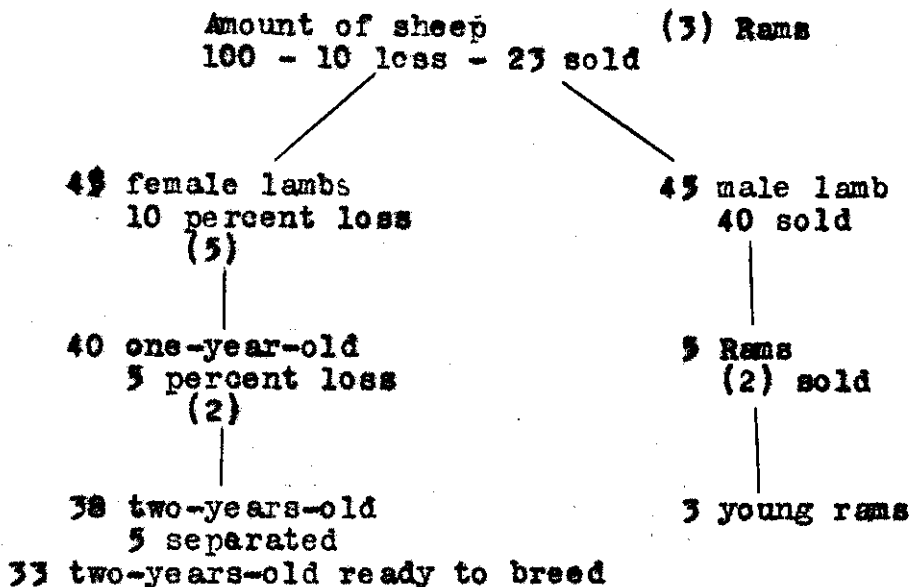
Old bulls	3 x 300Kg.	900 Kg.
Young bulls	6 x 200Kg.	1200 Kg.
Extra cows	3 x 150Kg.	<u>450 Kg.</u>
Livestock weight		2550 Kg.

Meat weight	<u>2550</u>	- 1275 Kg.
	2	

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

## Meat Production From Sheep



Old sheep	23 x 35 Kg.	805 Kg.
Lambs	40 x 12 Kg.	480 Kg.
Livestock weight		1285 Kg.

Meat weight	$\frac{1285}{2}$	- 642.5 Kg.
-------------	------------------	-------------

Yearly meat supply of one sheep 6.425 Kg.

Old rams	3 x 40Kg.	120 Kg.
Young rams	2 x 30Kg.	60 Kg.
Sheep separated	5 x 25	125 Kg.
Livestock weight		305 Kg.

Meat weight	$\frac{305}{2}$	- 152.5 Kg.
-------------	-----------------	-------------

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
91

## Yearly meat production

Cattle	:	12 651 000	x	26.2	-	331 456 200
Sheep	:	32 278 980	x	6.4	-	206 485 472
Buffalos	:	1 165 860	x	32	-	37 307 520
Ordinary goats	:	15 917 910	x	7	-	111 825 370
Angora goats	:	5 587 000	x	5	-	27 935 000
						714 609 562

Meat per person       $\frac{714\ 609\ 562}{27\ 754\ 800} = 25.8 \text{ Kg.}$

## Male animal meat production

Bull	:	361 924	x	300	-	108 577 200
Ram	:	1460 451	x	40	-	58 418 040
Goat	:	862 419	x	40	-	34 494 760
A. Goat	:	390 120	x	40	-	15 604 800
Buffalo bull	:	167 304	x	350	-	23 556 400
Livestock weight						240 653 200

Meat weight       $\frac{240\ 653\ 200}{2} = 120\ 326\ 600 \text{ Kg.}$

Meat per person      - 4.4 Kg.

## Other meat stocks of Turkey

Oxen(1/10)	:	598 009	x	300	-	125 429 700
Buffalo ox (1/10)	:	34 601	x	350	-	12 110 350
Castrated sheep	:	2 598 604	x	40	-	103 944 160
Castrated goat	:	1 403 035	x	40	-	56 121 400
C. Angora goat	:	676 621	x	40	-	27 064 840
						324 670 450

Meat weight       $\frac{324\ 670\ 450}{2} = 162\ 325\ 225 \text{ Kg.}$

Meat per person      - 5.9 Kg.

Total meat per person = 25.8 - 4.4 - 5.9 = 36.1

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
92

## B- Study of Current Systems of Supply

### 1- Current Production Points

The number of animals slaughtered in slaughter houses and meat production in different geographic locations are given in the following tables.

As is seen from the tables, some districts show themselves as production centers while others are not. In order to create a balance between production and consumption districts, some measures for proper distribution of meat must be taken.

Slaughter houses in Turkey are being established according to municipal regulation No.1580. And it is asserted that there must be a slaughter plant in every municipality.

Slaughter houses are constructed in varying types. There are 602 such places which differ from simple slaughtering places to slaughter plants. This irregular cutting houses provide unsatisfactory services.

#### Types of slaughter houses

<u>Type I</u>	<u>Type II</u>	<u>Type III</u>	<u>Cutting place</u>	<u>Large city type</u>
176	90	60	258	18

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
93

## Number of animals slaughtered and meat produced in slaughter houses (1963)

<u>City</u>	<u>Sheep and lamb Slaughtered (Head)</u>	<u>Meat produced (Ton)</u>
Adana	143.088	1.144
Adiyaman	3.978	79
Afyon	19.482	215
Ağrı	6.021	162
Anasya	35.436	448
Ankara	615.925	7.994
Antalya	6.213	75
Artvin	4.197	93
Aydın	70.118	614
Balıkesir	177.156	1.744
Bilecik	5.909	72
Bingöl	2.483	44
Bitlis	4.484	78
Bolu	29.661	337
Burdur	2.906	39
Bursa	233.486	2.117
Çanakkale	61.909	555
Çankırı	8.363	127
Çorum	28.044	290
Denizli	62.073	783
Diyarbakır	50.970	852
Edirne	56.129	528
Elazığ	25.279	339
Erzincan	13.734	204
Erzurum	103.904	1.970
Eskişehir	93.256	916
G. antep	89.958	1.489
Giresun	17.835	288
G.Hane	8.789	153
Hakkari	1.342	23
Hatay	50.210	750
Isparta	13.428	147
İçel	67.012	1.000
İstanbul	1.371.650	18.555
İzmir	562.662	4.677
Kars	17.358	234
K.Monu	17.263	212
Kayseri	79.356	1.901

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

94

<u>City</u>	<u>Slaughtered (Head)</u>	<u>Meat produced ( Ton)</u>
K.Eli	64 539	606
Kirşehir	29 410	536
Kocaeli	53 571	857
Konya	127 032	1 392
Kütahya	16 609	230
Malatya	28 508	521
Manisa	137 018	1 657
Maras	14 056	281
Mardin	19 892	240
Muğla	15 221	140
Muş	12 101	146
Nevşehir	9 409	124
Niğde	40 297	532
Ordu	8 715	120
Rize	4 474	75
Sakarya	29 140	470
Samsun	104 730	1 238
Siirt	15 063	189
Sinop	12 713	138
Sivas	39 281	942
Tekirdağ	57 982	527
Tokat	40 973	675
Trabzon	25 425	818
Tunceli	3 796	49
Urfa	34 594	445
Uşak	12 131	150
Van	13 573	315
Yozgat	14 715	272
Zonguldak	31 439	369
<b>Total</b>	<b>5 137 990</b>	<b>64 970</b>

## Cattle

Adana	9 911	701
Adıyaman	709	46
Afyon	17 379	1 108
Ağrı	4 859	253
Amasya	12 399	710
Ankara	90 379	4 287
Antalya	6 739	287

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, İSTANBUL

PAGE  
95

<u>City</u>	<u>Slaughtered (Head)</u>	<u>Meat produced (Ton)</u>
Artvin	2 465	179
Aydın	25 732	1 363
Balıkesir	32 810	1 592
Bilecik	3 733	183
Bingöl	874	64
Bitlis	2 161	146
Bolu	819 890	625
Burdur	3 954	169
Bursa	39 148	1 692
Çanakkale	10 768	967
Çankırı	3 346	187
Çorum	8 048	304
Denizli	6 672	561
Diyarbakır	7 743	493
Edirne	19 622	1 402
Elazığ	5 888	214
Erzincan	4 722	210
Erzurum	54 486	6 252
Eskişehir	32 405	1 178
Gaziantep	2 915	174
Giresun	12 161	608
Gümüşhane	4 082	374
Hakkari	405	24
Hatay	19 309	812
Isparta	4 428	210
İçel	8 012	331
İstanbul	224 647	29 140
İzmir	92 734	4 453
Kars	14 964	918
Kastamonu	12 211	698
Kayseri	7 941	459
Kırklareli	9 365	751
Kırşehir	4 684	151
Kocaeli	4 684	1 021
Konya	30 185	1 074
Kütahya	9 910	438
Malatya	9 111	498
Manisa	22 493	1 196
Maraş	3 535	155
Mardin	2 537	220
Muğla	3 765	148

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
96

<u>City</u>	<u>Slaughtered (Head)</u>	<u>Meat produced (Ton)</u>
Muş	1.308	94
Nevşehir	3 783	183
Niğde	4 390	223
Ordu	12 207	651
Rize	6 144	395
Sakarya	21 799	1 131
Samsun	26 536	1 127
Siirt	2 193	136
Sinop	6 679	356
Sivas	13 896	972
Tokat	6 198	457
Tekirdağ	11 393	983
Trabzon	16 476	1 052
Tunceli	1 622	106
Urfa	5 453	330
Uşak	1 567	58
Van	2 946	197
Yozgat	4 166	183
Zonguldak	32 405	1 214
Total	1 134 836	78 920

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
97

The standardization of slaughter houses is needed both for sound production and for efficient work. There are four modern meat packing plants organized by Meat and Fish Organization. Capacities of local slaughter houses and four packing plants are shown in the tables.

### Daily capacity of slaughter houses

<u>Slaughter house types</u>	<u>Number</u>	<u>Work hours</u>	<u>Hourly slaughter</u>		<u>Daily slaughter</u>	
			<u>Sheep</u>	<u>Cattle</u>	<u>sheep</u>	<u>Cattle</u>
Large city type	18	8 hours	30	5	4.320	4.320
Third type	60	8 "	25	3	12.000	1.400
Second type	70	8 "	20	3	11.200	1.680
First type	176	8 "	10	2	14.080	2.816
Cutting places	258	8 "	5	1	10.320	2.064

### Daily capacity of packing plants

#### 8 hours slaughter

<u>Plant name</u>	<u>Sheep</u>		<u>Cattle</u>		<u>Slaughter total (ton)</u>
	<u>Head</u>	<u>Ton</u>	<u>Head</u>	<u>Ton</u>	
Ankara	2.400	55	180	22	77
Erzurum	2.100	48	400	48	96
Konya	3.680	85	180	22	107
Zeytinburnu	2.000	46	320	38	84
<b>Total</b>	<b>10.180</b>	<b>234</b>	<b>1.080</b>	<b>130</b>	<b>364</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

98

## Yearly capacity (1.000 heads) (300 work days)

<u>Slaughter houses</u>	<u>Sheep</u>	<u>Cattle</u>
Type I	4 844	844
Type II	3 360	504
Type III	5 600	432
Cutting place	3 096	619
Large city type	1 296 - 12 960	216 - 1 296
Plants (packing)	3 054	324
<b>Total</b>	<b>18 850 - 30 294</b>	<b>3 559 - 4 639</b>

Yearly meat capacity ( for sheep, carcass weight is calculated as 18 Kg, and for cattle, carcass weight is calculated as 100 Kg)

<u>Slaughter houses (Ton)</u>	<u>Sheep</u>	<u>Cattle</u>
Type I	86 032	84 480
Type II	60 480	50 400
Type III	64 800	43 200
Cutting place	55 728	61 920
Large city type	23 328 - 23 328	21 600 - 129 600
Packing plants	39 000	70 200
<b>Total</b>	<b>339 268-529 320</b>	<b>331 800-439 800</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

99

From the tables it is seen that yearly meat production capacity with 8 hours of work daily and 300 work days in a year, is a minimum 651, 168 and a maximum of 969,120 tons.

In consumption centers by increasing the capacities of local slaughter houses it is possible to answer some part of demand, and by utilizing the real capacities in production centers (Eastern Anatolia) it is possible to realize to a great extent the meat transportation to consumption centers.

To utilize the whole capacity of slaughter houses; livestock transportation must be reduced to a minimum, and especially in slaughter houses where there are good transportation possibilities, meat must be transported as carcass. In seasons when production exceeds demand, extra products must be stored. For this storing refrigerated warehouses must be constructed at proper places.

In slaughter houses, only the following capacities (shown in the table) are presently utilized.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
100

## Presently utilized capacities of slaughter houses

<u>Types</u>	<u>Working hours</u>	<u>Hourly slaughter</u>		<u>Number</u>	<u>Total meat produced</u>
		<u>Cattle</u>	<u>Sheep</u>		
Type I	2	2	10	176	40.120 ton
Type II	2	3	20	80	31.680
Type III	2	3	25	70	31.500
Cutting place 1		1	5	258	14.700
Large city type	4-8	5-30	30-300	18	63.000
<b>Total</b>	-	-	-	602	181.000

Since total potential capacity varies between 651,168 - 969,120 tons. only 18 to 28 percent of this capacity is being utilized.

## Utilized capacities of Packing Plants

<u>Name of plant</u>	<u>Sheep</u>		<u>Cattle</u>	
	<u>1964</u>	<u>1965</u>	<u>1964</u>	<u>1965</u>
Ankara	14.247	16.355	63.631	29.532
Erzurum	32.111	38.375	106.935	121.186
Konya	15.106	18.108	27.148	64.036
Zeytinburnu	39.804	35.599	63.848	43.021
<b>Total</b>	101.268	108.437	261.563	257.775

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
101

## Distribution of slaughter houses according to cities

<u>City</u>	<u>Type I</u>	<u>Type II</u>	<u>Type III</u>	<u>Cutting place</u>	<u>Large city type</u>
Adana	-	3	2	7	-
Adiyaman	-	-	-	-	-
Afyon	3	3	-	8	-
Ağrı	-	-	-	6	-
Amasya	2	2	1	1	-
Ankara	7	-	1	7	1
Antalya	-	1	1	4	-
Artvin	2	-	-	5	-
Aydın	4	6	3	5	1
Balıkesir	8	2	2	6	-
Bilecik	1	-	-	1	-
Bingöl	3	-	-	-	-
Bitlis	1	1	-	4	-
Bolu	-	2	1	7	1
Burdur	3	1	-	3	-
Bursa	5	4	1	8	-
Çanakkale	7	2	2	11	-
Çankırı	-	1	1	5	-
Çorum	6	1	-	7	-
Denizli	4	1	1	1	1
Diyarbakır	-	-	6	-	1 special
Edirne	2	2	1	5	-
Elazığ	-	2	-	6	-
Erzincan	-	1	1	-	-
Eskişehir	2	-	-	-	-
Erzurum	9	1	-	-	-
Gaziantep	-	-	-	3	-
Gümüşhane	2	1	-	3	-
Giresun	2	1	1	-	-
Hakkari	1	-	-	4	-
Hatay	-	2	2	3	-
İçel	4	-	-	2	1
İsparta	2	4	1	1	3
İstanbul	5	2	1	14	3
İzmir	11	6	2	8	-
Kars	1	1	1	1	-

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
102

<u>City</u>	<u>Type I</u>	<u>Type II</u>	<u>Type III</u>	<u>Cutting place</u>	<u>Large city type</u>
Kastamonu	3	2	1	7	2
Kayseri	1	1	4	-	2
Kirklareli	2	2	-	2	1
Kirsehir	2	1	-	-	-
Kocaeli	2	1	1	3	1
Konya	7	1	2	7	-
Kütahya	5	-	-	5	-
Malatya	-	1	-	8	-
Manisa	8	2	2	-	-
Maras	6	1	-	6	-
Mardin	3	1	-	-	-
Muğla	1	2	-	3	-
Muş	2	-	3	3	-
Nevşehir	3	2	-	3	-
Niğde	-	3	2	-	-
Ordu	-	-	-	-	-
Rize	-	3	-	1	-
Sakarya	3	-	-	6	-
Samsun	5	1	-	6	-
Siirt	-	-	1	1	-
Sinop	2	1	-	4	-
Sivas	8	-	7	10	-
Tekirdağ	4	2	-	3	-
Tokat	2	4	-	6	-
Trabzon	5	-	1	1	-
Tunceli	-	-	-	6	-
Urfa	2	2	1	3	-
Uşak	-	-	1	-	-
Van	2	-	-	4	-
Yozgat	-	2	-	6	-
Zonguldak	1	6	1	-	-
<b>Total</b>	<b>176</b>	<b>90</b>	<b>60</b>	<b>258</b>	<b>18</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
103

## 2- Current Warehouse Capacities and Location

Every food product has its own time for economic large scale production. Producing that product in its proper season on a large scale at low cost and then stocking it for later consumption is the aim of every modern economic activity. Today, by using modern refrigeration it is possible to preserve the most perishable goods for a satisfactory period. With the development of refrigeration it is possible to transport meat from one corner of the world to the other.

The first refrigerated store-room in Turkey was founded in 1904, and the number has increased till to 1924 with some additional ice factories. The first refrigerated warehouse to keep the meat in carcass form was founded in 1926 in Sütlice. With the establishment of the meat and fish Organization in 1952, the first modern refrigerated warehouse started to work with four modern meat packing plants.

In 1030 municipalities, animals are being cut in slaughter houses and there are some little ice-rooms of these slaughter houses.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
104

Municipal slaughter houses with good preserving systems can be summarized as follows:

- Edirne municipality
- Izmir slaughter houses (465 m<sup>2</sup>)
- Ice tunnel in Izmir (10 tons of meat)
- Manisa municipality (2 storerooms preserve 20 tons of meat)
- Nazilli municipality (preserves 4,5 tons of meat)
- Ödemiş municipality (small size storerooms)
- Bursa municipality
- Adana municipality

In order to preserve meat properly and to serve meat with proper qualifications to the ultimate consumer, every municipal slaughter house must also have its own refrigerated warehouses. At present, most of the municipal slaughter houses are built solely for the slaughter of animals and no storing is planned.

Generally, in different districts meat prices fluctuate very widely (25 - 50 percent). These fluctuations can be prevented by establishing preserving systems in

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
106

different locations, storing meat in these systems while it is abundant, and consuming from these stocks when the supply is limited.

To have the controlled distribution of meat, it is necessary to establish local slaughter houses and warehouses in the center of the cities and then distribute from these centers to different parts of the city and related towns by way of refrigerated trucks. Some cold-air storerooms, other than these central preserving systems, must be placed in large consumption centers like hospitals, hotels and schools.

The modern refrigerated warehouses, are owned by the Meat and Fish Organization. The sites and capacities of these warehouses are given in the following tables.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
107

## Warehouse and storeroom capacities

<u>Sites</u>	<u>Freeze m<sup>2</sup></u>	<u>ton/days</u>	<u>Freezing(m<sup>2</sup>) preservation</u>	<u>Cold(m<sup>2</sup>) preser.</u>	<u>Ice ton/day</u>
Ayvalık	-	-	-	79	2
Antalya	-	-	-	585	2
Balıkesir	-	-	-	700	15
Beşiktaş	107	60	1 242	1 454	100
Bodrum	-	-	-	54	2
Burdur	-	-	-	54	2
Bursa	-	-	-	1 125	10
Çanakkale	-	-	-	38	12.5
Çeşme	-	-	-	38	12.5
Ereğli	-	-	-	108	8.6
Gelibolu	-	-	-	54	2
Giresun	-	-	-	54	2
Haydarpaşa	102	20	-	1 769	40
İskenderun	25	10	425	397	15
Kayseri	-	-	-	181	9
Marmara	12	5	68	60	25
Mersin	46	4	-	1 026	10
Ordu	-	-	-	114	3
Rize	-	-	-	54	2
Samsun	12	5	68	60	25
Sinop	17	10	200	59	25
Trabzon	28	10	213	190	25
Yozgat	-	-	-	114	3
Zonguldak	-	-	-	186	8.6
<b>Total</b>	<b>349</b>	<b>124</b>	<b>2 216</b>	<b>8 556</b>	<b>359.1</b>

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
108

## Weight of meat to be stored to one m<sup>2</sup>

Fresh fish	250 Kg.
Fresh meat	100 Kg.
Frozen fish	1 000 Kg.
Frozen meat	750 Kg.

## Meat packing industries' warehouse capacities

<u>Plants</u>	<u>Freeze m<sup>2</sup></u>	<u>ton/day</u>	<u>Freezing preser. (m<sup>2</sup>)</u>	<u>Cold preser.</u>	<u>Ice (m<sup>2</sup>) preser.</u>
Ankara	366	40	1 120	1 610	110
Erzurum	335	30	630	1 596	296
Konya	362	40	818	1 800	308
Z. burnu	293	30	5 662	2 810	--
Total	1 356	140	6 230	8 816	714

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
109

## G- Livestock Population

Live stock population and meat production potentials are given in the following tables.

### Population of animals that can be slaughtered

<u>Types</u>	<u>Amount (1000 heads)</u>
Sheep	32 654
Ordinary goat	15 599
Angora goat	5 563
Cattle	13 211
Buffalo	1 203

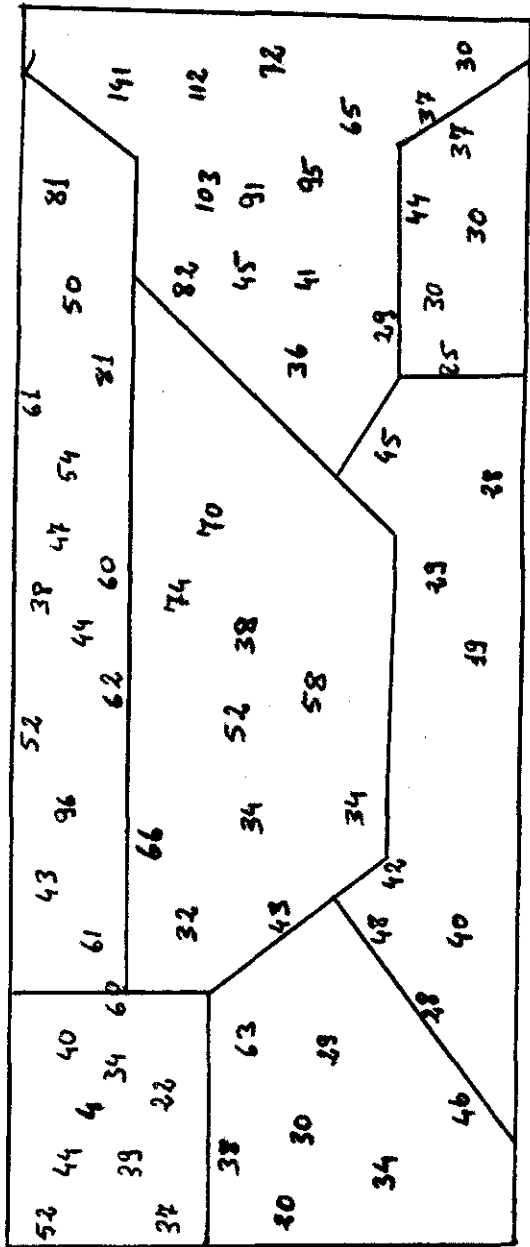
### Distribution of live stock population to geographic districts

<u>Name of district</u>	<u>Sheep</u>	<u>Ordinary goat</u>	<u>Cattle</u>	<u>Buffalo</u>
Middle North	4 924 238	1 341 671	1 814 205	201 191
Aegean	3 800 160	2 757 587	1 249 293	84 267
Marmara	2 228 249	757 607	778 781	116 187
Mediterranean	1 898 009	3 705 526	875 134	40 789
North East	3 843 746	768 444	1 863 707	94 906
South East	4 528 408	2 421 352	1 211 218	99 300
Blacksea	2 207 336	767 857	2 247 303	259 350
Middle East	2 957 373	2 211 696	1 662 113	129 518
Middle South	5 837 460	1 186 857	992 372	90 346

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
110

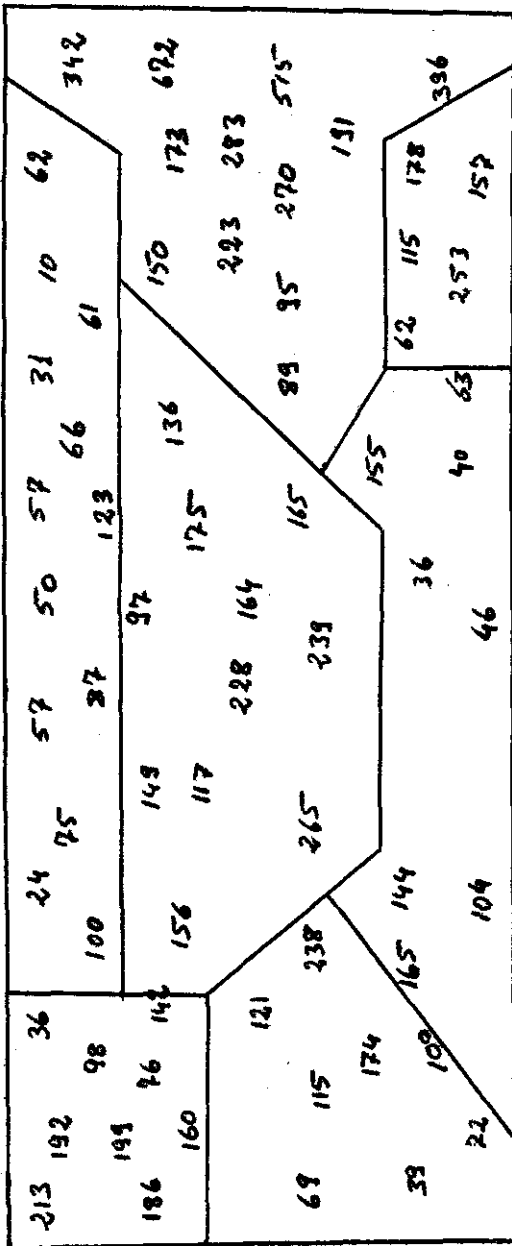


Cattle population for 100 people in geographic districts

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
111



Sheep Population for 100 People in geographic districts

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
112

## Meat productivity per unit of animal

<u>Years</u>	<u>Cattle</u>	<u>Buffaloes</u>	<u>Sheep</u>	<u>Goats</u>
1960	69.9	114.8	14.0	15.6
1961	69.6	108.5	13.5	15.5
1962	68.8	103.3	13.5	15.5
1963	70.3	120.1	13.0	15.3
1964	68.3	112.5	13.4	15.7

## Amount of animal per person in geographical districts

<u>Name of district</u>	<u>Sheep</u>	<u>Cattle</u>
Middle North	2.05	0.44
Aegean	1.36	0.28
Marmara	0.64	0.19
Mediterranean	1.67	0.28
North East	2.36	1.00
South East	3.04	0.54
Blacksea	0.86	0.59
Middle East	1.93	0.67
Middle South	3.06	0.39

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

113

## V- Locations of Meat Processing Industries

For achieving a proper distribution of meat, cities are grouped according to their common geographical characteristics. In each group a large packing plant is assumed to be located at a central place. All meat capacity of the cities of that group are brought to the packing plant of this group. Here animals are properly slaughtered, all the by-products are valued, and meat as carcass is sent back to the cities of that group, according to their needs. Small slaughter houses of cities may do some minor cuttings, but it is ideally proposed that all cutting must be done by the central plant and meat collected in the refrigerated warehouses of each city. Local slaughter houses may be used to meet any deficiency in supply.

Detailed account of such a system is given in the following pages. Proposed plant locations are: İstanbul İzmir Ankara, Konya, Samsun, Trabzon, Adana, Eskişehir, Erzurum, Elazığ, Sirt.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
114

If the internal supply within a group is not enough to meet the demand, meat is transported from another group with excess meat production over the standard. No livestock transportation between groups is allowed. Only carcass or dressed meat can be transported.

In such a distribution system all the middle men between retail butcher and animal producer will be eliminated. The feeder will find his buyer ready throughout the whole year and he himself will be able to bring his animals to the buyer and make profit over the old system. In such a system, the bottle neck of distribution channels will be broken.

Breeders will hand their herds to the packing plants and there their stock will be weighed and priced without any cheating.

In order to see the benefits of the new system, let's consider only two proposed packing plants which are planned to be located at Istanbul and Izmir. In these two plants, approximately

30.497.564

114.045.599

75.443.163 Kg. meat will be processed in a year. That

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

115

amount of meat can be obtained from a herd containing 221,189 cattle, 1.724,498 sheep and 106,037 goats.

In present distribution system, if a farmer breeds 100 head of sheep, (50 Kg. per animal) and sells them at 100 Kr. per Kg. he customarily earns 4,550 TL. instead of 5,000 TL. Calculations are made as follows.

Total weight of 100 sheep ( 50 Kg. per animal )	5.000 Kg.
5 percent feeding and watering deductions	<u>250 Kg.</u>
	4.750 Kg. Net
100 Kr. per Kg.	4.750.00 TL.
60 Kr. deduction as service and quality costs	<u>60</u>
	4.690.00 TL.
2 percent commission and 1 percent cash discount	<u>140.00</u>
	4.550.00

The loss for the farmer is around 9 percent. This amount will be saved by the farmer by the new system of distribution.

In these two packing plants the number of sheep to be slaughtered is calculated as 1.724,498. So, livestock breeders of Istanbul and Izmir groups will earn 9 percent of this amount. That is, breeders will earn, with this

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
116

new system of distribution, the value of 155,204 heads of sheep.

We can likewise study the cattle sales. If a farmer sells his 10 head of cattle (450 Kg. per animal) to an intermediary such as an animal merchant, from 70 Kr. per Kg., calculations of this sale are made as follows:

10 Cattle (450 Kg. per animal)	4500 Kg.
10 percent watering and feeding deductions	<u>450</u>
	4050 Kg. net
70 Kr. per Kg.	<u>x 70</u>
	2835.00 TL.
2 percent commission and 1 percent cash discount	<u>85.25</u>
	2749.95 TL.

From this sale the farmer gets 2,749.95 TL. instead of getting his bargain price of 3,150.00 TL. Here the loss of the breeder is 13 percent.

The cattle that will be processed in these two plants of Istanbul and Izmir are calculated as 221,189 head. With the new distribution system the breeder will earn 28,754 heads of cattle.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
117

There is another big advantage of this new system. For example, the meat deficiency of the Istanbul group will be met by the transportation of meat from Erzurum by way of Trabzon. The price of cattle, at wholesale level, in Erzurum is 405 Kr. per Kg. of live weight. In Istanbul the same amount is 515 Kr. according to Istanbul Animal Exchange. If the purchase of the animals is made in Erzurum and then the meat is brought by way of sea (which is very cheap) money will be saved (110 Kr. per animal). Also the losses of live weight during the transportation of livestock from Erzurum to Istanbul will be prevented. (Here some deductions must be made for the refrigerated ship transportation costs, which is around 30. Kr. per Kg.)

In these two packing plants there will be extra earnings for the proper handling of by-products. This will also help to reduce the meat prices. From these packing plants, for 221,189 cattle of 360 Kg. weight per animal, the following main by-products will be obtained.

Blood	Per animal	6.4 pound	total	708 tons
Tankege	per animal	24 pound	total	2654 tons
Fat	per animal	9.6 pound	total	1061 tons

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

118

In these packing plants, from 1,724,498 head of sheep at 41 Kg. weight per animal, the following main by-products are obtained.

Blood	per animal	0.75 pounds	total	647 tons
Tankage	per animal	2 pounds	total	1724 tons
Fat	per animal	2.5 pounds	total	1940 tons

In these packing plants, from 106,037 goats at 30 Kg. weight per animal, the following main by-products are obtained.

Blood	per animal	0.53 pounds	total	28 tons
Tankage	per animal	1.4 pounds	total	74 tons
Fat	per animal	1.6 pounds	total	35 tons

Total amount of non edible by-products ( by-products such as bones, hide, horns etc. are not included) are:

1383 tons of dry blood

4452 tons of tankage

3036 tons of fat

The money value of these by-products is:

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
119

1383 tons dry blood, 148.50 dollars per ton.	205.375
4452 tons tankage, 175.00 dollars per ton.	511.980
3036 tons fat, 120.00 dollars per ton.	<u>370.320</u>
Dollars	1.087.675
T.L.	10.876.750

Such calculations can also be made for other meat packing plants. Benefits that will accrue with this distribution system are, without doubt, very important and will help the Turkish population to consume more meat in a year; and they will also help the breeders by giving them more profit margins. Animal husbandry will develop and export possibilities for meat will be created.

Experts working for the application of the Second Five Year Plan say that their aim is to serve at least 15 Kg. of meat per person in a year. This criteria is also used for the calculations of this paper.

Ways to distribute 15 Kg. meat per person in a year are given in the following pages. In the calculations meat production capacities of the cities are taken as base. Amounts of different types of animals that constitute this capacity are not studied separately as it is too technical a problem. Calculations are made on meat weight instead of

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
120

## Group 1

<u>City name</u>	<u>Population</u>	<u>Meat production capacity</u> (Kg.)
Istanbul	2 302 438	2 988 943
Edirne	305 288	5 248 973
Kirklareli	258 052	3 942 432
Tekirdağ	286 714	3 735 166
Çanakkale	350 661	6 391 223
Bursa	756 283	9 622 555
Balıkesir	709 705	6 391 223
Adapazarı	402 994	6 272 706
İzmit	337 621	3 314 972
	<u>5 710 756</u>	<u>44 945 599</u>

Meat per person            8 Kg.

Meat deficiency according to 15 Kg. meat per person  
- 39 975 992 Kg.

<u>Group center</u>	<u>Amount of meat to be brought</u> (Kg.)
Konya	8 000 000
Ankara	11 696 106
Trabzon	10 258 334
Samsun	10 021 452

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
121

## Group 2

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
<u>Izmir</u>	1 230 515	6 828 185
<u>Manisa</u>	746 476	7 358 101
<u>Aydin</u>	524 929	3 395 180
<u>Muğla</u>	335 135	4 455 954
<u>Denizli</u>	463 082	4 940 827
<u>Uşak</u>	191 062	3 519 317
	<u>3 491 199</u>	<u>30 497 564</u>

Meat per person 9 Kg.

Deficiency 20 957 194 Kg.

<u>Group center</u>	<u>Amount of meat to be brought (Kg)</u>
<u>Eskişehir</u>	7 362 904
<u>Konya</u>	13 594 290

## Group 3

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg)</u>
<u>Ankara</u>	1 637 483	17 940 342
<u>Çankırı</u>	251 504	5 523 259
<u>Zonguldak</u>	643 901	5 269 967
<u>Kastamonu</u>	441 608	11 116 494
<u>Çorum</u>	485 847	9 711 142
<u>Yozgat</u>	438 359	7 116 427

Meat per person 18 Kg.

Excess 11 696 106 Kg.

<u>Group center</u>	<u>Amount of meat to be sent (Kg.)</u>
<u>Istanbul</u>	11 696 106

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

122

## Group 4

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
Eskisehir	415 285	6 506 600
Bilecik	139 004	2 408 526
Bolu	385 807	6 427 589
Kütahya	398 214	8 112 916
Afyon	502 416	11 394 818
	<u>1840 726</u>	<u>34 850 489</u>

Meat per person 19 Kg.

Excess 7 362 904

<u>Group center</u>	<u>Amount of meat to be sent (Kg.)</u>
Izmir	7 362 904

## Group 5

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
Konya	122 377	23 464 633
Isparta	266 399	4 274 611
Burdur	194 862	4 685 679
Antalya	486 706	20 084 148
Nigde	361 915	9 995 770
Kirşehir	194 775	5 076 198
Nevşehir	201 812	3 142 692
	<u>1 848 846</u>	<u>70 723 731</u>

Meat per person 37 Kg.

Excess 40 674 612

<u>Group center</u>	<u>Amount of meat to be sent (Kg.)</u>
Istanbul	8 000 000
Izmir	10 488 460
Adana	2 393 560
Iskenderun	19 792 592

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
123

## Group 6

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
<u>Adana</u>	903 812	2 538 459
<u>Kayseri</u>	536 912	10 819 720
<u>Mersin</u>	510 510	6 769 413
<u>Haras</u>	442 326	9 076 145
	<u>2 393 560</u>	<u>29 223 737</u>

Meat per person 14 Kg.

Deficiency 2 393 560 Kg.

<u>Group center</u>	<u>Amount of meat to be brought (Kg.)</u>
<u>Konya</u>	2 393 560

## Group 7

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
<u>Samsun</u>	752 701	9 173 013
<u>Sinop</u>	266 410	3 345 105
<u>Anasya</u>	285 348	4 685 765
<u>Tokat</u>	495 857	7 002 829
<u>Sivas</u>	705 077	2 3 461 258
	<u>2 505 363</u>	<u>47 667 970</u>

Meat per person 19 Kg.

Excess 10 021 452 Kg.

<u>Group center</u>	<u>Amount of meat to be sent (Kg.)</u>
<u>Istanbul</u>	10 021 452 Kg.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
124

<u>Group 8</u>	<u>Population</u>	<u>Meat production capacity (Kg.)</u>
<u>Trabzon</u>	595 416	6 242 886
Ordu	543 871	5 765 661
Giresun	427 664	4 487 616
Rize	281 261	1 962 261
	1 848 212	18 458 424

Meat per person                      10 Kg.

Deficiency                              9 241 060 Kg.

<u>Group center</u>	<u>Amount of meat to be sent (Kg)</u>
Istanbul (from Erzurum)	10 258 334

	<u>Amount of meat to be brought (Kg)</u>
Erzurum	9 241 060

<u>Group 9</u>	<u>Population</u>	<u>Meat production capacity</u>
<u>Erzurum</u>	628 856	14 173 704
Gümüşhane	263 486	4 928 949
Artvin	209 882	1 831 814
Kars	606 521	20 894 661
Erzincan	258 976	4 970 988
Ağrı	245 957	7 016 269
	2 213 678	53 816 385

Meat per person                      24.3 Kg.

Excess                                    20 587 205 Kg.

<u>Group center</u>	<u>Amount of meat to be sent (Kg)</u>
Istanbul	10 258 334
Trabzon	9 241 060
İskenderun	1 087 811

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

125

## Group 10

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg)</u>
Elazığ	323 829	3 676 815
Tunceli	154 830	3 628 082
Malatya	452 478	5 063 506
Diyarbakır	476 974	5 590 172
Bingöl	148 701	3 892 689
Muş	119 215	6 467 796
	<u>1 676 027</u>	<u>28 319 060</u>

Meat per person 16 Kg.

Excess 1 676 027 Kg.

Group center Amount of meat to be sent (Kg.)  
İskenderun 1 676 027

## Group 11

<u>City name</u>	<u>Population</u>	<u>Meat production capacity (Kg)</u>
Siirt	263 054	5 261 426
Bitlis	154 509	3 788 214
Van	269 111	9 380 241
Hakkari	83 961	3 083 586
Mardin	397 998	8 363 034
Urfa	449 853	7 786 508
Gaziantep	509 055	5 606 814
	<u>2 127 541</u>	<u>43 269 823</u>

Meat per person 20.3 Kg.

Excess 43 189 082 Kg.

Siirt is in the center of a big production group and is near to the borders. By creating a market for excess animal production on borders, animal smuggling can be prevented. Siirt, also is situated on the GEMTO road, and as GEMTO Agricultural Committee agreed on, it is possible to export meat to Iran and Pakistan from this group.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

126

## İskenderun

İskenderun will serve in this system as an export gate. Animals to be exported will be brought to İskenderun from Konya (19,792,592 Kg.) Elazığ (1,676,027 Kg.) and Erzurum (1,087,592) by rail. To supply ice for the cars coming from Erzurum, an ice Factory is needed in Malatya. Meats that are going to be exported, will be stored either in Adana or in İskenderun warehouses.

The causes for the selection of İskenderun as an export harbor can be summarized as such:

- a) İskenderun is relatively close to large animal production centers like Siirt and Elazığ.
- b) İskenderun has a natural and well protected harbor.
- c) İskenderun, being on the Mediterranean, is a good export gate both for Europe and for the Arabic Countries.

To meet canned meat requirements of foreign countries a canning factory at İskenderun must be established. Cyprus is a good market for canned meat.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
127

## VI- Conclusion

A summary of conclusions arrived at during this study follows.

a) Processing plants must be situated at livestock production centers because there is great weight loss during the processing of raw materials and raw materials (livestock) are very perishable.

b) Livestock production centers, where it is planned to construct processing plants, must have extra meat production capacity over internal demand of the district.

c) Transportation of livestock is too costly when compared with meat transportation. So, wherever possible meat transportation must replace livestock transportation. Within each group of cities which constitute the area of a processing plant, livestock moving can be done as the distances are very short. For example, from Van to Siirt, animals can be brought on foot, and as they will be fed on the road from large pastures there will be no weight loss.

d) Large slaughter plants by creating large markets can prevent animal smuggling across national borders. So, such plants should be constructed in otherwise suitable boundary areas.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

128

e) Meat processing industries are important especially for making animal by-products not used up to now, available for the use of different industries. These industries must be located at places where there can be maximum utilization of these by-products.

f) To make distribution easy, processing plants must be located at the most crowded part of that group of cities of the distribution area.

g) To make export of meat possible, process centers must be located at the export centers of such products. Cyprus, Arabic Countries, Iran and Pakistan are potential markets for Turkish meat products.

h) Process centers must be located at places where suitable transport facilities exist.

According to these requirements, proper locations for meat process centers are the following:

Istanbul, Izmir, Ankara, Eskişehir, Konya, Adana, Samsun Trabzon, Erzurum, Elazığ, Siirt, İskenderun and Siirt are proper places of export to foreign countries.

The following are the expected long term results of process plants that are to be located at the above points.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE  
129

- a) Transportation costs will decrease
- b) Meat demand of large consumption centers will be met satisfactorily.
- c) Meat export to outside markets will be realized.
- d) With the satisfaction of meat demand in large consumption centers, unseasonable and large scale slaughter of lambs will be reduced, increasing meat supply.
- e) Best use of side products of meat and animals will be realized; so, meat prices will fall.
- f) Slaughtering systems will develop and consumers will find better quality of graded meat in large amounts.
- g) Stable markets will be formed. Price fluctuations between markets will be reduced to a minimum
- h) Many of the middlemen involved in livestock collection and transportation will be eliminated; so, prices will be reduced.
- i) By preparing a perpetual market for animal producers, animal smuggling to the south will be reduced. As a result of these factors meat supply within Turkey will increase.
- k) Increased quality and quantity of meat with low prices will help the development of good dieting habits of the Turkish population.

# THESIS

ROBERT COLLEGE GRADUATE SCHOOL  
BEBEK, ISTANBUL

PAGE

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