THE UNIVERSITY OF TEXAS BULLETIN
No. 3127: July 15, 1931

A REPORT ON THE HEALTH AND NUTRITION OF MEXICANS LIVING IN TEXAS

By

JET C. WINTERS
Associate Professor of Home Economics
The University of Texas

Bureau of Research in the Social Sciences
Study No. 2

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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of Democracy, and while guided and controlled by virtue, the noblest attribute of man. It is the only dictator that freemen acknowledge, and the only security which freemen desire.

Mirabeau B. Lamar

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FOREWORD

This investigation was made possible by a grant from the Bureau of Research in the Social Sciences of The University of Texas. It could not have been carried out without the coöperation of many persons. The interest of Mexican people in the project was secured chiefly through the efforts of Misses Kathleen and Aurora Gonzales, public-school teachers in San Antonio, Texas; Miss Della Wright, secretary of the International Institute of Austin, Texas; and Mrs. Gaile Burkhart, City Health Nurse of Austin. The collection and much of the compilation of data were done by Miss Mary Goldman and Mrs. Helene P. Smith, trained nutritionists. Several students in the classes in nutrition also assisted in the compilation of data. To all of these and, most of all, to the Mexican families who so cheerfully permitted a study of their dietary habits I wish to express my sincere appreciation.

A typed copy of the results of this investigation, containing the calculations for the individual families of the nutritive requirements and nutritive value of food consumed, is filed in the library of The University of Texas for reference.

JET C. WINTERS.

The University of Texas.

PART I

THE MEXICAN FAMILY

PLAN OF INVESTIGATION

AS AN OUTCOME of many investigations concerning the relationship of food to physiological well-being certain dietary standards have been established, and more or less definite failure in physiological efficiency has been shown to follow any great deviation from these. Among people living on a very low economic level these standards are apt to be flagrantly violated. Consequently, a study of the food intake of such a people, particularly when combined with a knowledge of their physical condition, should yield data of much interest to those concerned with the problems of nutrition and should afford an excellent opportunity for testing the validity of dietary standards. It was, then, with the idea of determining what deficiencies were characteristic of Mexican diet and of discovering possible relationships between these deficiencies and physical conditions that this study of the diet of typical groups of Mexican families living in Texas was undertaken.

Texas has a considerable Mexican population. In 1930 it was estimated to be about 820,000, or 14 per cent of the total State population.[1] Many of these Mexicans work on farms or in section gangs on the railroad, but numbers of them live in segregated districts of towns and cities. It is with urban Mexicans that this investigation is concerned. They are, on the whole, unskilled workers and belong to the lowest wage-earning group. Their dietary habits have undoubtedly been modified by their contact with Americans and by a different kind of food supply, but they cling, to some extent, to the diet which they followed in Mexico. None of the families studied had lived in Texas less than eight years. Many had been there twenty or twenty-five years, and a few "always."

Extent of study.—Material was gathered in two Texas cities, San Antonio and Austin. San Antonio is one of the large cities of Texas, with a population of some 250,000,

[1] Manuel, H. T., *The Education of Mexican and Spanish-Speaking Children in Texas*, p. 54.

30 to 35 per cent of which is estimated as Mexican. There are several Mexican districts in the city, some of which are close to the business section. Here the Mexicans live in "corrals," a corral consisting of rows of small houses built very close together and facing each other. Water is supplied from hydrants in a center plot of ground. Each corral is required by law to have a definite number of shower-baths and toilets. Twenty representative families from two adjacent corrals were selected for the dietary study. They represent the lowest income group, from $10 to $25 per week. Dietary data were also collected from twenty Mexican families living in different and better districts and not in corrals. These were representative of a higher income group, from $25 to $40 per week. A few of them owned their homes. Austin is a city of some 50,000, with a much smaller percentage of Mexicans than San Antonio. The two cities are only about eighty-five miles apart, so that environmental conditions are much the same. In Austin data were obtained from twenty-five families representing a mixed income group, the range being about the same as in San Antonio. In every case the families selected for study had at least three children between the ages of two and fifteen. The average number of children under fifteen years of age per family is, in the San Antonio group, 4.1; in the Austin group, 4.8.

Method of obtaining data.—In San Antonio the coöperation of Mexican families was secured by Miss Kathleen Gonzales, a teacher in one of the Mexican schools; for, we found, to overcome suspicion it is important to have the aid of some person whom the Mexicans know and trust. The actual data were obtained by a trained worker, Miss Mary Goldman, who went into the homes and made an inventory of all food material on hand at the beginning of the study, then made daily visits to determine the kind and amount of food bought, and made a second inventory of food on hand at the end of the period. In this way reliable data were obtained concerning the kind and amount of food used during the week of observation. No account was taken of

waste, but this was thought to be negligible. Ten families were studied each week, the study covering a period of four successive weeks.

The Austin data are probably not so accurate as those from San Antonio. The coöperation of the families was secured by Miss Della Wright, secretary of the International Institute, an establishment devoted to welfare work among the Mexicans. The dietary material here was obtained by various volunteer social workers. These workers made daily visits to the families but did not exercise the same care in obtaining and recording data as did the San Antonio investigators. On the whole, however, this material was satisfactory. In rare instances records were kept by a Mexican mother, but it is exceptional to find a woman among the lower-income class with enough intelligence to keep even the simplest record.

Calculation of data.—After compiling the material for each family in such a way that the kind and amount of food consumed during a week's time could be accurately stated, the calorie, protein, calcium, phosphorus, and iron content of the food was estimated, mainly from Table 18 in Rose, *Laboratory Handbook of Nutrition,* Third Edition. Since this table is based on edible food material, it was necessary in cases where "as purchased" and "edible" portions differed materially (bananas, watermelon, cantaloupe, etc.) to use tables giving protein and mineral values in terms of hundred calorie portions.[2] For certain widely-used Mexican foods no data are available. This is true of *masa, tortillas,* canned chili, and sweet bread. *Masa* is made from whole corn grains soaked in lime water, boiled, washed, and ground, this process resulting in a dough which may be rolled or patted quite thin and cut or shaped into round pieces about the size of an ordinary salad plate. These, fried or baked, are called *tortillas. Masa* may be bought and made into *tortillas* by the housewife, or the *tortillas* may be bought either from a factory where they are made by running *masa* through hot rollers, or from Mexican

[2]Sherman, H. C., *Chemistry of Food and Nutrition.* Table 19.

families who make a business of supplying them, often cooking them directly over a charcoal furnace. In order to estimate the food value of *masa* and *tortillas*, the moisture content was determined and from this the actual amount of ground corn in the product estimated. *Pan dulce*, or sweet bread, is a name applied by the Mexicans to bakery products made by the addition of fat and sugar to ordinary bread dough. Additional calories were estimated from the amount of sugar and fat added, and protein and mineral content were based on ordinary bread figures. Canned chili, used in only a few instances, was frozen, and the meat, beans, and fat separated and weighed. Nutritive value was estimated from figures obtained in this way. Only the cheapest cuts of meat, usually stew meat containing large amounts of waste material, were purchased. For this reason the food-value figures for meat are low.

Standards used in calculating nutritive requirements.— The discrepancies among the various dietary standards in use at the present time have been so adequately discussed by Hawley in her bulletin entitled *Dietary Scales and Standards for Measuring a Family's Nutritive Needs*[3] that it seems unnecessary to review the subject here. In view of these discrepancies, it was thought best to use two different standards in determining the adequacy of diets. Consequently, the dietary requirements were estimated by (1) the "individual method" and (2) the Hawley method.

In the first method individual requirements for each member of the family were estimated, and the sum of these was considered the requirement for the family as a whole. Three thousand calories were taken as representing the energy requirement of the adult man at moderately active muscular work and 2,700 that of the adult woman. All persons over fifteen years of age were considered adults. The requirement was increased by 10 per cent for occupations demanding unusual energy output. These are the usual standards for adults of average activity, and it is possible,

[3]United States Department of Agriculture, Technical Bulletin No. 8.

since Mexicans are smaller than Americans, that they are somewhat high. The average height of a group of twenty-five Mexican men selected at random was 5 feet, 5½ inches. The average weight was 147 pounds. A similar group of women had an average height of 5 feet, 2 inches, and an average weight of 125 pounds. Since these figures are not greatly below the American average, and since the food bought was of such poor quality that there was probably more than average waste, it was thought that these standards were not excessively high. There is the possibility, however, that the calorie deficiency is somewhat exaggerated because of the use of too high a standard. It is regretted that requirements were not based on actual weights, but these would have been difficult to obtain. Children's calorie requirements were based on the tables of Gillett, the mid-point in the given range being used. The protein needs of the family were considered met if the protein supplied as much as 10 per cent of the calories. Mineral requirements for adults were taken to be .69 gm. calcium, 1.32 gms. phosphorus, and .015 gm. iron daily for every person over fifteen years of age. Children under fifteen were counted as requiring one gram each of phosphorus and calcium daily.[4] The iron standard for children was varied according to the calorie requirement, .0005 gm. for each 100 calories.[5] For lactating mothers (represented by children under one year of age), the calorie requirement was increased 20 per cent, the calcium 75 per cent, phosphorus 20 per cent, and iron 17 per cent. These increases are based on suggestions by Rose.[6]

In Hawley's method of estimating nutritive needs, the family is reduced to "man units" on the basis of the following table, which provides separate units for energy and protein-minerals.[7]

---

[4]Sherman, H. C., *Chemistry of Food and Nutrition*, Third Edition, p. 542. 1926.

[5]Rose, M. S., *Laboratory Handbook for Dietetics*, p. 27. 1929.

[6]Rose, *Feeding the Family*, Third Edition, p. 119.

[7]Hawley, *Dietary Scales and Standards for Measuring A Family's Nutritive Needs*. United States Department of Agriculture. Technical Bulletin No. 8.

TABLE I

DOUBLE SCALE FOR CALCULATING THE ENERGY AND THE PROTEIN AND MINERAL NEEDS OF A FAMILY*

Age of Individual (Years)	Degree of Activity	Energy Scale†		Protein-Mineral Scale‡	
		Male	Female	Male	Female
Over 60	Moderately active	0.9	0.7	0.9	0.7
Over 60	Sedentary	.8	.6	.8	.6
18 to 60	Active	1.2	.9	1.1	.9
Do	Moderately active	1.0	.8	1.0	.8
Do	Sedentary	.8	.7	1.0	.8
15 to 17	Moderately active	1.1	.9	1.5	1.0
10 to 14	"	.8	....	1.3	....
13 to 14	"	....	.9	....	1.3
10 to 12	"	....	.8	....	1.2
6 to 9	"	.6	.6	1.0	1.0
Under 6	"	.4	.4	.8	.8

*The standard for each nutrient is based on food as eaten and indicates the nutritive need of a moderately active man seventy kilograms in weight.

†1.0=3,000 calories.

‡1.0=67 gms. protein, 1.3 gms. phosphorus, .68 gm. calcium, and .012 gm. iron.

Comparing the results of estimating requirements according to the two methods, it will be found that there is no great difference in calories. The protein, phosphorus, and iron figures are higher and the calcium figures lower when estimated by the Hawley method. Consequently, when the two standards are applied to inadequate diets, the inadequacy will appear greater in protein, phosphorus, and iron, and less in calcium, when the Hawley rather than the "individual standard" is used. In the following tables and discussions the "individual standard" is referred to as Standard I and the Hawley standard as Standard II.

Cost standards.—For the purpose of reducing cost to a "per-man-per-day" basis, the United States Department of Labor scale was used. The scale follows:

Man	1.00
Woman	.90
Children 11–14 yrs.	.90
Children 7–10 yrs.	.75
Children 4–6 yrs.	.40
Children 1–3 yrs.	.15

This rating has been so generally employed, particularly for the purpose of estimating cost of food per day per person, that it was thought best to use it here in order that

these results might be compared with those of other studies. A careful study of prices at the time this investigation was made showed that 40 cents per day per person might reasonably be considered the minimum amount for which adequate nutrition could be provided. Accordingly, this amount is used as the standard in discussing the economy of the Mexican diet.

ADEQUACY OF DIETS

Calorie, protein, and mineral adequacy.—Table XII, in the Appendix to Part I, gives the cost and percentage adequacy in five food factors of sixty-five Mexican diets calculated according to two different standards as explained above. These may be roughly summarized as follows:[8]

Requirements	Percentage of Diets Inadequate According to Standard I	Percentage of Diets Inadequate According to Standard II
Calories	54	55
Protein	29	43
Calcium	94	81
Phosphorus	54	76
Iron	51	84
Amount spent	81	81

These data may also be summarized in table form as follows:

TABLE II

ADEQUACY OF DIETS OF SIXTY-FIVE MEXICAN FAMILIES ON THE BASIS OF TWO STANDARDS AS EXPLAINED IN TEXT

	No. of Families with 95–100 Per Cent Adequacy	Per Cent of Total	No. of Families with 75–95 Per Cent Adequacy	Per Cent of Total	No. of Families with 50–75 Per Cent Adequacy	Per Cent of Total	No. of Families below 50 Per Cent Adequacy	Per Cent of Total
Calories								
Standard I	30	46	19	29	14	22	2	3
Standard II	29	45	17	26	14	22	5	7
Protein								
Standard I	46	71	14	22	5	7	0	0
Standard II	37	57	10	16	15	23	3	4
Calcium								
Standard I	4	6	11	17	28	43	22	34
Standard II	12	19	16	24	26	40	11	17
Phosphorus								
Standard I	30	46	15	23	17	26	3	4
Standard II	16	24	25	39	18	28	6	9
Iron								
Standard I	32	49	19	30	13	20	1	1
Standard II	10	16	24	36	24	38	7	10

[8] 90–100 per cent adequacy has been counted "adequate."

From this table it will be seen that

1. According to Standard I, calorie estimations show:

46 per cent of diets adequate.
29 per cent of diets at least three-fourths adequate.
22 per cent of diets one-half to three-fourths adequate.
3 per cent of diets less than one-half adequate.

Protein estimations show:

71 per cent of diets adequate.
22 per cent of diets at least three-fourths adequate.
7 per cent of diets one-half to three-fourths adequate.
0 per cent of diets less than one-half adequate.

Calcium estimations show:

6 per cent of diets adequate.
17 per cent of diets at least three-fourths adequate.
43 per cent of diets from one-half to three-fourths adequate.
34 per cent of diets less than one-half adequate.

Phosphorus estimations show:

46 per cent of diets adequate.
23 per cent of diets at least three-fourths adequate.
26 per cent of diets one-half to three-fourths adequate.
4 per cent of diets less than one-half adequate.

Iron estimations show:

49 per cent of diets adequate.
30 per cent of diets at least three-fourths adequate.
20 per cent of diets from one-half to three-fourths adequate.
1 per cent of diets less than one-half adequate.

2. According to Standard II, calorie estimations show:

45 per cent of diets adequate.
26 per cent of diets at least three-fourths adequate.
22 per cent of diets from one-half to three-fourths adequate.
7 per cent of diets less than one-half adequate.

Protein estimations show:

57 per cent of diets adequate.
16 per cent of diets at least three-fourths adequate.
23 per cent of diets from one-half to three-fourths adequate.
4 per cent of diets less than one-half adequate.

Calcium estimations show:

19 per cent of diets adequate.
24 per cent of diets at least three-fourths adequate.
40 per cent of diets from one-half to three-fourths adequate.
17 per cent of diets less than one-half adequate.

Phosphorus estimations show:

24 per cent of diets adequate.
39 per cent of diets at least three-fourths adequate.

28 per cent of diets from one-half to three-fourths adequate.
9 per cent of diets less than one-half adequate.

Iron estimations show:

16 per cent of diets adequate.
36 per cent of diets at least three-fourths adequate.
38 per cent of diets from one-half to three-fourths adequate.
10 per cent of diets less than one-half adequate.

It is evident that somewhat different conclusions as to the adequacy of Mexican diets will be reached according to the standard used. Employing the Hawley standards, mineral deficiencies are much more marked than calorie or protein deficiency, while only calcium deficiency exceeds calorie when the "individual method" is used. By either method the figures for calories vary only slightly, and deviation from standard is less for protein than for any other factor.

Another way of envisaging dietary deficiencies is to consider diets in relation to the number of deficiencies which they show. Thus, according to Standard I:

7 per cent of the diets are adequate in all five factors.
27 per cent of the diets are inadequate in only one factor.
15 per cent of the diets are inadequate in two factors.
10 per cent of the diets are inadequate in three factors.
15 per cent of the diets are inadequate in four factors.
26 per cent of the diets are inadequate in all five factors.

Average number of factors inadequate, 2.8

Using Standard II:

10 per cent of the diets are adequate in all five factors.
6 per cent of the diets are inadequate in only one factor.
6 per cent of the diets are inadequate in two factors.
20 per cent of the diets are inadequate in three factors.
21 per cent of the diets are inadequate in four factors.
37 per cent of the diets are inadequate in all five factors.

Average number of factors inadequate, 3.4.

By either standard outstanding deficiencies in the Mexican diet are apparent. If the sixty-five families studied may be taken as representative of the Mexican population, then it may be said that more than 50 per cent of the Mexicans are living on deficient diets and at least 25 per cent on diets that are only one-half to three-fourths adequate. It may

be said, also, that the most outstanding deficiency is in calcium, and the least deficiency in protein.

Comparison of the adequacy of Mexican and American Diets.—The standard "per-man-per-day" intakes for five food factors have been computed by Sherman to be as follows:

Energy	3,000	calories
Protein	75	gms.
Phosphorus	1.32	gms.
Calcium	.69	gm.
Iron	.015	gm.

As a result of data from 224 typical American families, Sherman gives the following average food values on the per-man-per-day basis:[9]

Energy	3,256	calories
Protein	106	gms.
Phosphorus	1.63	gms.
Calcium	.74	gm.
Iron	.017	gm.

Similar figures for sixty-five Mexican dietaries are:[10]

Energy	2,665	calories
Protein	86	gms.
Phosphorus	1.35	gms.
Calcium	.64	gm.
Iron	.015	gm.

Concerning the average food values for the American families, Sherman says:

> . . . It will be seen that the freely chosen dietaries contained a liberal surplus of protein and a fair supply of phosphorus and iron but scarcely more than is actually necessary of calories or calcium. Correspondingly we find that the number of individual family dietaries actually deficient in calcium and calories is high enough to cause serious concern while the cases of deficiency of phosphorus or iron were considerably less frequent and there were few, if any, cases showing an actual deficiency of protein.[11]

The Mexican figures show a considerably lower average than the American in all five food factors. However, the

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[9]Sherman, *Chemistry of Food and Nutrition*, Third Edition, p. 552.

[10]For reducing to per man per day, the United States Bureau of Labor Scale was used in order to obtain figures comparable to Sherman's. If Hawley units are used, quite different results are obtained.

[11]Sherman, *Chemistry of Food and Nutrition, Third Edition*, p. 552.

averages are as much or more than the standard in everything but calories and calcium. Evidently the difference in the two diets is in amount and not in kind.

From a dietary study based on ninety-two typical American families, Sherman and Gillett evolve the following table:[12]

TABLE III

AVERAGE FOOD VALUE PER MAN PER DAY OF FOUR GROUPS OF AMERICAN DIETARIES GROUPED ACCORDING TO COST

Group	Cost (cents)	Calories	Protein Grams	Phosphorus Grams	Calcium Grams	Iron Milligrams
I	19.2	2,043	78	1.14	.51	12.1
II	28.2	2,665	91	1.39	.64	14.9
III	34.7	3,106	109	1.60	.72	17.7
IV	49.4	3,889	126	1.95	1.01	20.6

The table below gives the average of the four income groups studied in San Antonio. It is not exactly comparable to the table of Gillett, but serves to show that, for the same amount of money, the Mexicans secured approximately the same amounts of protein, calories, phosphorus, calcium, and iron as the Americans. The difference in price of food in 1917 and 1930 has not been considered.

TABLE IV

AVERAGE FOOD VALUE PER MAN PER DAY OF FOUR GROUPS OF MEXICAN DIETARIES GROUPED ACCORDING TO FAMILY INCOME

Group	Cost (cents)	Calories	Protein Grams	Phosphorus Grams	Calcium Grams	Iron Milligrams
I	24	2,320	77	1.32	.53	14
II	29	2,572	83	1.31	.57	13
III	27	3,090	87	1.42	.61	15
IV	32	2,740	89	1.44	.73	14

In the same study the percentage of American diets inadequate in the various food factors is given. These may be compared with the inadequacy tables on page 16 of this study, but, again, the two are not strictly comparable, as they are not computed in exactly the same way.

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[12]Sherman and Gillett, *Adequacy and Economy of Some City Dietaries*. 1917.

TABLE V

PERCENTAGE OF AMERICAN AND MEXICAN DIETS INADEQUATE IN THE VARIOUS FOOD FACTORS. BASED ON NINETY-TWO AMERICAN AND SIXTY-FIVE MEXICAN DIETARIES

	American	Mexican Standard I	Mexican Standard II
Calories	59	54	55
Protein	13	29	43
Calcium	53	94	81
Phosphorus	49	54	76
Iron	41	51	84

All of these figures serve to show that the Texas-Mexican diet is not, on the whole, as adequate as the American diet; that the same type of deficiencies exist in the Mexican as in the American diet, and that the differences are hardly as great as might be expected in the face of differences in economic conditions and in the general level of intelligence.

Vitamin adequacy.—Since there is no way of making a quantitative estimation of the vitamin content of diets, perhaps the best data on which to base an opinion of general vitamin adequacy are the kinds and amounts of foods used. The following table gives a list of food appearing in the dietaries, the number of families using each food, and the amount used per week per family for those foods which appear on any considerable number of diets. From this table it appears that the Mexican diet contains beans, cereals (largely white flour, white rice, and whole corn), and lard in large amounts. Meat, eggs, milk, and cheese are used frequently, but in small amounts. Tomatoes, potatoes, and onions are the most widely used vegetables. Fruit plays a very small part in the diets, but bananas and oranges appear on almost a third of them. Sugar is practically the only sweet used. Coffee is bought regardless of economic status.

TABLE VI

FOODS APPEARING IN SIXTY-FIVE MEXICAN DIETS DURING A PERIOD OF ONE WEEK, NUMBER OF DIETS IN WHICH EACH APPEARED, AND AMOUNT OF THOSE FOODS APPEARING ON MORE THAN ONE-FOURTH OF THE DIETS

Food	Number Families Using Food	Average Amount Per Week Per Family* lbs.
Fruits		
Apples	15	-----
Apples (dried)	2	-----
Bananas	29	3.24
Cantaloupe	6	-----
Cherries	1	-----
Grapes	3	-----
Lemons	4	-----
Oranges	29	2.97
Peaches	10	-----
Peaches (canned)	9	-----
Pineapple (canned)	1	-----
Plums	4	-----
Prunes	2	-----
Raisins	3	-----
Watermelon	15	-----
Vegetables		
Beans (green)	4	-----
Beets	6	-----
Cabbage	18	-----
Carrots	5	-----
Cauliflower	2	-----
Celery	1	-----
Corn	10	-----
Corn (canned)	7	-----
Cucumbers	4	-----
Egg plant	1	-----
Lettuce	8	-----
Onions	50	2.34
Peas	7	-----
Potatoes	59	6.16
Pumpkin	12	-----
Spinach	3	-----
Squash	3	-----
Sweet potatoes	7	-----
Tomatoes	59	4.46
Legumes		
Beans (dried)	62	5.56
Cereals and Cereal Products		
Bread (white)	45	5.91
Cakes	6	-----
Corn meal	3	-----
Corn flakes	2	-----
Crackers	22	.50

*On basis of number of families using and not of entire group.

TABLE VI—(Continued)

FOODS APPEARING IN SIXTY-FIVE MEXICAN DIETS DURING A PERIOD OF ONE WEEK, NUMBER OF DIETS IN WHICH EACH APPEARED, AND AMOUNT OF THOSE FOODS APPEARING ON MORE THAN ONE-FOURTH OF THE DIETS

Food	Number Families Using Food	Average Amount Per Week Per Family* lbs.
Cream of wheat	6	-----
Farina	2	-----
Flour (white)	50	16.29
Macaroni	22	.93
Masa	36	8.37
Oatmeal	16	2.48
Rice	47	2.38
Spaghetti	2	-----
Sweet bread	44	6.50
Tapioca	1	-----
Tortillas	22	4.56
Vermicelli	28	.98
Meat and Meat Substitutes		
Bacon	26	1.36
Brains	1	-----
Cheese	41	1.00
Chicken	5	-----
Corned beef	2	-----
Eggs	59	24 eggs
Fish (fresh)	2	-----
Fish flakes	1	-----
Liver	3	-----
Meat (beef)	58	4.18
Oysters	1	-----
Salmon	4	-----
Sardines	4	-----
Sausage	24	1.61
Tripe	1	-----
Weiners	1	-----
Milk	62	10.7 qts.
Fats		
Lard	59	3.97
Butter	58	.76
Oil	2	-----
Sweets		
Sugar	61	5.21
Syrup	2	-----
Jam and jelly	4	-----
Candy	1	-----
Molasses	2	-----
Miscellaneous		
Coffee	60	1.68
Tea	1	-----

*On basis of number of families using and not of entire group.

TABLE VI—(Continued)

FOODS APPEARING IN SIXTY-FIVE MEXICAN DIETS DURING A PERIOD OF ONE WEEK, NUMBER OF DIETS IN WHICH EACH APPEARED, AND AMOUNT OF THOSE FOODS APPEARING ON MORE THAN ONE-FOURTH OF THE DIETS

Food	Number Families Using Food	Average Amount Per Week Per Family* lbs.
Canned soup	2	------
Pecans	1	------
Cream	1	------
Pickles	2	------
Pie	1	------
Chili (canned)	14	------
Jello	2	------
Ice cream	2	------
Chocolate	1	------
Cocoa	1	------
Noodles	1	------
Mayonnaise	1	------
Peppers	65	------

*On basis of number of families using and not of entire group.

Vitamin A.—Milk, butter, eggs, leafy vegetables, and glandular meats are usually depended upon as sources of this vitamin. While milk appears on all but three of the diets, it is used in very small amounts. In the two lower-income groups of the San Antonio study the average amount of milk bought was only a little more than a quart a day per family. These two groups comprise fifty adults and seventy-nine children. The amount of milk purchased during the week was 143 quarts. If all the milk were given to the children, it would average only about one-fourth quart, or one cup, per day. Since in Part II of this study, which is concerned with the food intake of pre-school Mexican children, it was found that the average amount of milk taken was nearly one and one-half cups, it seems a safe guess that the custom in these Mexican families is to give the milk to the younger children and let the older ones do without. In the higher-income groups a little more than one and a half quarts per day per family was purchased. This group contained fifty-eight adults and eighty-two children. The amount of milk purchased was 230.5 quarts, an average of .4 quart per day per child. In the Austin group

there is approximately the same average amount of milk per child as in the two higher-income groups of the San Antonio study. This group comprises seventy-two adults and 110 children. The amount of milk bought was 290.5 quarts. There seems to be a tendency to purchase a quart of milk a day per family, regardless of the number of children. Twenty-four of the sixty-five families bought six to eight quarts per week. Only thirteen families bought more than two quarts. The amount of milk used is certainly too small to furnish sufficient Vitamin A. Butter appears in only 30 per cent of the lower-income diets and is bought in very small amounts, an average of a little more than one-fourth pound per week per family. In the higher-income group butter appears on 70 per cent of the diets, but again it is used in very small amounts, one-half pound per week per family. Eggs are widely used, but there is a great deal of variation in the number bought. In the two lower-income groups in San Antonio fifteen eggs per week per family were used and in the two higher-income groups, twenty-five per week per family. The Austin group used an average of thirty-two eggs per week per family. This is interesting in view of the fact that the Austin study was made in the winter, when eggs were expensive, and the San Antonio study in summer, when eggs were cheap. Of the fruits that are popular with the Mexican, only bananas, and of the vegetables only tomatoes, are good sources of A. On the whole, it seems quite probable that the Mexican diet does not furnish enough of this vitamin to promote the best physiological efficiency.

Vitamin B.—The increasing use of milled cereals in place of the whole-grain corn, so universally used by the Mexican in his home country, may be cutting down his Vitamin B supply to a dangerous extent. Only 10 to 12 per cent of the calories obtained from cereals came from the whole-grain varieties. The Mexican never buys graham or wholewheat flour or brown rice. This growing tendency to substitute milled cereals for whole grains is shown by the fact that while forty-five of the sixty-five families studied used white

bread and fifty white flour, only twenty-two used *tortillas* and thirty-six *masa*. It is also shown by the large amounts of white flour and white-flour products used in comparison to the small amount of corn products. White-flour *"tortillas"* (most of the white flour is used in making these) are being substituted to a large extent for corn *tortillas*, a practice much to be regretted from the standpoint of mineral as well as vitamin supply. In diets in which more than 40 per cent of the calorie intake comes from cereals, it is especially desirable that the cereals used carry their full quota of minerals and vitamins. To offset the possible B deficiency, there is the fact that beans, potatoes, and tomatoes are extensively used. There seems to be less danger of a B than of an A deficiency.

Vitamin C.—In spite of the small amounts of fresh fruits and vegetables used, the wide use of tomatoes, an extremely rich source of C, and the use of large amounts of potatoes, a fair source, make a deficiency in this vitamin less probable than in either A or B.

Vitamin D.—Through all the summer and the greater part of the winter Mexican children, wearing very few clothes, play in the sunshine. Plenty of D may be supplied in this way, in spite of the pigmentation of the skin which might be expected to prevent the greatest profit from the ultra-violet rays of the sun. Cod-liver oil or Viosterol therapy is practically unknown.

Vitamin G.—Not a great deal is known as yet concerning the distribution of this vitamin. Milk and meat are said to be good sources, but the Mexican diet supplies little of either of these foods. Cereals have been found to supply very little G, and beans, once thought to be efficient in preventing pellagra, were found, on experiment,[13] to be ineffective. On the basis of our present knowledge, the Mexican would seem to be very poorly insured in regard to Vitamin G.

Comparison of Mexican food intake with dietary plans.—It is interesting to compare the Mexican diet with dietary

[13]Goldberger, *U. S. Public Health Reports*, Vol. 40, p. 2. 1925.

plans outlined by various authorities. Rose[14] suggests the following as a working plan for the construction of an adequate diet for a family of two adults and three children:

TABLE VII

SUGGESTED PERCENTAGE DISTRIBUTION OF CALORIES FOR AN ADEQUATE FAMILY DIET

	Per Cent of Total Calories from Each Class of Food					
Level of Income	Cereal Grains	Milk	Vegetables and Fruits	Fats	Sugar	Eggs, Cheese, Meat, and Other Flesh Food
Low	35	25	12	12	10	6
Moderate	25	25	17	15	10	8
High	20	25	20	15	10	10

From Tables XIV, XVI, XVIII, in the Appendix to Part I, giving the percentage distribution of cost and nutrients in Mexican families, a summary table may be made for comparison with the above. Figures for the forty San Antonio families, the twenty-five Austin families, and the group as a whole show the following distribution:

TABLE VIII

PERCENTAGE DISTRIBUTION OF CALORIES IN GROUPS OF MEXICAN FAMILIES

	Per Cent of Total Calories from Each Class of Food					
	Cereal Grains	Milk and Cheese	Vegetables* and Fruits	Fats	Sugar	Eggs and Meats
San Antonio	43	7	15	18	10	7
Austin	43	9	12	16	10	10
Total group	43	8	14	17	10	8

*Includes beans, given separately in Appendix tables.

The most outstanding difference in the Mexican distribution and that suggested by Rose lies in the percentage of total calories obtained from milk. Rose postulates that for an adequate diet in a family with three small children 25 per cent of the calories should come from milk. The Mexican families with an average of about 4.5 small children get probably 6 to 8 per cent of their calories from milk.

[14]Rose, *Laboratory Handbook for Dietetics*, Third Edition, p. 31.

(Figures in the table include cheese.) Other differences in the Mexican distribution and that suggested by Rose are the larger percentage of calories from cereals and the slightly larger percentage from fats. It is also important to point out that much more than half of the calories from vegetables and fruits come from dried beans. In considering the results of these differences in distribution, it should be stated that:

1. Diets in which too large a percentage of calories are drawn from cereals are apt to be deficient in calcium and Vitamin A.
2. Milk has been shown to be very definitely connected with calcium adequacy, and it is also an excellent source of A.
3. Diets in which too large a proportion of calories is drawn from cereals and too small a proportion from milk would almost certainly be deficient in calcium and Vitamin A.

Moreover, one looks in vain for foods that might offset the tendency toward these deficiencies. Butter and eggs are used in amounts much too small to supplement for A. The large amount of beans used makes the calcium deficiency less than it would otherwise be but cannot make up for the small amount of milk.

Another plan for an adequate diet consists of suggestions as to the apportionment of the food budget. Perhaps one of the best known is that suggested by the Food Administration:

> One-fifth, more or less, for vegetables and fruit.
> One-fifth, or more, for milk and cheese.
> One-fifth, or less, for meats, fish, and eggs.
> One-fifth, or more, for bread and cereals.
> One-fifth, or less, for fats, sugar, and other groceries and food adjuncts.

The Mexicans spend only about one-eighth of their food money for milk and cheese, nearly one-fourth for meat and eggs, nearly one-fourth for cereals, and about one-fifth for the other two classes. Both in regard to the percentage of the budget spent for milk and in the calories obtained from milk, Mexican diets are far below these standards.

ECONOMY OF DIET

THIS economy of diet phase of the study was designed to reveal the relative importance of economic conditions and of poor food selection in determining the inadequacy of the Mexican diet. Sherman gives the following table which permits a comparison between the percentage expenditures for the different types of food and the returns from each in terms of calories, protein, calcium, phosphorus, and iron in the case of a series of 224 American family dietaries.

TABLE IX

PERCENTAGE DISTRIBUTION OF TOTAL FOOD COST AND OF NUTRIENTS IN 224 AMERICAN DIETARIES[15]

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat and fish	35.34	18.99	3.86	26.36	30.37	32.19
Eggs	4.64	1.77	3.64	4.02	6.25	5.47
Milk and cheese	11.56	8.08	55.76	20.61	5.11	10.59
Butter and fats	.31	10.32	.73	.32	.33	9.55
Grain products	37.25	38.20	15.67	30.27	25.87	18.29
Sugar and molasses	.14	10.06	1.81	.20	1.80	4.57
Vegetables	9.55	9.05	14.87	15.58	26.42	10.55
Fruit	.78	2.99	3.15	1.82	3.29	5.31
Nuts	.11	.14	.07	.13	.09	.15
Food adjuncts	.32	.40	.44	.69	.47	3.33
Total	100.00	100.00	100.00	100.00	100.00	100.00

A similar table for sixty-five typical Mexican dietaries is given below:[16]

TABLE X

PERCENTAGE DISTRIBUTION OF TOTAL FOOD COST AND OF NUTRIENTS IN SIXTY-FIVE MEXICAN DIETARIES

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	18.99	6.27	1.87	14.44	14.79	18.01
Beans (dried)	16.38	8.12	15.63	21.89	30.51	4.90
Grain products	40.67	42.96	12.09	29.85	27.11	20.95
Milk and cheese	12.17	7.82	57.63	21.09	4.70	14.70
Sweets	.87	9.85	.34	.03	.45	4.81
Fats	1.28	17.39	.31	.53	.34	7.93
Eggs	5.02	1.86	3.51	4.44	7.21	6.60
Fruits and vegetables	4.01	5.44	8.49	7.58	14.91	14.97
Miscellaneous	.57	.25	.11	.18	.08	.44
Accessories	.....	.....	.....	.....	.....	6.66
Total	100.00	100.00	100.00	100.00	100.00	100.00

[15]Sherman, *Chemistry of Food and Nutrition*, Third Edition, p. 555.

[16]Tables XIII and XIV in the Appendix give this information according to income groups.

With the exception of the percentage spent for meat, the cost distribution of the Mexican dietaries is not unlike that of the American. In spite of the small amount of milk used, if these two tables are representative, the Mexican actually spends a greater percentage of his food money for milk and cheese than the American. Beans were made a separate item for the Mexicans because used in such large quantities. It is interesting to note that they give the best nutritive return for the money invested in them of all the various classes of food; i.e., the percentage of protein, calories, and minerals is much larger in comparison to the percentage of food money spent than is the case in any other type of food. All kinds of dried beans, *frijoles*, are used by Mexicans, but their favorite is a small brown, mottled bean called the "pinto."

In regard to the American dietaries, Sherman states:

> Such investigations of the data of actual dietary studies, supplemented by laboratory experimentation both upon human and animal subjects, have now made it quite clear that the average or typical American food budget can be easily improved by giving greater prominence to milk, vegetables, and fruit, the money needed for this being obtained if necessary by reducing the expenditure for meats and sweets.[17]

Since the Mexican spends a smaller percentage of money for meat, uses larger amounts of beans, which apparently give the best nutritive return of all the foods, and spends a somewhat larger percentage for milk than the American, it would seem that his food selection is better than that of the American.

As has been explained, it had been estimated that 40 cents per day per person, using the United States Bureau of Labor figures for reducing families to man units, was the minimum amount on which an adequate diet could be provided at the time this study was made. On this basis, it will be found (Table XII, in the Appendix to Part I, gives the cost per day per person for each family) that,

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[17]Sherman, H. C., *Chemistry of Food and Nutrition*, Third Edition, p. 558.

In the two lower-income groups in San Antonio:

10 per cent spent enough money to secure adequate food.
35 per cent spent at least three-fourths enough to secure adequate food.
30 per cent spent from one-half to three-fourths enough to secure adequate food.
25 per cent spent less than one-half enough to secure adequate food.

In the two higher-income groups in San Antonio:

30 per cent spent enough money to secure adequate food.
20 per cent spent at least three-fourths enough to secure adequate food.
30 per cent spent from one-half to three-fourths enough to secure adequate food.
20 per cent spent less than one-half enough to secure adequate food.

In the Austin study:

16 per cent spent enough money to secure adequate food.
24 per cent spent at least three-fourths enough to secure adequate food.
40 per cent spent from one-half to three-fourths enough to secure adequate food.
20 per cent spent less than one-half enough to secure adequate food.

In the group as a whole:

18 per cent spent enough money to secure adequate food.
26 per cent spent at least three-fourths enough to secure adequate food.
34 per cent spent from one-half to three-fourths enough to secure adequate food.
22 per cent spent less than one-half enough to secure adequate food.

It is evident that economic conditions are chiefly responsible for the lack of proper nutrition among the Mexicans. The fact that 18 per cent of the families spend enough money to obtain adequate food and only 7 per cent (page 18) secure a completely adequate diet indicates poor food selection, but when it is shown that at least 40 per cent of the diets are adequate in everything but calcium (page 37), the indications are reversed. Certainly some improvement of the diet may be made by better selection, but not much can be accomplished until economic conditions permit the spending of more money for food.

Looking toward the betterment of the Mexican diet, the following recommendations are made:

1. The wide use of beans, potatoes, tomatoes, and onions is to be highly commended.

2. The use of milled cereals, particularly the substitution of flour for corn *tortillas*, is to be discouraged.

3. The use of milk, especially canned or dried, is to be encouraged. Lack of refrigeration and unsanitary conditions in the home, as well as a tendency to buy the poorest grade possible, leave one in doubt as to the wisdom of advising the use of fresh milk.

4. A wider use of the cheaper leafy vegetables is strongly advisable. An attempt should be made to introduce dishes made from raw cabbage, which is very cheap and obtainable throughout the year.

5. Molasses is cheap and, used to replace part of the sugar, would enhance the iron content of the diet.

6. Money spent for coffee should be invested in food. Too large a proportion of the food money is spent for materials, principally coffee and peppers, having no nutritive value.

7. The use of less fried and less highly-seasoned food would result in better digestion.

RELATION OF DIET TO HEALTH

THE Mexican diet has been found to be:

(1) Low in calories.
(2) Somewhat inadequate in protein.
(3) Low in minerals, particularly calcium.
(4) Low in vitamins, especially A.

What disastrous physiological results might be expected to accompany these deficiencies? From the calorie inadequacy it is reasonable to conclude that the percentage of underweight will be large. An emaciated, cadaverous people might be anticipated. There seem to be no statistics on the amount of underweight among Mexican adults, but various investigations of the weight of school children show their percentage of underweight is about the same as for American children. In a study in Austin which included 309 children of various ages, 35 per cent of the children were underweight.[18] In another Texas investigation[19] which included approximately 1,400 children from seven to twenty-one years of age 32 per cent of underweight was found. These figures are no higher than those reported for American children.

Since calcium inadequacy is so outstanding, it is logical to look for physical results of this deficiency. Present-day literature on the subject, however, does not make very clear what physical effects are to be expected from a low calcium intake, unaccompanied, as in this case it may be presumed to be, by Vitamin D deficiency. Insufficient lime is said to bring about osteoporosis, a disorder of the bone closely allied with, but not marked by the clinical symptoms of, rickets. The extent of osteoporosis can be discovered only by the X-ray. Aub[20] has shown that the bone trabeculae act as a storehouse for calcium and that calcium may be withdrawn from the trabeculae in case of an

[18]Report of the Austin City Health Officer, Dr. Eugene Chimene. 1930.
[19]Report of Dr. H. T. Manuel. Brownsville Schools. 1928.
[20]Aub, J. C., Harvey Lectures 1928–29, p. 151.

increased demand or a period of low intake and replaced, when the demand is decreased or the intake increased, without harm to the bony structure. Mexicans, however, suffer from a constantly low intake. It would seem that Mexican women, particularly, should furnish an example of what happens when the body is insufficiently supplied with calcium, since, in addition to the low intake, they undergo the great drain on calcium resources brought about by many pregnancies and lactation periods. Thus, there is a constant withdrawal of calcium with very little opportunity for replacement. As many as ten children during a period of twelve to fifteen years is not an unusual record for Mexican women. As a rule the tenth child is nursed quite as successfully as the first, but it would be interesting to know something about the calcium content of the milk at this time. As far as can be ascertained without actual statistics, Mexican women, although far from being the toothless hags that might be expected under the circumstance, do have considerable dental trouble during the time of pregnancy and lactation. Whether this is greater or less than among American women, who have fewer children and larger calicum intake, it would be impossible to say, as the question is complicated by the fact that American women are more apt to have satisfactory dental care, while in the case of Mexican women only serious trouble receives attention. In examining the records for the past four years of three Mexican clinics in San Antonio, nine cases of osteomalacia were found. This is rather surprising in view of the rarity of the disease in this country. Osteomalacia is usually ascribed to a Vitamin D, rather than calcium, deficiency, but the latter may be a contributing factor. On the whole, the amount of physiological disturbance that can be traced to low calcium intake seems to be less than would be expected as a result of the marked deficiency shown by the dietary study. It may be that the amount of calcium necessary for physiological well-being, in the presence of a plentiful supply of Vitamin D, is much lower than the standard in present use. This standard was

determined before the interrelationship between calcium metabolism and Vitamin D was discovered. It may be that there are physiological results which this very inadequate study fails to bring out. In any event, the question is interesting and important enough to deserve closer study. Certain it is that Mexicans exist on much less calcium than is commonly thought to be necessary for physiological well-being and on less than is supplied by the ordinary American dietary, which itself is more likely to be low in calcium than in any other food factor.

The lower resistance of Mexicans, compared to Americans, to certain diseases is well known. The table below is taken from the data of the State Department of Health and shows the percentage of Mexicans and Americans dying in the State of Texas during 1928 and 1929 from diseases that are more or less definitely connected with diet.

TABLE XI

PERCENTAGE OF MEXICANS AND AMERICANS DYING IN STATE OF TEXAS FROM DISEASES RELATED TO DIET

Disease	Year 1928		Year 1929	
	Americans	Mexicans	Americans	Mexicans
Digestive system, total	9.50	18.20	9.10	15.20
Liver	.93	.70	1.30	.66
Diarrhea (under 2 yrs.)	2.80	12.00	2.20	9.90
Diarrhea (over 2 yrs.)	1.30	2.30	.99	2.01
Peritonitis	1.50	.65	1.10	.61
Intestinal obstruction	.98	.42	1.08	.49
Appendicitis	.97	.....	1.10	.....
Kidney	5.80	2.20	5.50	2.50
Anemias	.36	.20	.28	.13
Respiratory system, total	18.40	27.20	18.90	27.60
Pneumonia	6.70	8.02	7.37	8.10
Diphtheria	.98	.59	.93	.46
Tuberculosis of lungs	5.70	11.60	5.60	12.40
Rickets	.01	.02	.01	.02
Scurvy	.002	.01	.002	.02
Pellagra	1.40	.71	1.20	1.05
Bone diseases, total	.09	.04	.06	.04

It is seen that the percentage of Mexicans dying from digestive disorders is almost twice as great as that of Americans. On analyzing the situation, however, the difference is found to be almost entirely accounted for by the large percentage of children under two years of age dying of diarrhea.

It is impossible to say how much of this diarrhea is due to food and how much to infection, but it is probable that the greater amount is due to infection from bad food rather than to the kind or amount of food. The large percentage of deaths from diarrhea is borne out by figures from the San Antonio Health Department which show 16 to 18 per cent of Mexican deaths in that city during the years 1927, 1928, and 1929 due to diarrhea. The table shows also that a much larger percentage of Mexicans than Americans die from respiratory disorders. This fact is largely accounted for by the greater death rate from tuberculosis that is prevalent among the Mexicans. Every physician who has worked among Mexicans has emphasized their great susceptibility to this disease. The lowered resistance to infection is undoubtedly due partly to unsanitary living conditions and crowded quarters, but it may, to almost as great an extent, be due to the low vitamin content of the diet, and particularly to insufficient Vitamin A.

The typical food deficiency diseases do not appear to be much, if any, more prevalent among the Mexicans than among Americans. In three San Antonio clinics, where the clientele is largely Mexican, there were recorded in the last four years fourteen cases of rickets, six cases of scurvy, thirty-five of pellagra, and nine of osteomalacia.

APPENDIX TO PART I

TABLE XII

THE COST AND THE PERCENTAGE ADEQUACY OF DIETS OF SIXTY-FIVE MEXICAN FAMILIES ARRANGED ACCORDING TO INCOME GROUPS AND EXPRESSED ON THE BASIS OF (1) INDIVIDUAL STANDARD AND (2) HAWLEY STANDARD

1. Lowest Income Group—San Antonio

Family	Percentage Adequacy					Cost Per Day Per Person
	Calories	Protein	Calcium	Phosphorus	Iron	
No. 1—(1)	100+	100+	93	100+	100+	.41
—(2)	100+	100+	100+	100+	88	—
No. 2—(1)	70	100+	32	81	87	.24
—(2)	62	69	44	67	56	—
No. 3—(1)	51	70	30	59	78	.19
—(2)	46	49	45	53	50	—
No. 4—(1)	66	100+	51	98	100+	.20
—(2)	59	75	59	76	75	—
No. 5—(1)	77	82	51	91	100	.21
—(2)	76	77	67	85	82	—
No. 6—(1)	96	100+	50	100+	100+	.32
—(2)	95	100+	65	100+	100+	—
No. 7—(1)	55	67	23	60	70	.17
—(2)	54	52	27	47	49	—
No. 8—(1)	49	57	29	48	70	.10
—(2)	43	47	34	40	50	—
No. 9—(1)	100+	100+	56	87	91	.28
—(2)	100+	100+	64	80	75	—
No. 10—(1)	96	100+	59	96	100+	.32
—(2)	82	100+	63	79	78	—

2. Low Income Group—San Antonio

No. 1—(1)	100+	100+	86	100+	100+	.41
—(2)	100+	100+	100	100+	100+	—
No. 2—(1)	69	82	40	67	78	.20
—(2)	65	60	50	66	56	—
No. 3—(1)	85	100+	57	100+	100+	.37
—(2)	79	95	76	97	86	—
No. 4—(1)	100+	100	70	100	100	.30
—(2)	100+	100+	79	97	78	—
No. 5—(1)	98	100	88	100	100	.31
—(2)	91	100	96	100	99	—

TABLE XII—(Continued)

THE COST AND THE PERCENTAGE ADEQUACY OF DIETS OF SIXTY-FIVE MEXICAN FAMILIES ARRANGED ACCORDING TO INCOME GROUPS AND EXPRESSED ON THE BASIS OF (1) INDIVIDUAL STANDARD AND (2) HAWLEY STANDARD

Family	Percentage Adequacy					Cost Per Day Per Person
	Calories	Protein	Calcium	Phosphorus	Iron	
No. 6—(1)	47	51	21	42	45	.12
—(2)	43	43	26	35	34	—
No. 7—(1)	100	100	43	87	100	.28
—(2)	97	97	62	80	98	—
No. 8—(1)	71	86	37	64	71	.16
—(2)	66	70	68	50	52	—
No. 9—(1)	100+	100+	76	100+	100+	.25
—(2)	100+	100+	93	95	87	—
No. 10—(1)	81	100	67	100	95	.32
—(2)	83	100	75	90	78	—
3. Medium Income Group—San Antonio						
No. 1—(1)	79	73	31	65	69	.15
—(2)	75	62	35	52	51	—
No. 2—(1)	87	100	39	81	92	.17
—(2)	88	100	50	75	79	—
No. 3—(1)	100	89	44	62	71	.20
—(2)	100	81	61	62	59	—
No. 4—(1)	100	100	51	100	100	.40
—(2)	100	100	68	93	95	—
No. 5—(1)	100	100	71	100	100	.36
—(2)	100	100	96	100	100	—
No. 6—(1)	100	100	80	100	100	.39
—(2)	100	100	97	100	100	—
No. 7—(1)	100	100	100	100	100	.39
—(2)	100	100	100	100	100	—
No. 8—(1)	56	61	33	63	74	.16
—(2)	55	50	37	47	53	—
No. 9—(1)	75	78	32	70	79	.19
—(2)	72	67	39	58	55	—
No. 10—(1)	86	100	64	92	95	.27
—(2)	85	100	70	80	76	—
4. Highest Income Group—San Antonio						
No. 1—(1)	100	100	80	100	93	.31
—(2)	98	100+	85	88	65	—
No. 2—(1)	99	100	71	100	100	.41
—(2)	91	100	89	95	93	—

TABLE XII—(Continued)

THE COST AND THE PERCENTAGE ADEQUACY OF DIETS OF SIXTY-FIVE MEXICAN FAMILIES ARRANGED ACCORDING TO INCOME GROUPS AND EXPRESSED ON THE BASIS OF (1) INDIVIDUAL STANDARD AND (2) HAWLEY STANDARD

Family	Percentage Adequacy					Cost Per Day Per Person
	Calories	Protein	Calcium	Phosphorus	Iron	
No. 3—(1)	100	100	100	100	100	.44
—(2)	100	100	100	100	100	....
No. 4—(1)	100	79	67	93	90	.30
—(2)	100	67	79	85	75	....
No. 5—(1)	100	100	74	100	100	.32
—(2)	100	100	92	84	81	....
No. 6—(1)	77	100	57	79	90	.27
—(2)	76	83	73	70	67	....
No. 7—(1)	100	100	76	100	96	.39
—(2)	100	100	91	87	80	....
No. 8—(1)	67	83	45	89	77	.25
—(2)	67	80	50	80	70	....
No. 9—(1)	97	100	55	86	100	.20
—(2)	99	100	65	84	83	....
No. 10—(1)	83	100	80	100	91	.28
—(2)	82	100	88	92	92	....
5. Mixed Income Group—Austin						
No. 1—(1)	65	77	16	46	66	.11
—(2)	58	63	23	41	47	....
No. 2—(1)	73	76	35	58	65	.17
—(2)	66	58	53	51	43	....
No. 3—(1)	76	84	37	53	57	.19
—(2)	71	66	50	47	39	....
No. 4—(1)	100	100	25	57	81	.16
—(2)	99	92	35	51	58	....
No. 5—(1)	44	75	38	69	89	.16
—(2)	44	73	46	63	70	....
No. 6—(1)	51	77	55	66	64	.21
—(2)	47	63	60	54	45	....
No. 7—(1)	66	87	55	70	72	.21
—(2)	60	68	73	63	50	....
No. 8—(1)	83	100+	59	74	75	.21
—(2)	81	84	83	68	55	....
No. 9—(1)	87	100+	41	70	85	.25
—(2)	86	95	58	69	68	....
No. 10—(1)	100	100	45	80	89	.21
—(2)	100	100	57	69	61	....

TABLE XII—(Continued)

THE COST AND THE PERCENTAGE ADEQUACY OF DIETS OF SIXTY-FIVE MEXICAN FAMILIES ARRANGED ACCORDING TO INCOME GROUPS AND EXPRESSED ON THE BASIS OF (1) INDIVIDUAL STANDARD AND (2) HAWLEY STANDARD

Family	Percentage Adequacy					Cost Per Day Per Person
	Calories	Protein	Calcium	Phosphorus	Iron	
No. 11—(1)	81	100	64	100	100	.33
—(2)	76	91	77	87	74	....
No. 12—(1)	81	97	58	70	64	.30
—(2)	80	97	81	73	55	....
No. 13—(1)	100	100	70	96	98	.30
—(2)	100	100	94	78	65	....
No. 14—(1)	100	100	82	100	100	.52
—(2)	100	100	100	100	99+	....
No. 15—(1)	81	100	59	100	100	.30
—(2)	79	100	67	88	82	....
No. 16—(1)	100	100	42	76	82	.32
—(2)	100	96	60	67	58	....
No. 17—(1)	71	100+	73	91	88	.28
—(2)	70	84	90	77	66	....
No. 18—(1)	100	100	80	100	100	.37
—(2)	100	100	100	100	100	....
No. 19—(1)	75	82	56	88	59	.21
—(2)	75	73	66	76	48	....
No. 20—(1)	100	100	81	100	100	.43
—(2)	100	100	100	100	89	....
No. 21—(1)	89	100	98	100	91	.29
—(2)	86	92	100	100	77	....
No. 22—(1)	100	100	53	95	99	.45
—(2)	100	100	73	82	67	....
No. 23—(1)	88	100	64	80	95	.45
—(2)	87	100	75	75	80	....
No. 24—(1)	88	100	64	100	100	.24
—(2)	71	95	71	85	87	....
No. 25—(1)	100	100	96	100	100	.50
—(2)	100	100	100	88	82	....

TABLE XIII

Distribution of Cost and Nutrients for One Week in Sixty-five Mexican Families Arranged According to Income Groups

(1) Laredo Corral—Lowest Income—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	5,027	51,050	2.971	59.971	.6319	15.05
Beans	6,965	107,229	49.563	145.849	2.1669	6.80
Cereals	9,536	319,729	21.555	126.427	1.1430	19.07
Milk and cheese	2,557	49,600	90.138	68.945	.1664	8.76
Sweets	16	86,700	.....	.....	.....	4.26
Fats	8	115,139	.....	.....	.....	4.20
Eggs	592	6,808	3.036	8.280	.1380	2.35
Fruit and vegetables	874	31,223	10.050	27.561	.6792	7.76
Accessories	.....	.....	.....	.....	.....	8.20
	25,575	767,478	177.313	437.033	4.9254	76.45

(2) Hernandez Corral—Second Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	6,632	55,457	4.470	80.871	.8331	18.36
Beans	5,151	79,018	36.658	107.915	1.6037	4.97
Cereals	11,762	386,122	26.277	133.885	1.2476	19.77
Milk and cheese	3,041	60,950	107.745	83.761	.1066	11.32
Sweets	.....	81,627	.....	.....	.....	3.59
Fats	97	176,834	.795	3.286	.0209	7.42
Eggs	1,396	16,058	7.161	19.530	.3255	5.90
Fruit and vegetables	1,074	45,333	17.526	31.476	.6577	12.67
Accessories	.....	.....	.....	.....	.....	5.66
	29,153	901,399	200.632	460.724	4.7951	89.66

(3) South Frio Street—Third Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	3,923	35,855	2.627	46.801	.4743	11.00
Beans	6,556	100,487	46.646	137.295	2.0400	6.08
Cereals	14,824	486,551	33.051	177.184	1.6637	25.18
Milk and cheese	2,960	57,575	103.959	80.010	.1910	10.23
Sweets	11	119,982	.957	.200	.0331	4.47
Fats	61	216,460	.475	1.856	.0096	9.25
Eggs	1,174	13,468	6.006	16.380	.2730	4.43
Fruit and vegetables	1,418	56,754	21.814	41.839	.8088	17.13
Accessories	.....	.....	.....	.....	.....	6.94
	30,927	1,087,132	215.535	501.565	5.4935	94.71

TABLE XIII—(Continued)

DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN SIXTY-FIVE MEXICAN FAMILIES ARRANGED ACCORDING TO INCOME GROUPS

(4) South Leona Street—Highest Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	8,568	78,648	5.598	102.040	1.1095	25.94
Beans	4,555	70,627	34.209	96.445	1.4384	4.41
Cereals	15,095	484,297	33.870	181.091	1.6716	25.04
Milk and cheese	5,283	106,219	188.529	145.352	.3664	19.79
Sweets	65	112,035	2.871	.600	.0993	4.90
Fats	158	202,693	1.398	4.696	.0338	10.95
Eggs	2,105	24,071	11.005	29.922	.4963	8.39
Fruit and vegetables	2,046	86,128	35.888	56.690	1.0587	25.55
Miscellaneous	174	7,070	.773	1.063	.0040	1.65
Accessories						9.76
	38,049	1,171,788	314.141	617,899	6.2780	136.38

(5) Austin Group—Mixed Incomes—25 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	14,725	176,361	13.211	175.676	1.9163	47.53
Beans	10,317	157,085	74.035	216.881	3.0162	9.83
Cereals	32,028	1,043,159	71.699	342.415	3.3814	48.07
Milk and cheese	11,074	221,299	398.458	301.140	.7500	46.09
Sweets	1,696	223,407	1.443	.292	.0196	14.27
Fats	2,308	390,132	2.161	7.233	.0500	20.09
Eggs	5,024	57,794	26.861	69.098	1.1909	22.14
Fruit and vegetables	2,797	125,125	45.630	86,855	1.7416	34.74
Miscellaneous	1,004	8,612	.947	4.834	.0246	1.24
Accessories						13.07
	80,973	2,402,974	634.445	1,204.424	12.0906	257.07

TABLE XIV

PERCENTAGE DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN FIVE GROUPS OF MEXICAN DIETARIES ARRANGED ACCORDING TO INCOME GROUPS

(1) Laredo Corral—Lowest Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	19.70	6.66	1.68	13.70	12.80	19.66
Beans	27.21	13.90	27.95	33.34	44.00	8.90
Cereals	37.25	41.60	12.15	28.95	23.21	24.96
Milk and cheese	10.01	6.46	50.81	15.77	3.38	11.48
Sweets	.06	11.30	.....	.....	.....	5.58
Fats	.03	15.10	.....	.....	.....	5.48
Eggs	2.31	.91	1.72	1.89	2.80	3.06
Fruit and vegetables	3.42	4.07	5.69	6.35	13.81	10.16
Accessories	.....	.....	.....	.....	.....	10.72
Total	100.00	100.00	100.00	100.00	100.00	100.00

(2) Hernandez Corral—Second Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	22.59	6.15	2.24	17.55	17.35	20.45
Beans	17.73	8.77	18.29	23.42	33.50	5.54
Cereals	40.42	42.80	13.10	29.05	25.95	22.03
Milk and cheese	10.45	6.76	53.63	18.18	2.21	12.65
Sweets	.....	9.07	.....	.....	.....	4.01
Fats	.33	19.62	.40	.71	.44	8.29
Eggs	4.79	1.78	3.58	4.25	6.80	6.58
Fruit and vegetables	3.69	5.04	8.76	6.84	13.75	14.13
Accessories	.....	.....	.....	.....	.....	6.32
Total	100.00	100.00	100.00	100.00	100.00	100.00

(3) South Frio Street—Third Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	12.69	3.32	1.22	9.30	8.62	11.62
Beans	21.11	9.25	21.66	27.40	37.22	6.42
Cereals	48.02	14.71	15.35	35.30	30.39	26.60
Milk and cheese	9.55	5.29	48.20	16.00	3.48	10.80
Sweets	.04	11.04	.44	.04	.60	4.71
Fats	.20	19.93	.22	.37	.02	9.76
Eggs	3.81	1.24	2.76	3.27	4.97	4.67
Fruit and vegetables	4.59	5.23	10.15	8.32	14.70	18.10
Accessories	.....	.....	.....	.....	.....	7.32
Total	100.00	100.00	100.00	100.00	100.00	100.00

TABLE XIV—(Continued)

PERCENTAGE DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN FIVE GROUPS OF MEXICAN DIETARIES ARRANGED ACCORDING TO INCOME GROUPS

(4) South Leona Street—Highest Income Group—10 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	22.53	6.71	1.78	16.53	17.68	19.02
Beans	11.99	6.03	10.90	15.60	22.93	3.23
Cereals	39.65	41.35	10.78	29.29	26.62	18.36
Milk and cheese	13.90	9.06	60.00	23.52	5.84	14.51
Sweets	.17	9.56	.91	.10	1.58	3.59
Fats	.38	17.29	.45	.76	.54	8.03
Eggs	5.54	2.05	3.50	4.84	7.91	6.15
Fruit and vegetables	5.38	7.35	11.42	9.18	16.84	18.75
Miscellaneous	.46	.60	.25	.17	.06	1.20
Accessories	.....	.....	.....	.....	.....	7.13
Total	100.00	100.00	100.00	100.00	100.00	100.00

(5) Austin Group—Mixed Incomes—25 Families

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
Meat	18.18	7.31	2.08	14.58	15.85	18.49
Beans	12.74	6.59	11.66	18.01	24.94	3.82
Cereals	39.55	43.23	11.30	28.42	27.96	18.67
Milk and cheese	13.67	9.17	62.80	25.02	6.18	17.94
Sweets	2.09	9.69	.22	.....	.15	5.55
Fats	2.85	16.16	.15	.....	.20	7.81
Eggs	6.24	2.39	4.23	5.73	9.85	8.61
Fruit and vegetables	3.45	5.18	7.19	7.21	14.40	13.52
Miscellaneous	1.24	.31	.....	.....	.....	.49
Accessories	.....	.....	.....	.....	.....	5.09
Total	100.00	100.00	100.00	100.00	100.00	100.00

TABLE XV

DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN FORTY MEXICAN DIETARIES—MIXED INCOMES—SAN ANTONIO

(Totals for Groups 1–4 in Table XIII)

Food	Protein *Gms.*	Calories	Calcium *Gms.*	Phosphorus *Gms.*	Iron *Gms.*	Cost
Meat	24,150	221,010	15.666	289.683	3.0488	70.35
Beans	23,227	357,361	167.076	487.504	7.2490	22.26
Cereals	51,217	1,676,699	114.753	618.587	5.7259	89.06
Milk and cheese	13,841	274,344	490.371	378.068	.8304	50.10
Sweets	92	400,344	3.828	.800	.1324	17.22
Fats	324	711,126	2.668	9.838	.0643	31.82
Eggs	5,267	60,405	27.208	74.112	1.2328	21.07
Fruit and vegetables	5,412	219,438	85.278	157.566	3.2044	63.11
Miscellaneous	174	7,070	.773	1.063	.0040	1.65
Accessories	.....	.....	.....	.....	.....	30.56
Total	123,704	3,927,797	907.621	2,017.221	21.4920	397.20

TABLE XVI

PERCENTAGE DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN FORTY MEXICAN DIETARIES—MIXED INCOMES—SAN ANTONIO

(Totals for Groups 1–4 in Table XIV)

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	19.51	5.62	1.73	14.36	14.20	17.68
Beans	18.80	9.12	18.41	24.16	33.68	5.60
Cereals	41.39	42.70	12.64	30.70	26.63	22.42
Milk and cheese	11.20	6.98	54.08	18.75	3.86	12.61
Sweets	.07	10.18	.42	.04	.62	4.33
Fats	.26	18.10	.29	.49	.30	8.01
Eggs	4.26	1.53	3.00	3.67	5.74	5.30
Fruit and vegetables	4.38	5.58	9.40	7.79	14.90	15.89
Miscellaneous	.14	.18	.01	.05	.02	.41
Accessories	.....	.....	.....	.....	.....	7.75
Total	100.00	100.00	100.00	100.00	100.00	100.00

TABLE XVII

DISTRIBUTION OF COST AND NUTRIENTS FOR ONE WEEK IN SIXTY-FIVE MEXICAN DIETARIES

(Total from Table XIII)

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	38,875	397,371	28.877	465.359	4.9651	117.88
Beans	33,544	514,446	241.111	704.385	10.2652	32.09
Cereals	83,245	2,719,858	186.452	961.002	9.1073	137.13
Milk and cheese	24,915	495,643	888.829	679.208	1.5804	96.19
Sweets	1,788	623,751	5.271	1.092	.1520	31.49
Fats	2,632	1,101,258	4.829	17.071	.1143	51.91
Eggs	10,291	118,199	54.069	143.210	2.4237	43.21
Fruit and vegetables	8,209	344,563	130.908	244.421	4.9460	97.85
Miscellaneous	1,178	15,682	1.720	5.897	.0286	2.89
Accessories	.....	.....	.....	.....	.....	43.63
Total	204,677	6,330,771	1,542.066	3,221.645	33.5826	654.27

TABLE XVIII

Percentage Distribution of Cost and Nutrients for One Week in Sixty-five Mexican Dietaries

Food	Protein	Calories	Calcium	Phosphorus	Iron	Cost
	Gms.		*Gms.*	*Gms.*	*Gms.*	
Meat	18.99	6.27	1.87	14.44	14.79	18.01
Beans	16.38	8.12	15.63	21.89	30.51	4.90
Cereals	40.67	42.96	12.09	29.85	27.11	20.95
Milk and cheese	12.17	7.82	57.63	21.09	4.70	14.70
Sweets	.87	9.85	.34	.03	.45	4.81
Fats	1.28	17.39	.31	.53	.34	7.93
Eggs	5.02	1.86	3.51	4.44	7.21	6.60
Fruit and vegetables	4.01	5.44	8.49	7.58	14.91	14.97
Miscellaneous	.57	.25	.11	.18	.08	.44
Accessories	.....	.....	.....	.....	.....	.....
Total	100.00	100.00	100.00	100.00	100.00	100.00

PART II

THE MEXICAN INFANT AND PRE-SCHOOL CHILD

PLAN OF INVESTIGATION

IT WAS originally planned to devote the second part of this study to the diet of the Mexican child. Upon finding that an elaborate comparative study of the diet and physical status of American, Mexican, and Negro school children of Texas was already under way,[1] it was decided to limit this investigation to the Mexican infant and pre-school child.

Extent of study.—Data on the feeding of infants and children up to two years of age were obtained from seventy-six mothers, fifty in San Antonio and twenty-six in Austin. This material concerned 266 children, an average of 3.5 children per family, and included, as well as actual feeding régimes, information on the prenatal care of the mother, her care during confinement, and the general health of the children. In order to obtain accurate information on the food intake of the pre-school child, actual dietaries were kept for seventy-five children from two to five years of age. Each dietary covered a period of one week.

Method of obtaining data.—The material on the feeding of infants, together with the related data referred to above, was obtained by visits to the families and interviews with the mothers. A copy of the blank used for recording the information will be found in the Appendix to Part II. In Austin the investigator, Helene P. Smith, accompanied the city health nurse on her visits and obtained the information, while in San Antonio the mothers were interviewed by a teacher in the Mexican schools, Aurora Gonzales, who was thoroughly familiar with Mexican habits and well acquainted with the objects and methods of the investigation. These same investigators collected the dietary records for the older children.

Considerable difficulty was experienced in securing accurate dietary records for the two to five-year-old children.

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[1]This study is under the supervision of Jessie Whitacre of the Agricultural and Mechanical College of Texas.

In order to get a sample of a normal Mexican child's food intake under average home conditions, it is obviously necessary to obtain the assistance of the mothers. It required a great deal of explanation and persuasion to get these mothers to help in keeping the food-intake records, and constant supervision was necessary. The family was visited every day to see that the record had been kept, and questions were asked to make sure that nothing had been omitted. It was also difficult to get an accurate idea of the amount of food eaten by the child. A sample of the form on which dietary records were kept is included in the Appendix. The mothers were instructed:

1. To record exactly what the child ate, and not what he was served.
2. To record carefully the amount eaten in cups, spoonfuls, etc.
3. To indicate size of portion, if food could not be measured.
4. To note method of preparation of food.
5. To record accurately sugar and cream used on cereals, butter on bread, etc.
6. To make the record immediately after the meal.

By various means the coöperation of mothers was obtained, and, with the careful supervision exercised, it is believed the records are as accurate as it is possible to get.

Calculation of data.—For dietary calculations, Rose, *Laboratory Handbook for Dietetics,* Third Edition, and *Tables on Nutritive Values of Food,* compiled by nutrition classes under the direction of the author at The University of Texas were used.

RESULTS OF STUDY OF PRENATAL CARE AND EARLY FEEDING

SINCE the diet and health of the mother before the birth of the child are important factors in the child's nutrition, an inquiry was made into the diet and health of Mexican women during pregnancy. It was found that Mexican mothers never follow any particular dietary regime before childbirth. When it is remembered that much stress is laid on the importance of a plentiful supply of minerals and vitamins for the expectant mother and that the diet of Mexicans is deficient in these factors, and particularly deficient in calcium, the mineral whose importance at this time has been most emphasized, it would seem that Mexican diets are not well adapted to the production and rearing of healthy children. In only 2.4 per cent of 266 pregnancies is the health of the mother reported bad, while in 84.5 per cent it is said to be good and in 13.1 per cent fair.

Ignorant midwives are commonly employed by Mexican mothers at the time of childbirth, but there is a growing tendency to employ a physician. In 60 per cent of 266 births midwives were in attendance; in 35.7 per cent physicians were employed; and in 4.2 per cent neighbors or relatives were depended upon. In spite of lack of care and sanitation at the time of childbirth, there seems to be no great loss of life either of mother or child, though there is considerable suffering from infections. There were seven cases of premature births, one case in which instruments were necessary, and no stillbirths reported in the survey. On the whole, the mothers are apparently very sturdy, and it is not uncommon for them to be up and back at part of their daily work in three days after childbirth.

It is interesting that in spite of a low mineral, low vitamin diet, Mexican women are usually able to nurse their many children successfully. They probably wean them at a

later age than is common with American women, as is shown by the following table:

AGE OF WEANING

	Cases
6 months	10
9 months	41
12 months	51
15 months	54
18 months	37
21 months	18
2 years	23
2½ years	19
3 years	1
3–4 years	12

Eighty-five per cent of the children were entirely breast-fed, while 7.2 per cent were partly, and 7.5 per cent entirely bottle-fed. The common practice is to breast-feed the child as long as he will take it and the supply holds out. A few mothers, 18 per cent, follow some sort of feeding schedule, but most of them, 82 per cent, feed the child whenever he is hungry or whenever he cries. When bottle-feeding is necessary, sweetened condensed milk, usually diluted with water and often not even warmed, is almost invariably used.

Solid food is generally a part of the diet at about six months of age, and at twelve months the children are eating everything the family eats. Cereals are rather widely used for younger children, but the use of green vegetables is decidedly limited. Vegetables, to Mexicans, mean beans and fried potatoes. A popular food combination consists of *frijoles,* fried potatoes, *tortillas,* and coffee. The practice of giving coffee, more or less diluted with milk, to infants and children is very common.

Cod-liver oil therapy is unknown except in a few cases where physicians have given samples to mothers. About 19 per cent of the mothers give orange juice to infants, but with no regularity. Tomato juice is not used as such, but, since canned tomatoes are in general use, the older children must get a certain amount. On the whole, the feeding régime of infants and young children falls far short of the ideal advocated by modern pediatricians.

Standards used in calculating nutritive requirements of pre-school children.—Not a great deal of material on the nutritive requirements of children is available. A survey of the literature on food requirements of the pre-school child has recently been made by Eppright[2] and by Sweeny.[3] Since some discrepancy exists between the standards set up by various investigators, particularly in regard to calories and protein, the two most widely used have been selected for use in this study. These are, for calories, those of Gillett and Holt and are as follows:

TABLE I

CALORIE REQUIREMENT OF PRE-SCHOOL CHILDREN

	According to Gillett[4]		*According to Holt*[5]			
			Per Pound		Per Kilogram	
Age	Girls	Boys	Girls	Boys	Girls	Boys
2–3 yrs.	980–1,280	1,000–1,300	43	42	94	93
3–4 yrs.	1,060–1,360	1,100–1,400	40	40	87	80
4–5 yrs.	1,140–1,440	1,200–1,500	37	38	82	84

For protein requirement, the standards most widely used are based on the body weight or on the calorie requirement. Accordingly, the following have been selected:

Standard A—Two to three grams per kilogram of body weight, based on normal weight.

Standard B—Ten to 15 per cent of the calorie requirement, based on requirement for normal weight.

The mineral standards are the same as those used in Part I of this study:

Calcium—One gram per day.

Phosphorus—One gram per day.

Iron—Five ten-thousandths of a gram per 100 calories of standard calorie requirement.

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[2]Eppright, E. S., *A Dietary Study of White and Negro Pre-School Children.* Thesis. The University of Texas. 1930.

[3]*Merrill-Palmer Standards of Physical and Mental Growth*, p. 5.

[4]Gillett, Lucy H., *Food Allowances for Healthy Children*, p. 8. Bulletin of Association for Improving the Condition of the Poor.

[5]Holt, L. E., *Food, Health, and Growth*, p. 84, The Macmillan Co. 1922.

Calorie, protein, and mineral adequacy.—In order to get figures that may be used for comparison with the above standards, it is first necessary to estimate the daily calorie, protein, and mineral intake for each child and to obtain the average for the week. Table XIV, in the Appendix to Part II, gives the average intake in each of the above factors arranged according to age and sex of the seventy-five children studied. Table II, following below, is a summary of Table XIV, and gives the averages for the different age and sex groups.

TABLE II

AVERAGE DAILY INTAKE OF CALORIES, PROTEIN, CALCIUM, PHOSPHORUS, AND IRON FOR MEXICAN PRE-SCHOOL CHILDREN

	Calories	Protein *grams*	Calcium *grams*	Phosphorus *grams*	Iron *grams*
2–3 years:					
Boys	1,041	34.57	.6224	.9489	.00512
Girls	867	31.51	.5199	.9913	.00480
3–4 years:					
Boys	1,071	34.91	.6103	.8407	.00615
Girls	1,042	36.44	.5280	.9531	.00489
4–5 years:					
Boys	1,058	37.30	.4868	.8509	.00538
Girls	772	32.02	.5095	.7560	.00434

For comparison with the Gillett calorie standards the average calorie intake of each child is taken as "within range," "above range," or "below range," "above range" meaning above the highest figure of Gillett, and "below range," below the lowest figure. For comparison with the Holt calorie standard the average calorie intake of each child per unit of body weight is obtained and the percentage variation from the Holt standard estimated. Protein intakes have been estimated both on the basis of body weight and of percentage of calorie intake. Table XV, in the Appendix to Part II, gives the variations from the two calorie and protein standards and from the mineral standards for each of the seventy-five children studied.

In order to compare roughly the results of the two calorie standards, "within range" of the Gillett standard

and +10 to —10 per cent from the average of the Holt figures may be considered equivalent, while more than 10 per cent below or above the Holt standard may be taken as equivalent to "below range" or "above range" on the Gillett standard. Table III, below, is arranged on this basis. Although there is considerable variation within the different groups when compared according to the two standards, the percentage of adequacy and inadequacy is the same for the group as a whole.

TABLE III

CALORIES—FREQUENCY OF PERCENTAGE DEVIATION FROM STANDARDS

(Given in Percentages)

		Holt and Fales Standard			*Gillett Standard*		
	Cases	Below —10 Per Cent	—10 Per Cent to +10 Per Cent	Above +10 Per Cent	Below Range	Within Range	Above Range
2–3 years:							
Boys	15	39.6	33.7	26.4	46.0	33.7	19.8
Girls	5	80.0	0.0	20.0	80.0	0.0	20.0
3–4 years:							
Boys	5	60.0	40.0	0.0	60.0	20.0	20.0
Girls	12	41.6	41.6	16.6	50.0	33.2	16.6
4–5 years:							
Boys	19	78.6	16.0	5.0	73.6	21.0	5.3
Girls	19	89.6	10.4	0.0	84.0	16.0	0.0
Total	75	66.6	22.6	10.6	66.6	22.6	10.6

Concerning the adequacy in calories of the diet of Mexican pre-school children it may be said that two-thirds of the group have calorie intakes definitely below the requirement, that a larger percentage of boys than girls have inadequate intakes, and that a much higher percentage of the four-year-old group than of the other groups are below the standard. By consulting Table XV, it will be seen that for the individual child adequacy according to one standard does not always mean adequacy according to the other.

In considering adequacy in protein according to Standard A, diets are considered adequate that provide two to three grams per kilogram of body weight. Using Standard

B, diets are taken to be adequate if the protein provides 10 to 15 per cent of the calorie requirement. Table IV gives the percentage deviation from the two standards.

TABLE IV

PROTEIN—FREQUENCY OF PERCENTAGE DEVIATION FROM STANDARDS

(Given in Percentages)

		Standard A			*Standard B*		
	Cases	Below 2 gms.	Within 2–3 gms.	Above 3 gms.	Below 10 Per Cent	Within 10–15 Per Cent	Above 15 Per Cent
2–3 years:							
Boys	15	0.0	60.0	40.0	20.0	60.0	20.0
Girls	5	0.0	80.0	20.0	40.0	40.0	20.0
3–4 years:							
Boys	5	40.0	40.0	20.0	40.0	60.0	0.0
Girls	12	8.3	58.3	33.3	25.0	50.0	25.0
4–5 years:							
Boys	19	20.8	68.0	10.4	32.2	62.5	5.2
Girls	19	37.0	63.0	0.0	37.0	63.0	0.0
Total	75	18.6	62.6	18.6	30.6	58.6	10.6

Thus it will be seen that with the exception of three to four-year-old boys, a group very inadequately represented, the percentage below Standard A is not large, excepting the four to five-year-old group. Moreover, the percentage under standard for the group as a whole is only 18.6 per cent as compared with 66.6 per cent for calories. It is apparent that Standard B is higher than Standard A.

Mineral intakes are compared directly with the mineral standards. The following table gives the frequency of percentage deviation from standards for calcium, phosphorus, and iron.

TABLE V

MINERALS—FREQUENCY OF PERCENTAGE DEVIATION FROM STANDARDS

(Given in Percentages)

	No. Cases	100 Per Cent Adequate	90–100 Per Cent Adequate	80–90 Per Cent Adequate	70–80 Per Cent Adequate	60–70 Per Cent Adequate	50–60 Per Cent Adequate	Below 50 Per Cent Adequate
				Calcium				
2–3 years:								
Boys	15	6.6	0.0	13.3	13.3	26.6	13.3	26.6
Girls	5	0.0	0.0	0.0	0.0	20.0	40.0	40.0

TABLE V—(Continued)

MINERALS—FREQUENCY OF PERCENTAGE DEVIATION FROM STANDARDS

(Given in Percentages)

	No. Cases	100 Per Cent Adequate	90–100 Per Cent Adequate	80–90 Per Cent Adequate	70–80 Per Cent Adequate	60–70 Per Cent Adequate	50–60 Per Cent Adequate	Below 50 Per Cent Adequate
3–4 years:								
Boys	5	0.0	0.0	20.0	20.0	20.0	0.0	40.0
Girls	12	8.3	0.0	8.3	0.0	8.3	8.3	66.6
4–5 years:								
Boys	19	0.0	0.0	0.0	16.0	16.0	16.0	52.0
Girls	19	5.3	0.0	10.6	5.3	10.6	16.0	52.0
Total	75	4.0	0.0	8.0	9.3	16.0	14.6	48.0
				Phosphorus				
2–3 years:								
Boys	15	20.0	13.3	26.6	20.0	13.3	0.0	6.6
Girls	5	20.0	20.0	0.0	20.0	20.0	20.0	0.0
3–4 years:								
Boys	5	20.0	20.0	0.0	40.0	20.0	0.0	0.0
Girls	12	33.3	0.0	25.0	16.6	16.6	8.3	0.0
4–5 years:								
Boys	19	32.0	16.0	16.0	5.0	26.0	0.0	5.0
Girls	19	10.5	16.0	21.0	10.5	16.0	10.5	16.0
Total	75	22.7	13.3	18.7	16.0	16.7	5.3	6.7
				Iron				
2–3 years:								
Boys	15	33.3	13.3	26.6	6.6	13.3	6.6	0.0
Girls	5	20.0	0.0	20.0	0.0	40.0	20.0	0.0
3–4 years:								
Boys	5	40.0	20.0	20.0	0.0	0.0	20.0	0.0
Girls	12	25.0	16.6	8.3	16.6	16.6	16.6	0.0
4–5 years:								
Boys	19	21.0	10.5	10.5	15.7	26.3	10.5	5.4
Girls	19	0.0	15.7	10.0	21.0	15.7	15.7	21.0
Total	75	20.0	13.3	14.6	13.3	18.6	13.3	6.7

Again, as in the study of the Mexican families, the calcium deficiency is outstanding. Only 4 per cent of the diets provide an adequate amount of calcium, while 48 per cent are more than 50 per cent deficient. As is the case with calories, the diets of the older group are more deficient in calcium than those of the younger, only about one-fourth

of the two-year-old group being more than 50 per cent deficient, while more than one-half of the diets of the four-year-old group show this amount of inadequacy. Roughly speaking, it may be said that about one-fourth of the two-year-old group and approximately one-half of the three and four-year-old group are receiving diets which supply less than half the calcium requirement. The phosphorus deficiency is much less drastic than that of calcium, since more than one-third[6] of the diets are adequate in this factor and only 6.7 per cent as much as 50 per cent inadequate. Moreover, the tendency toward marked deficiency in the diets of the older children is not so obvious. The deficiencies in iron closely parallel those of phosphorus. Again, one-third of the diets are adequate, and approximately the same small percentage more than 50 per cent inadequate, but the in-between figures indicate that the iron deficiency is somewhat more marked than that of phosphorus.

On the whole, the mineral deficiencies are outstanding, at least two-thirds of the diets being from 10 to 50 per cent deficient in all three minerals. The calcium inadequacy is by far the greatest, since almost two-thirds of the diets are 40 per cent or more below the standard requirement for this element.

In order to compare the adequacy of the diets of the Mexican pre-school children with the adequacy of the diets of Mexican families as a whole, as discussed in Part I, Table VI has been arranged. In this table the Holt standard has been used for calories, and two to three grams per kilogram of body weight for protein. It is probably fairer to compare these results with Standard I than Standard II, as used for families, since mineral standards are on the same basis.

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[6]Less than 10 per cent inadequacy is ignored, as explained in Part I.

TABLE VI

Comparison of Adequacy of Diets of Mexican Families and of Mexican Pre-School Children

	95–100 Per Cent Adequate		75–95 Per Cent Adequate		50–75 Per Cent Adequate		Less Than 50 Per Cent Adequate	
	Per Cent of Families	Per Cent of Children	Per Cent of Families	Per Cent of Children	Per Cent of Families	Per Cent of Children	Per Cent of Families	Per Cent of Children
Calories	46	24	29	32	22	37	3	7
Protein	71	84	22	9	7	5	0	2
Calcium	6	4	17	11	43	37	34	48
Phosphorus	46	24	24	44	26	25	4	7
Iron	49	27	30	30	20	36	1	7

From this table it is evident that the same kind of deficiencies are characteristic of the diet of the pre-school child as of the family as a whole. Mineral deficiencies are greater in the child's diet than the family diet, and calorie deficiency is much more marked. Only the protein needs seem to be somewhat better supplied in the case of the children. For purposes of comparison it may be said that:

46 per cent of the family diets provide adequate calories.
24 per cent of the children's diets provide adequate calories.
71 per cent of the family diets provide adequate protein.
84 per cent of the children's diets provide adequate protein.
6 per cent of the family diets provide adequate calcium.
3 per cent of the children's diets provide adequate calcium.
46 per cent of the family diets provide adequate phosphorus.
24 per cent of the children's diets provide adequate phosphorus.
49 per cent of the family diets provide adequate iron.
27 per cent of the children's diets provide adequate iron.

Apparently the younger Mexican children are not even as adequately fed as the study of family dietaries would lead one to expect. They are evidently not receiving their share of the nutrients available.

Considering the children's diets in relation to the number of deficiencies which they show, it was found that:

4 per cent of the diets are adequate in all five factors.
17 per cent of the diets are inadequate in only one factor.
11 per cent of the diets are inadequate in two factors.
20 per cent of the diets are inadequate in three factors.
32 per cent of the diets are inadequate in four factors.
16 per cent of the diets are inadequate in all five factors.
Average number of factors inadequate: 3,4.

A similar table for families as a whole shows, according to Standard (1) :[7]

7 per cent of the diets adequate in all five factors.
27 per cent of the diets inadequate in only one factor.
15 per cent of the diets inadequate in two factors.
10 per cent of the diets inadequate in three factors.
32 per cent of the diets inadequate in four factors.
26 per cent of the diets inadequate in five factors.
Average number of factors inadequate: 2.8.

This comparison again brings out the greater inadequacy of the children's diets. It is probable that the calorie deficiency accounts for the iron, phosphorus, and protein deficiencies, and that, had the calorie requirement been met, the only outstanding deficiency would have been that of calcium.

Vitamin content of diets.—Since vitamin adequacy can best be judged on the basis of the kind and amount of food in the diets, a table showing the number of times different types of food appeared on the dietaries was compiled. Seventy-five dietaries for a period of one week each represent a total of 1,575 meals. The table below shows the number of times each food was served during the period of a week, or in the 1,575 meals:

TABLE VII

NUMBER OF MEALS IN WHICH CERTAIN TYPES OF FOOD OCCURRED

Milk	888
Beans (dried)	432
Cereals	430
Rice	—
Oatmeal	—
Macaroni, spaghetti, vermicelli	—
Post Toasties	—
Cream of Wheat	—
Corn Flakes	—
Puffed Rice	—
Breads	1,332
White flour products (bread and *tortillas)*	764
Corn *tortillas*	396
Corn bread	15
Sweet bread, rolls, etc.	74
Brown bread	1

[7]Part I of this study.

TABLE VII—(Continued)

NUMBER OF MEALS IN WHICH CERTAIN TYPES OF FOOD OCCURRED

Rye bread	2
Whole wheat bread	1
Griddle cakes	2
Biscuit	36
Soda crackers, Saltines	41
Meats	258
Beef (steak, hamburger, ground loaf, hash, balls, chili)	-----
Pork (roast, chops)	-----
Sausage	-----
Bacon	-----
Ham	-----
Mutton	-----
Veal	-----
Fish	-----
Liver	-----
Potatoes (sweet and Irish)	214
Eggs	143
Butter	211
Pastries and sweets	139
Cookies	58
Candy	58
Cake	15
Pie (apple, lemon)	8
Mexican foods	23
Enchiladas	-----
Tamales	-----
Chili	-----
Fruits	337
Fresh—	
Apples	-----
Oranges, orange juice	-----
Bananas	-----
Grapefruit	-----
Dried—	
Prunes	-----
Canned—	
Peaches	-----
Pineapple	-----
Pears	-----
Vegetables	186
Fresh—	
Cabbage	-----
Spinach	-----
Tomatoes	-----
Mustard and turnip greens	-----
Water cress	-----
Lettuce	-----
Carrots	-----
Beets	-----
Beans	-----
Onions	-----

TABLE VII—(Continued)

NUMBER OF MEALS IN WHICH CERTAIN TYPES OF FOOD OCCURRED

Canned—	
Corn	-----
Peas	-----
Tomatoes	-----
Other foods seldom used—	
Cottage cheese	-----
Peanut butter	-----
Doughnuts	-----
Molasses	-----
Nuts	-----
Popcorn	-----
Jelly	-----

Although milk is included in considerably more than half of the meals served, the average amounts used (shown in the table below) are not large.

TABLE VIII

AVERAGE DAILY MILK INTAKE OF MEXICAN PRE-SCHOOL CHILDREN

Age	Amount in Cups
Two to three years—	
Boys	1.66
Girls	1.38
Three to four years—	
Boys	1.72
Girls	1.25
Four to five years—	
Boys	1.11
Girls	1.55
Average	1.44

Practically no milk is used in cooking. It is served plain, on cereals, and in cocoa, chocolate, and coffee. All but two of the seventy-five children had milk in some form during the seven-day period. Eleven in each city drank plain milk, five in San Antonio had milk only in coffee, and forty-eight children in the two cities drank it both plain and in coffee. Milk intake figures show that only one child took the standard one quart a day, 29 per cent of the children had as much as a pint a day, 34 per cent had a cup a day, 30 per cent had less than a cup, and 2.6 per cent had none.

The few children who get fresh fruit are given it consistently. Orange juice occurs in only three dietaries. Green vegetables are used even less than fruits. They occur in thirty-seven meals, but twenty-six of these are on one diet. Almost no spinach is used, ten of the sixteen times that it occurred being in one diet. The study was made during the time fresh spinach was on the market. Nineteen children in the two cities had neither fruits nor green vegetables during the entire week, and there were as many more that had them only once during this time. Fortunately, canned tomatoes are widely used, and canned vegetable soup is a favorite dish.

Cereal and cereal products appear on the diets frequently and in large amounts. A meal often consists of beans and bread. The tendency to substitute milled cereal products for the whole grain is shown here as in the study of the family dietaries. Whole grain products (corn *tortillas,* rye bread, and whole wheat bread) appeared at only 400 of the meals served, while white flour products appeared on 932. Of the cereals used, oatmeal is fairly popular, but it appears much less often than rice and macaroni.

Beans are used extensively in the diets, appearing almost often enough to represent once a day for six days a week for every child.

Although large amounts of potatoes are consumed by many of the children, they appear in only half as many meals as beans. Frying is the favorite method of cooking potatoes, but they are served baked, boiled, mashed, and as potato chips.

Butter was served in 211 meals, but it appears ten to fifteen times on one diet and is used in very few dietaries. The majority of the children get no butter or, if any, only a very small amount.

While eggs do not appear on the children's dietaries as often as the family diets indicate, yet they occur on an average twice a week for each child and are usually served fried.

Meat occurs often enough to represent a serving approximately three times a week for each child. Beef is the most widely used meat; ham and mutton appear fairly often; liver is listed only once during the entire study.

About 75 per cent of the children in the two cities drink coffee, the amount consumed per day varying from one to four cups. Milk is usually added, and at first it was thought that rather large amounts of milk must be consumed in this way. Calculations, however, showed that probably not more than .1 to .2 cups were used in this manner.

There is a surprising lack of Mexican dishes, such as tamales, *enchiladas,* and chili, in the children's dietaries. These are used for Sundays and holidays as a special treat. The tendency to serve rich, concentrated foods, high in fat and highly seasoned, is shown in their meats, gravies, soups, and combination dishes of rice, meat, and tomatoes. Many kinds of peppers are bought and are freely used.

On the whole, vitamin deficiencies of the diets of the children are similar to those of the family. Too little milk, butter, eggs, and leafy vegetables are used to supply the requisite amount of Vitamin A. Although the substitution of milled for whole cereals has cut down on the supply of Vitamin B, it is possible that this element is still fairly well supplied by the large amounts of beans, potatoes, and tomatoes used. The use of large amounts of tomatoes and potatoes makes a deficiency of Vitamin C less probable than of either A or B. The amount of Vitamin D is questionable, but the children live largely out of doors in a semi-tropical climate. Whether or not sufficient amounts of Vitamin D are obtained can best be settled by an examination into the extent to which signs of rickets are present among Mexican children. This will be discussed later. On the basis of our present knowledge of the distribution of Vitamin G, the children's diets appear to be decidedly deficient in this factor. The diet of the Mexican pre-school child presents quite a contrast to that which has been proposed as the result of much practical and experimental experience. This prescribes that the pre-school child's diet

should be built around whole-wheat bread, butter, milk, green vegetables, cereals, fruits, eggs, liver, and potatoes and that special precautions must be taken to supply Vitamins C and D by using orange or tomato juice and cod-liver oil or Viosterol. The Mexican pre-school child subsists largely on beans, potatoes, cereals, and coffee. Luckily, he has plenty of sunshine, and the natural fondness for tomatoes is a fortunate one.

COMPARISON OF NUTRITION OF MEXICAN CHILDREN WITH THAT OF AMERICAN AND NEGRO CHILDREN

A STUDY of the nutrition of American and Negro children has been made by Eppright.[8] Her investigation included a group of fifty American and fifty Negro children selected at random in Austin, Texas. Comparing the figures obtained from the Mexican study with those of Eppright, it was found that—

1. The calorie intake of the Mexican children was definitely lower than that of the American children and somewhat lower than that of the Negroes.

2. The average protein intake was below that of both the American and Negro group.

3. Calcium intake was markedly lower than that of the American group but only slightly lower than that of the Negro group.

4. Phosphorus and iron intakes did not vary greatly from those of the other groups, the phosphorus intake being somewhat higher than that of the American group and lower than that of the Negro and the iron intake slightly lower than that of either of the other groups.

Table IX shows the percentage in each group below the standard requirement.

TABLE IX

PERCENTAGE OF AMERICAN, NEGRO, AND MEXICAN CHILDREN BELOW STANDARD DIETARY REQUIREMENTS

	Protein		Calories		More Than 10 Per Cent Below Standards		
	Below 2 gms. Per Kilogram of Body Weight	Below 10 Per Cent of Calorie Requirement	More Than 10 Per Cent Below Holt Standard	Below Gillett Range	Calcium	Phosphorus	Iron
American	20	26	52	32	50	38	50
Negroes	26	26	62	40	90	74	32
Mexican	18	31	66	66	96	64	66

[8]Eppright, E. S., *A Dietary Study of White and Negro Pre-School Children.* Thesis. The University of Texas. 1930.

These figures show a much more deficient diet for the Mexican group than for either the American or Negro. The greater deficiency of the Mexican diet is also shown by figures relative to the number of inadequate factors (Table X).

TABLE X

PERCENTAGE FREQUENCY OF INADEQUATE FACTORS IN DIETS OF AMERICAN, NEGRO, AND MEXICAN CHILDREN

Number of Inadequate Factors	Americans Per Cent	Negroes Per Cent	Mexicans Per Cent
0	30	10	4
1	22	14	17
2	14	32	11
3	10	14	20
4	12	10	32
5	12	20	16
Total	100	100	100

Average Number of Inadequate Factors

Americans	1.8 per person
Negroes	2.6 per person
Mexicans	3.4 per person

The results of this dietary study show that the nutrition of the Mexican pre-school child is poor both in comparison to dietary standards and in comparison to that of both American and Negro pre-school children. The outstanding deficiencies are those of calories, calcium, and Vitamins A and G.

RELATION OF DIET TO HEALTH OF MEXICAN PRE-SCHOOL CHILDREN

SINCE the calorie intake of the Mexican pre-school child is very low, both in comparison with the standard and with the intake of American and Negro children of like age, a large percentage of underweight might be expected. Contrary to this expectation, however, only three children in the group of seventy-five (4 per cent) were more than 7 per cent underweight. Moreover, 32 per cent of the group were more than 7 per cent overweight. In similar groups of American and Negro children, 6 per cent and 34 per cent, respectively, of underweight had been found. The most inadequate diet seemed to have resulted in the least percentage of underweight. These findings were so surprising and so at variance with what had been found in groups of Mexican school children that it was decided to see if this small percentage of underweight was typical of a larger group of children. It was thought desirable, also, to get further data on the physical condition of the Mexican pre-school child. A group of approximately two hundred Mexican pre-school children living in San Antonio were given physical examinations by Doctor Edith Bonnet of that city. Of this group 33 per cent were 7 per cent or more underweight, but only 13 per cent were more than 10 per cent underweight and only 8 per cent more than 7 per cent overweight (Table XII). Whatever the explanation of the small percentage of underweight found in the dietary group, it apparently is not typical. However, 17 per cent of the American children admitted to the University Nursery School in Austin were found to be underweight, so that the 6 per cent of underweight found by Eppright cannot be considered typical either. No data are available for a large Negro group. The question of underweight cannot be settled until more accurate data are available.

The average height of Mexican children is apparently considerably below that of American children as given by

various investigators. Table XI gives the range in height for pre-school children given by Merrill-Palmer, by Baldwin, and by the Children's Bureau, and, for comparative purposes, the average of the different age groups of Mexican children. The number of children examined was too small for computing a range, but it will be seen that the average height of the various Mexican groups is below the smallest figure in the American range.

TABLE XI

HEIGHTS OF MEXICAN AND AMERICAN PRE-SCHOOL CHILDREN

(Heights in inches)

American Boys			Mexican Boys
Merrill-Palmer	Baldwin	Children's Bureau	
2–3 Year Range 34.6–37.6	33.8–36.9	33.6–36.6	2–3 Year Average 33.6 (Group of 29)
3–4 Year Range 37.6–40.4	36.9–39.3	36.6–39.2	3–4 Year Average 36.4 (Group of 34)
4–5 Year Range 40.4–42.9	39.3–41.9	39.2–41.6	4–5 Year Average 39.0 (Group of 32)
American Girls			**Mexican Girls**
Merrill-Palmer	Baldwin	Children's Bureau	
2–3 Year Range 34.2–37.1	33.1–36.4	33.1–36.2	2–3 Year Average 32.9 (Group of 28)
3–4 Year Range 37.1–40.2	36.4–39.3	36.2–38.9	3–4 Year Average 36.3 (Group of 29)
4–5 Year Range 40.2–42.5	39.3–41.5	38.9–41.4	4–5 Year Average 38.4 (Group of 46)

The physical examination findings are summed up in Table XII, which gives the results for the group as a whole, and in Table XIII, which gives figures for the various age groups. These data may be interpreted, in part at least, in terms of dietary deficiencies. A large percentage of the group shows the various posture defects that have been ascribed to undernutrition. In a group of such very young children 41 per cent of children with decayed teeth seems large. No data on teeth are available for a large group of Texas-American children, but a survey of Kansas pre-school children made by Rypin[9] shows that of 1,197 children 27.2 per cent had dental caries, which averaged over

one tooth for each mouth examined and almost four decayed teeth for each carious mouth, and that of the teeth erupted 6.3 per cent were carious. An analysis of the data on Mexican children shows an average of 1.2 decayed teeth for each mouth examined and 3 decayed teeth for each of the carious mouths. Of the teeth erupted, 7 per cent were carious. If comparison between these two groups is valid, it shows a larger percentage of bad teeth in the Mexican group. Low intake of calcium and of Vitamins C and D have been definitely connected with dental decay.

Although the examinations were made in midsummer, there is a large percentage of nose discharges. Lack of Vitamin A may be a causative factor.

The question of rickets in Mexican children is a disputed one. Many physicians who have worked with Mexican children state that rickets does not exist among them. The examining physician for the present group found that only 15 per cent showed no evidence of rickets, while 66 per cent showed at least two signs of this disorder. However, since bow-legs, knock-knees, and flat feet are not considered as definitely indicative of rickets, it may be pointed out that about 19 per cent of the group showed signs of rickets other than these abnormalities. Only 7 per cent of the American children admitted to the University Nursery School showed definite signs of rickets.

Surveying the tables for differences in age groups, it will be found that the percentages of underweight in the four to five-year-old group is 42, while for the younger groups it is about 25. This accords with our finding that the diet of the older children is more deficient than that of the younger. Moreover, there is an increased number of poor postures in the older group, more decayed teeth, and more signs of rickets. In general physical condition, 58 per cent of the two-to-three-year group, 38 per cent of the three-to-four-year group, and 24 per cent of the four-to-five-year-old group were marked "good." The number of

[9]Quoted from McCollum and Simmonds, *Newer Knowledge of Nutrition.* Fourth Edition. 1929.

children in "good" physical condition decreases alarmingly in the older group. Not a great deal of difference is apparent in the figures on boys and girls. Boys, apparently, are more subject to rickets than girls, as 9.5 per cent of the boys and 21.3 per cent of the girls showed no signs.

It is to be regretted that figures for American and Negro children of like age are not available. From observation and from conversations with physicians and nurses it would seem that the Mexican pre-school child is not markedly inferior physically to the American pre-school child. The death rate of Mexican children under two years of age is exceedingly high, and it may be that only the sturdiest survive, while the weaker American children are not so apt to die early in life but do bring down the general average of the physical condition of the pre-school children. Comparative statistics, however, are needed to prove or disprove this idea. It is generally conceded that Mexican children have a lower resistance than American children to infections, particularly of the respiratory type. It must be admitted, also, that they are considerably more exposed to infections of every type, so that it is impossible to know to what extent this lowered resistance is due to diet alone.

TABLE XII

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN—95 BOYS, 103 GIRLS
(Results in percentage)

Weight

	Normal	7 Per Cent or More Underweight	10 Per Cent or More Underweight	7 Per Cent or More Overweight
Boys	53.2	35.1	15.9	11.7
Girls	64.3	30.6	9.9	4.9
Total	58.9	32.8	12.8	8.2

Expression

	Alert	Fatigued	Slight Circles	Marked Circles
Boys	88.4	11.6	60.0	25.2
Girls	88.3	11.6	52.4	34.9
Total	88.3	12.1	56.1	30.3

TABLE XII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN—95 BOYS, 103 GIRLS

Posture

	Protruding Shoulders	Exaggerated Spinal Curves	Protruding Abdomen	Flat Feet	Forward Head
Boys	62.1	31.5	86.3	32.6	81.1
Girls	66.0	32.0	77.6	29.1	79.6
Total	64.6	31.8	81.8	30.8	80.3

Posture

	Excellent	Good	Poor	Bad
Boys	0	55.8	41.1	3.1
Girls	0	57.2	37.8	4.8
Total	0	57.0	39.4	4.0

Tonsils

	Hypertrophied	Inflamed	Cervical Glands Palpable
Boys	83.2	18.9	89.5
Girls	91.2	24.2	85.4
Total	87.3	21.7	87.3

Teeth

	Decayed	Poor Occlusion
Boys	34.7	12.6
Girls	47.5	9.7
Total	41.4	11.1

Flesh

	Muscle Tone			Amount of Fat		
	Good	Fair	Flabby	Sufficient	Little	Much
Boys	12.6	68.4	18.9	74.8	24.2	1.0
Girls	14.5	55.3	30.1	72.8	26.2	.9
Total	13.6	61.6	24.7	74.2	25.2	1.0

	Skin		Special Senses	
	Good	Anemic	Nose Discharge	Eye Discharge
Boys	91.7	8.4	42.1	3.2
Girls	93.2	6.8	40.8	3.8
Total	92.9	7.5	41.4	3.5

Signs of Rickets

	Knock-Knees	Bow-Legs	Enlarged Wrists	Enlarged Ankles	Harrison's Groove	Depressed Ensiform	Bosses
Boys	65.3	4.2	14.7	4.2	32.6	43.1	14.7
Girls	48.5	2.9	22.3	.9	21.3	33.0	6.8
Total	56.5	3.5	18.7	2.5	26.8	37.9	10.6

Signs of Rickets

	No Sign	One Sign	Two Signs	Three Signs	Four Signs
Boys	9.5	27.4	36.8	23.1	3.2
Girls	21.3	34.9	27.1	16.5	.9
Total	15.6	31.3	32.3	19.6	2.0

TABLE XII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN—95 BOYS, 103 GIRLS

Habits

	Too Much Crying	Too Little Sleep	Poor Appetite	Irregular Bowel Movement
Boys	26.3	13.7	20.0	11.5
Girls	25.2	8.7	18.4	13.6
Total	25.7	11.1	19.1	12.6

General Physical Condition

	Excellent	Good	Fair	Poor
Boys	1.1	33.7	44.2	21.1
Girls	1.9	42.7	25.2	30.1
Total	1.5	38.2	34.8	25.7

TABLE XIII

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

(Results in percentage)

Two-to-Three-Year Group—29 Boys, 28 Girls

Weight

	Normal	7 Per Cent or More Under-weight	10 Per Cent or More Under-weight	7 Per Cent or More Over-weight
Boys	51.7	27.6	20.7	20.7
Girls	64.3	32.1	7.1	3.6
Total	57.9	29.8	14.1	12.3

Expression

	Alert	Fatigued	Slight Circles	Marked Circles
Boys	86.2	13.8	65.5	17.2
Girls	92.8	7.2	57.1	32.1
Total	89.5	10.5	61.4	24.5

Posture

	Protruding Shoulders	Exaggerated Spinal Curves	Protruding Abdomen	Flat Feet	Forward Head
Boys	34.5	17.2	82.8	51.7	79.3
Girls	39.3	32.1	92.8	32.1	75.0
Total	36.8	24.5	87.7	42.1	77.2

Posture

	Excellent	Good	Poor	Bad
Boys	0	79.4	17.2	3.4
Girls	0	60.7	35.7	3.6
Total	0	70.2	26.3	3.5

Tonsils

	Hypertrophied	Inflamed	Cervical Glands Palpable
Boys	82.8	6.9	79.3
Girls	82.1	14.2	75.0
Total	82.5	10.5	77.2

TABLE XIII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

Teeth

	Decayed	Poor Occlusion
Boys	20.7	6.9
Girls	10.7	7.1
Total	15.8	7.0

Flesh

	Muscle Tone			Amount of Fat		
	Good	Fair	Flabby	Sufficient	Too Little	Too Much
Boys	10.3	75.9	13.8	79.4	17.2	3.4
Girls	21.4	42.8	35.7	64.3	32.1	3.6
Total	15.8	59.6	24.6	71.9	24.6	3.5

	Skin		Special Senses	
	Good	Anemic	Nose Discharge	Eye Discharge
Boys	93.1	6.9	48.3	6.9
Girls	92.8	7.2	57.1	3.6
Total	93.0	7.0	52.6	5.3

Signs of Rickets

	Knock-Knees	Bow-Legs	Enlarged Wrists	Enlarged Ankles	Harrison's Groove	Depressed Ensiform	Bosses
Boys	62.1	6.9	31.0	13.8	34.5	31.0	10.3
Girls	39.3	0	25.0	0	25	21.4	17.8
Total	50.9	3.5	28.1	7.0	29.8	26.3	14.1

Signs of Rickets

	No Sign	One Sign	Two Signs	Three Signs	Four Signs
Boys	20.7	17.2	34.6	24.1	3.4
Girls	28.5	28.5	35.9	7.1	0
Total	24.6	22.8	35.0	15.8	1.8

Habits

	Too Much Crying	Too Little Sleep	Poor Appetite	Irregular Bowel Movement
Boys	31.0	10.3	10.3	3.4
Girls	28.5	14.3	10.7	10.7
Total	29.8	12.2	10.5	7.0

General Physical Condition

	Excellent	Good	Fair	Poor
Boys	0	48.3	44.8	6.9
Girls	3.6	64.3	10.7	21.4
Total	1.7	56.3	28.0	14.0

TABLE XIII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

Three-to-Four-Year Group—34 Boys, 29 Girls

Weight

	Normal	7 Per Cent or More Under-weight	10 Per Cent or More Under-weight	7 Per Cent or More Over-weight
Boys	60.6	27.2	9.1	12.1
Girls	75.8	20.8	13.8	3.4
Total	67.7	24.2	11.3	8.1

Expression

	Alert	Fatigued	Slight Circles	Marked Circles
Boys	82.4	17.6	52.9	32.3
Girls	93.1	6.9	37.9	48.3
Total	87.3	12.7	46.0	39.6

Posture

	Protruding Shoulders	Exaggerated Spinal Curves	Protruding Abdomen	Flat Feet	Forward Head
Boys	55.8	29.4	91.2	32.3	79.4
Girls	62.1	24.1	93.1	34.5	82.8
Total	58.7	26.9	92.1	33.3	80.9

Posture

	Excellent	Good	Poor	Bad
Boys	0	47.1	50.0	2.9
Girls	0	62.1	37.9	0
Total	0	53.9	44.4	1.6

Tonsils

	Hypertrophied	Inflamed	Cervical Glands Palpable
Boys	79.4	23.5	91.1
Girls	86.2	24.1	89.6
Total	82.5	23.8	90.5

Teeth

	Decayed	Poor Occlusion
Boys	26.4	8.8
Girls	48.3	3.4
Total	36.5	6.3

Flesh

	Muscle Tone			Amount of Fat		
	Good	Fair	Flabby	Sufficient	Too Little	Too Much
Boys	8.8	70.6	20.6	88.2	11.7	0
Girls	10.3	62.1	27.6	75.8	24.1	0
Total	9.5	66.7	23.8	82.5	17.4	0

TABLE XIII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

	Skin		Special Senses	
	Good	Anemic	Nose Discharge	Eye Discharge
Boys	91.1	8.8	44.1	2.1
Girls	86.2	13.8	34.5	3.4
Total	88.9	11.1	39.7	3.2

Signs of Rickets

	Knock-Knees	Bow-Legs	Enlarged Wrists	Enlarged Ankles	Harrison's Groove	Depressed Ensiform	Bosses
Boys	70.6	2.9	8.8	0	41.2	29.4	14.7
Girls	62.1	3.4	31.0	3.4	17.2	37.9	0
Total	66.7	3.2	19.1	1.6	30.1	33.3	7.9

Signs of Rickets

	No Sign	One Sign	Two Signs	Three Signs	Four Signs
Boys	8.8	32.3	41.2	11.7	5.8
Girls	17.2	31.0	24.1	24.1	3.4
Total	12.7	31.7	33.3	17.4	4.8

Habits

	Too Much Crying	Too Little Sleep	Poor Appetite	Irregular Bowel Movement
Boys	29.4	11.7	14.7	17.6
Girls	20.6	6.9	24.1	20.7
Total	25.4	9.5	19.0	19.0

General Physical Condition

	Excellent	Good	Fair	Poor
Boys	2.9	32.3	44.1	20.6
Girls	0	44.8	31.0	24.1
Total	1.6	38.0	38.0	22.2

Four-to-Five-Year Group—32 Boys, 46 Girls

Weight

	Normal	7 Per Cent or More Underweight	10 Per Cent or More Underweight	7 Per Cent or More Overweight
Boys	46.9	50.0	18.8	3.1
Girls	56.8	36.3	9.0	6.8
Total	52.6	42.1	13.2	5.3

Expression

	Alert	Fatigued	Slight Circles	Marked Circles
Boys	93.8	6.3	62.5	25.0
Girls	82.6	17.4	58.7	28.3
Total	87.2	12.8	60.3	26.9

TABLE XIII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

Posture

	Protruding Shoulders	Exaggerated Spinal Curves	Protruding Abdomen	Flat Feet	Forward Head
Boys	93.8	46.9	84.5	15.6	84.4
Girls	86.9	37.0	89.1	23.9	80.4
Total	89.7	41.1	87.2	20.5	82.0

Posture

	Excellent	Good	Poor	Bad
Boys	0	43.8	53.1	3.1
Girls	0	52.2	39.1	8.7
Total	0	48.7	44.8	6.4

Tonsils

	Hypertrophied	Inflamed	Cervical Glands Palpable
Boys	87.5	25.0	97.9
Girls	100.0	30.4	89.1
Total	94.8	28.2	92.3

Teeth

	Decayed	Poor Occlusion
Boys	56.2	21.9
Girls	69.6	15.2
Total	64.1	17.9

Flesh

	Muscle Tone			Amount of Fat		
	Good	Fair	Flabby	Sufficient	Too Little	Too Much
Boys	18.8	59.4	21.9	56.2	43.8	0
Girls	13.0	58.7	28.3	76.1	23.9	0
Total	15.4	58.9	25.6	67.9	32.1	0

	Skin		Special Senses	
	Good	Anemic	Nose Discharge	Eye Discharge
Boys	90.6	9.3	34.4	0
Girls	97.8	2.2	34.8	4.3
Total	94.8	5.1	34.6	2.5

Signs of Rickets

	Knock-Knees	Bow-Legs	Enlarged Wrists	Enlarged Ankles	Harrison's Groove	Depressed Ensiform	Bosses
Boys	62.5	3.1	6.3	0	21.9	68.8	18.8
Girls	45.7	4.3	15.2	0	21.7	37.0	4.3
Total	52.6	3.8	11.5	0	21.8	50.0	10.3

TABLE XIII—(Continued)

SUMMARY OF PHYSICAL EXAMINATION FINDINGS OF A GROUP OF MEXICAN PRE-SCHOOL CHILDREN

Signs of Rickets

	No Sign	One Sign	Two Signs	Three Signs	Four Signs
Boys	0	31.3	34.4	34.4	0
Girls	19.6	41.3	21.7	17.4	0
Total	11.5	37.2	26.9	24.3	0

Habits

	Too Much Crying	Too Little Sleep	Poor Appetite	Irregular Bowel Movement
Boys	18.8	18.8	34.4	12.5
Girls	26.1	6.5	19.6	10.9
Total	23.1	11.5	25.6	11.5

General Physical Condition

	Excellent	Good	Fair	Poor
Boys	0	18.8	46.9	34.4
Girls	2.2	28.3	30.4	39.1
Total	1.3	24.3	37.2	37.2

TABLE XIV

Average Daily Intake of Seventy-five Mexican Pre-School Children

Two-year Boys

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A2	2–0	27	32.5	1,477	52.06	1.0850	2.1761	.00809
A3	2–0	34	34.0	1,231	32.65	.6597	.7801	.00505
A5	2–1	30	34.5	841	30.10	.8407	.7710	.00787
A6	2–2	25	32.0	1,357	34.04	.3456	1.0435	.00658
A7	2–2	33	34.0	1,048	41.15	.6250	.7889	.00482
A9	2–10	29	32.5	1,457	42.21	.8264	.9347	.00556
Average	.....	29.7	33.2	1,235	38.70	.7304	1.0824	.00633
San Antonio—								
SA1	2–2	25	30.5	974	32.46	.6538	.8304	.00398
SA3	2–4	26	31.0	1,096	37.78	.7886	.8727	.00449
SA4	2–4	29	35.0	785	29.93	.6730	.8761	.00334
SA5	2–5	28	34.0	795	26.37	.3188	.6371	.00343
SA6	2–5	32	30.0	1,175	37.34	.5439	1.6796	.00506
SA7	2–6	30	34.0	584	24.33	.4053	.6220	.00437
SA8	2–6	35	33.0	780	25.58	.2529	.4866	.00368
SA10	2–9	30	33.0	1,118	34.43	.5899	.8099	.00484
SA11	2–10	33	36.0	907	38.13	.7271	.9247	.00569
Average	.....	29.8	32.9	913	31.82	.5504	.8599	.00432
Total—15 cases, average	.....	29.7	33.0	1,041	34.57	.6224	.9489	.00512

TABLE XIV—(Continued)

AVERAGE DAILY INTAKE OF SEVENTY-FIVE MEXICAN PRE-SCHOOL CHILDREN

Two-year Girls

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A1	2-0	26	34.5	842	34.19	.5480	.7863	.00504
A4	2-1	28	32.0	1,313	43.90	.5550	1.9827	.00872
A8	2-5	20	33.5	822	26.96	.6684	.6726	.00326
Average	.....	24.7	33.3	992	35.01	.5905	1.1472	.00567
San Antonio—								
SA2	2-2	25	31.0	518	21.33	.4056	.5806	.00284
SA9	2-7	30	36.0	842	31.18	.4228	.9344	.00416
Average	.....	27.5	33.5	680	26.25	.4142	.7575	.00350
Total—5 cases, average	.....	25.8	33.4	867	31.51	.5199	.9913	.00480

TABLE XIV—(Continued)

AVERAGE DAILY INTAKE OF SEVENTY-FIVE MEXICAN PRE-SCHOOL CHILDREN

Three-year Boys

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A12	3–6	36	40.0	855	29.32	.8310	.7541	.00861
A14	3–10	36	39.5	1,581	39.00	.3739	1.1761	.00790
A16	3–11	30	37.5	831	29.67	.6104	.6198	.00367
Average	.....	34	39.0	1,089	32.66	.6051	.8500	.00673
San Antonio—								
SA12	3–3	25	34.0	1,100	39.08	.7836	.9309	.00526
SA13	3–4	36	36.0	988	37.51	.4528	.7227	.00529
Average	.....	30.5	35.0	1,044	38.29	.6132	.8268	.00528
Total—5 cases, average	.....	32.6	37.4	1,071	34.91	.6103	.8407	.00615

TABLE XIV—(Continued)

AVERAGE DAILY INTAKE OF SEVENTY-FIVE MEXICAN PRE-SCHOOL CHILDREN

Three-year Girls

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A10	3–0	25	33.25	1,119	40.85	.5270	1.9679	.00752
A11	3–2	30	33.50	928	36.85	.3274	.7738	.00444
A13	3–10	30	36.50	1,106	30.28	.3696	.6485	.00417
A15	3–11	27	35.00	1,043	40.64	.4405	.7593	.00532
Average	.....	28	34.50	1,049	37.15	.4161	1.0374	.00536
San Antonio—								
SA14	3–6	35	34.00	1,418	52.44	.8875	1.1389	.00622
SA15	3–6	40	39.00	825	24.09	.3181	.5526	.00352
SA16	3–7	32	34.00	888	32.28	.6405	.8233	.00416
SA17	3–8	26	34.50	1,075	32.02	.3707	.8270	.00432
SA18	3–8	33	34.00	667	26.05	.3839	.6594	.00339
SA19	3–10	33	36.00	1,449	51.28	1.1913	1.3179	.00647
SA20	3–10	32	32.50	804	26.45	.4655	.8339	.00317
SA21	3–11	32	38.00	1,183	44.09	.4144	1.1351	.00596
Average	.....	33	35.2	1,038	36.09	.5840	.9110	.00465
Total—12 cases, average	.....	31.2	35.0	1,042	36.44	.5280	.9531	.00489

TABLE XIV—(Continued)

AVERAGE DAILY INTAKE OF SEVENTY-FIVE MEXICAN PRE-SCHOOL CHILDREN

Four-year Boys

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A21	4–3	35	40.0	1,075	33.19	.5733	1.0118	.00621
A22	4–3	36	40.0	1,300	35.42	.3745	1.0772	.00665
A23	4–4	33	39.0	602	14.80	.1669	.4168	.00220
A25	4–6	40	43.5	1,305	57.72	.7459	.9954	.01021
Average	.....	36	40.6	1,070	35.28	.4651	.8753	.00632
San Antonio—								
SA23	4–1	33	36.0	1,414	49.36	.6481	.9869	.00633
SA27	4–2	38	38.5	842	27.99	.3670	.6603	.00404
SA28	4–3	35	39.0	1,082	44.52	.5443	1.0424	.00672
SA31	4–3	33	37.0	1,085	36.20	.4134	.8588	.00498
SA34	4–6	39	40.0	1,115	35.40	.7002	.8681	.00421
SA35	4–6	37	38.0	731	29.72	.3882	.6808	.00375
SA36	4–6	40	39.0	939	35.42	.2412	.6892	.00518
SA37	4–6	38	39.0	844	36.06	.3506	.7377	.00512
SA39	4–8	39	37.0	945	41.63	.6628	.9279	.00369
SA40	4–8	37	37.5	1,086	35.68	.5876	.8428	.00553
SA41	4–8	38	36.0	985	33.86	.3746	.6952	.00420
SA44	4–11	33	45.0	1,013	39 87	.6222	.9125	.00475
SA45	4–11	40	39.5	896	28.50	.3691	.6082	.00422
SA49	4–11	45	45.0	1,317	42.57	.3729	1.1296	.00437
SA50	5–0	50	42.0	1,531	50.91	.7483	1.0270	.00980
Average	.....	38.3	39.0	1,055	37.84	.4927	.8445	.00512
Total—19 cases, average	.....	37.8	39.5	1,058	37.30	.4868	.8509	.00538

TABLE XIV—(Continued)

AVERAGE DAILY INTAKE OF SEVENTY-FIVE MEXICAN PRE-SCHOOL CHILDREN

Four-year Girls

	Age Years and Months	Weight, Pounds	Height, Inches	Calories	Protein, Grams	Calcium, Grams	Phosphorus, Grams	Iron, Grams
Austin—								
A17	4–0	32	39.25	1,412	48.99	.9968	1.4024	.00644
A18	4–0	39	42.00	1,151	47.76	.8082	.9392	.00554
A19	4–1	30	39.50	1,233	35.05	.6241	.7631	.00486
A20	4–2	31	36.50	877	23.07	.1763	.6748	.00410
A24	4–6	36	42.00	894	36.94	.5749	.8000	.00533
Average	———	33.6	39.80	1,113	38.36	.6360	.9159	.00525
San Antonio—								
SA22	4–0	34	34.00	759	27.84	.5971	.6980	.00286
SA24	4–1	40	40.00	795	38.11	.3455	.8853	.00593
SA25	4–2	38	39.00	699	32.81	.3188	.9109	.00421
SA26	4–2	35	38.50	885	31.92	.3979	.7198	.00491
SA29	4–3	49	39.00	612	20.74	.4084	.4849	.00226
SA30	4–3	56	44.00	1,042	40.33	.8645	1.0048	.00398
SA32	4–4	40	39.00	903	38.93	.7305	.9174	.00621
SA33	4–5	51	40.00	519	17.79	.2580	.3426	.00266
SA38	4–8	36	40.00	721	24.76	.4880	.8145	.00273
SA42	4–9	36	40.00	912	31.61	.4655	.6845	.00413
SA43	4–11	30	36.25	474	18.63	.2189	.4102	.00279
SA46	4–11	35	38.00	754	28.05	.3595	.5403	.00411
SA47	4–11	39	40.00	1,077	39.81	.5340	.8173	.00547
SA48	4–11	42	43.00	664	25.35	.5134	.5541	.00385
Average	———	40	39.30	772	29.05	.4643	.6917	.00401
Total—19 cases, average	———	38.3	39.4	862	32.02	.5095	.7560	.00434

TABLE XV

Percentage Deviation from Standards in Diet of Mexican Pre-School Children

Two-year Boys

	Age Years and Months	Protein 10–15 Per Cent of Calorie Intake Standard	Protein 2–3 Grams Per Kilo Standard	Calories Holt and Fales Standard	Calories Gillett Standard	Minerals Calcium, Grams	Minerals Phosphorus, Grams	Iron, Grams
Austin—								
A2	2–0	+27	+47	+35.0	−13.0	+ 8	+117	+48
A3	2–0	Within	Within	+ 8.5	Within	−34	− 22	−10
A5	2–1	Within	Within	−22.0	−15.0	−16	− 23	+44
A6	2–2	Within	Within	+29.0	− 4.3	−66	+ 4	+25
A7	2–2	Within	+11	− 7.5	Within	−38	− 22	−15
A9	2–10	+ 3.2	+15	+33.0	−12.0	−18	− 7	+ 1.8
San Antonio—								
SA1	2–2	Within	+ 3.2	+ .8	− 2.6	−35	− 17	−17
SA3	2–4	Within	+12.0	+ 8.7	Within	−22	− 13	−10
SA4	2–4	Within	Within	−35.0	−21.0	−33	− 13	−45
SA5	2–5	− 7.3	Within	−29.0	−20.0	−69	− 37	−39
SA6	2–5	+ 7.8	+24.0	+27.0	Within	−46	+ 67	+ 9.5
SA7	2–6	−14.0	Within	−48.0	−41.0	−60	− 38	−22
SA8	2–6	− 6.5	Within	−28.0	−22.0	−75	− 52	−32
SA10	2–9	Within	Within	+ 2.3	Within	−42	− 20	−11
SA11	2–10	Within	Within	−30.0	− 9.3	−28	− 8	−12

TABLE XV—(Continued)

PERCENTAGE DEVIATION FROM STANDARDS IN DIET OF MEXICAN PRE-SCHOOL CHILDREN

Three-year Boys

	Age Years and Months	Protein: 10–15 Per Cent of Calorie Intake Standard	Protein: 2–3 Grams Per Kilo Standard	Calories: Holt and Fales Standard	Calories: Gillett Standard	Minerals: Calcium, Grams	Minerals: Phosphorus, Grams	Minerals: Iron, Grams
Austin—								
A12	3–6	−18	−10	−40.0	−22	−17	− 25	+19.0
A14	3–10	Within	Within	+ 9.7	+12	−63	+ 17	+ 9.7
A16	3–11	−12	− 1	−37.0	−24	−39	− 39	−44.0
San Antonio—								
SA12	3–3	Within	+ 6.2	+ 1.8	Within	−22	− 7	− 2.5
SA13	3–4	Within	Within	−20.0	−11	−55	− 28	−15.0

TABLE XV—(Continued)

PERCENTAGE DEVIATION FROM STANDARDS IN DIET OF MEXICAN PRE-SCHOOL CHILDREN

Four-year Boys

	Age Years and Months	Protein: 10–15 Per Cent of Calorie Intake Standard	Protein: 2–3 Grams Per Kilo Standard	Calories: Holt and Fales Standard	Calories: Gillett Standard	Minerals: Calcium, Grams	Minerals: Phosphorus, Grams	Minerals: Iron, Grams
Austin—								
A21	4–3	− 3.2	Within	−21.0	−10	−43	+ 1	− 9.2
A22	4–3	Within	Within	− 4.9	Within	−63	+ 7	− 2.7
A23	4–4	−55.0	−53	−54.0	−49	−84	− 59	−66.0
A25	4–6	Within	+ 3.4	−16.0	Within	−26	− 1	+31.0
San Antonio—								
SA23	4–1	+11	+17.0	+20.0	Within	−36	− 2	+ 7.4
SA27	4–2	−10	− 6.6	−32.0	−29.0	−64	− 34	−35.0
SA28	4–3	Within	Within	−18.0	− 9.8	−46	+ 4	+ 1.05
SA31	4–3	Within	Within	−10.0	− 9.5	−59	− 15	−18.0
SA34	4–6	Within	Within	−18.0	− 7.0	−30	− 14	−38.0
SA35	4–6	−5.1	Within	−41.0	−39.0	−62	− 32	−40.0
SA36	4–6	Within	Within	−28.0	−21.0	−76	− 32	−22.0
SA37	4–6	Within	Within	−36.0	−29.0	−65	− 27	−23.0
SA39	4–8	Within	Within	−22.0	−21.0	−34	− 8	−39.0
SA40	4–8	Within	Within	−13.0	− 9.5	−42	− 16	−11.8
SA41	4–8	Within	Within	−16.0	−17.0	−63	− 31	−28.0
SA44	4–11	− 6.7	− 2.4	−40.0	−15.0	−38	− 9	−44.0
SA45	4–11	−16.0	− 9.8	−32.0	−25.0	−64	− 40	−36.0
SA49	4–12	Within	Within	−22.0	Within	−63	+ 12	−48.0
SA50	4–12	Within	Within	+ 3.3	+ 2.0	−26	+ 2	+24.0

TABLE XV—(Continued)

PERCENTAGE DEVIATION FROM STANDARDS IN DIET OF MEXICAN PRE-SCHOOL CHILDREN

Two-year Girls

	Age Years and Months	Protein: 10–15 Per Cent of Calorie Intake Standard	Protein: 2–3 Grams Per Kilo Standard	Calories: Holt and Fales Standard	Calories: Gillett Standard	Minerals: Calcium, Grams	Minerals: Phosphorus, Grams	Minerals: Iron, Grams
Austin—								
A1	2-0	Within	Within	−32.0	−14.0	−46	− 22	−19.0
A4	2-1	+13.0	+34	+27.0	+ 2.5	−45	+ 98	+69.0
A8	2-5	− 3.0	Within	−26.0	−16.0	−34	− 33	−40.0
San Antonio—								
SA2	2-2	−13.0	Within	−47.0	−47.0	−60	− 42	−42.0
SA9	2-7	− 3.4	Within	−34.0	−14.0	−58	− 7	−35.0

TABLE XV—(Continued)

PERCENTAGE DEVIATION FROM STANDARDS IN DIET OF MEXICAN PRE-SCHOOL CHILDREN

Three-year Girls

	Age Years and Months	Protein: 10–15 Per Cent of Calorie Intake Standard	Protein: 2–3 Grams Per Kilo Standard	Calories: Holt and Fales Standard	Calories: Gillett Standard	Minerals: Calcium, Grams	Minerals: Phosphorus, Grams	Minerals: Iron, Grams
Austin—								
A10	3–0	+ 4.6	+15.0	+ 7.5	Within	−48	+ 96	+44
A11	3–2	Within	Within	−14.0	−12.0	−68	− 23	−17
A13	3–10	− 2.5	Within	−10.0	Within	−64	− 36	−32
A15	3–11	Within	+ .3	−10.0	− 1.6	−56	− 25	−8.2
San Antonio—								
SA14	3–6	+29.0	+42.0	+31.0	+ 4.2	−12	+ 13	+15
SA15	3–6	−29.0	−22.0	−39.0	−22.0	−69	− 45	−48
SA16	3–7	Within	Within	−17.0	−16.0	−36	− 18	−22
SA17	3–8	Within	Within	− 7.3	Within	−63	− 18	−25
SA18	3–9	− 6.9	Within	−40.0	−37.0	−62	− 35	−29
SA19	3–10	+13.0	+25.0	+29.0	+ 6.5	+19	+ 31	+ 7.8
SA20	3–10	Within	Within	−25.0	−24.0	−54	− 17	−41
SA21	3–11	Within	Within	−10.0	Within	−59	+ 13	− 9.6

TABLE XV—(Continued)

PERCENTAGE DEVIATION FROM STANDARDS IN DIET OF MEXICAN PRE-SCHOOL CHILDREN

Four-year Girls

	Age Years and Months	Protein: 10–15 Per Cent of Calorie Intake Standard	Protein: 2–3 Grams Per Kilo Standard	Calories: Holt and Fales Standard	Calories: Gillett Standard	Minerals: Calcium, Grams	Minerals: Phosphorus, Grams	Minerals: Iron, Grams
Austin—								
A17	4–0	Within	Within	+ 6.0	Within	− 1	+ 40	− 3.3
A18	4–0	Within	Within	−20.0	Within	−20	− 7	−22.0
A19	4–1	Within	Within	− 7.4	Within	−38	− 24	−27.0
A20	4–2	−19	−17	−23.0	−23	−83	− 33	−28.0
A24	4–6	Within	Within	−19.0	−21	−43	− 20	− 3.9
San Antonio—								
SA22	4–0	Within	Within	−26.0	−33	−41	− 31	−44.0
SA24	4–1	Within	Within	−40.0	−30	−66	− 12	−10.0
SA25	4–2	Within	Within	−44.0	−38	−69	− 9	−33.0
SA26	4–2	Within	Within	−27.0	−22	−61	− 29	−19.0
SA29	4–3	−34	−32	−51.0	−46	−60	− 52	−64.0
SA30	4–3	Within	Within	−31.0	− 8.5	−14	+ 0.48	−47.0
SA32	4–4	Within	Within	−28.0	−20	−27	− 9	− 1.2
SA33	4–5	−47	−45	−61.0	−54	−75	− 66	−60.0
SA38	4–8	−27	−24	−45.0	−36	−52	− 19	−59.0
SA42	4–9	Within	Within	−31.0	−20	−54	− 32	−37.0
SA43	4–11	−34	−33	−58.0	−58	−79	− 59	−51.0
SA46	4–11	− 8.1	− 6.3	−38.0	−33	−65	− 46	−30.9
SA47	4–11	Within	Within	−19.0	− 5.5	−47	− 19	−17.0
SA48	4–11	−31	−30	−55.0	−41	−49	− 45	−47.0

TABLE XVI

Deviation from Standard Weight of Mexican Pre-School Children—Group of 198

Two-year Girls

Age	Height	Weight, Pounds	Standard Weight, Pounds	Variation Percentage
32 months	33.3	26	25	+ 4
32 months	33.3	32.2	25	+ 28.8
24 months	31.7	23.7	24	± 0
32 months	31.7	22	24	— 8.3
34 months	32	23	25	— 8
26 months	31	22	23	— 4.3
26 months	33.5	23.2	25	— 7.2
26 months	33.8	24	26	— 7.6
31 months	33.2	24	25	— 4
30 months	32.4	22.2	24	— 7.5
27 months	33.1	25	25	± 0
28 months	31.6	22.4	23	± 0
32 months	35.8	25.8	30	— 14
33 months	33.7	26.6	26	± 0
24 months	32.2	24.8	24	± 0
33 months	33.5	25.5	26	± 0
33 months	36.2	30.2	30	± 0
31 months	32.7	24.2	25	± 0
26 months	34	26.2	26	± 0
26 months	32.5	25.2	24	+ 5
27 months	32.9	24.5	25	± 0
24 months	30	21.5	21	± 0
33 months	35	26.5	29	— 8.6
30 months	32.4	20	24	— 16.6
30 months	33.2	23.5	25	— 6
30 months	32.8	24.6	25	± 0
31 months	30.7	20.7	23	— 10

Three to Four-year Girls

44 months	36.8	25.5	30	— 15
45 months	38.1	35	33	+ 6
38 months	36.7	28.1	31	— 9.4
46 months	39.5	30.2	34	— 11.1
36 months	38.2	34.3	33	+ 4
45 months	37.2	32	31	+ 3.2
41 months	35	28	29	— 3.8
42 months	36.4	27	30	— 10
36 months	36.5	28	30	— 6.6
40 months	36	28	30	— 6.6
36 months	32.2	24.5	25	± 0
45 months	37.8	32.7	33	± 0
47 months	36.4	26.1	30	— 13
38 months	32	22	25	— 12
46 months	38.5	32.5	33	± 0
42 months	35.5	30.7	29	+ 6
36 months	32.9	24.2	25	± 0
39 months	34.4	26.6	27	± 0
42 months	38.2	31	33	— 6
45 months	37.5	33	31	— 6.4
37 months	35.2	29.2	29	± 0

TABLE XVI—(Continued)

DEVIATION FROM STANDARD WEIGHT OF MEXICAN PRE-SCHOOL CHILDREN—GROUP OF 198

Age	Height	Weight, Pounds	Standard Weight, Pounds	Variation Percentage
42 months	34	29.2	27	+ 8.1
45 months	36.4	30.5	30	± 0
42 months	38	31.3	33	± 0
45 months	38.4	32.2	33	± 0
44 months	35.6	28.2	29	± 0
43 months	36.3	29.2	30	± 0
Four to Five-year Girls				
48 months	36.5	28	30	— 6.6
56 months	39.5	33.8	34	± 0
50 months	37	28	31	— 9.6
60 months	42.3	35.1	39	—10
49 months	40.2	32	36	—11.1
57 months	35.8	28.5	31	— 8
54 months	36	28	31	— 9.6
49 months	35.5	29.5	29	± 0
51 months	38	30.7	33	— 7
48 months	35.5	27.5	29	— 5.1
53 months	37	35	31	+13
57 months	40.8	35.1	37	— 5.1
54 months	38.3	28.1	33	—11.8
56 months	35.3	28.5	29	± 0
54 months	40.5	36.2	36	± 0
60 months	38.7	32	34	— 6
50 months	39.5	32.5	34	— 4.1
54 months	40.5	33.5	36	— 7
55 months	36.5	.....	.....	.....
50 months	40.7	33.7	37	— 9
54 months	40.7	34.4	37	— 7
49 months	37.7	33.3	33	± 0
59 months	41.7	43.6	39	+11.7
50 months	.....	.....	.....	.....
53 months	39	31	36	—14
50 months	37.5	31.7	31	± 0
Two to Three-year Boys				
24 months	30.7	24.8	23	+ 7.8
24 months	33	27.5	26	+ 5.7
28 months	31.6	22.8	24	— 5
31 months	35.2	31.7	29	+ 9.3
24 months	32.2	22.2	25	—11.2
29 months	31.1	22.6	25	— 9.6
31 months	35.4	31.7	29	+ 9.3
30 months	34.6	27	27	± 0
33 months	34.5	29	27	+ 7.4
29 months	34.7	26.7	27	± 0
30 months	32.7	27.1	26	+ 4.2
33 months	33.2	22.3	26	—14.2
33 months	34.8	29	35	—17.1
30 months	34	27	27	± 0
33 months	34	26	27	— 3.7

TABLE XVI—(Continued)

DEVIATION FROM STANDARD WEIGHT OF MEXICAN PRE-SCHOOL CHILDREN—GROUP OF 198

Age	Height	Weight, Pounds	Standard Weight, Pounds	Variation Percentage
25 months	32	21.5	25	— 14
30 months	34	26.7	27	± 0
27 months	32.8	.....	.....	.....
29 months	36.5	31	31	± 0
31 months	41	28.5	38	— 25
34 months	33.5	25.5	26	± 0
31 months	35.8	29	31	— 6.4
32 months	30.5	20.5	22	— 6.8
30 months	33.7	24.6	27	— 8.8
33 months	34.5	28.5	27	+ 5.5
25 months	33.4	28	26	+ 7.6
27 months	36.2	32	31	+ 3.2
Three to Four-year Boys				
37 months	34.7	26.2	29	— 9.5
38 months	40	32.1	36	— 10.8
43 months	37.5	32.7	32	± 0
45 months	36.5	31.5	31	± 0
42 months	32.5	23.5	24	± 0
46 months	38.5	30.5	33	— 7.5
39 months	32.8	23.5	26	— 9.6
43 months	34.8	29	29	± 0
47 months	36.5	33.5	31	+ 8
36 months	31.7	23.7	25	— 5.2
42 months	39.5	35	35	± 0
45 months	39.5	35.7	35	± 0
36 months	35.2	31.5	29	+ 8.6
36 months	40	39.5	36	+ 9.7
36 months	34.5	29.2	27	+ 8.1
44 months	38.5	33.2	33	± 0
45 months	36	30.7	31	± 0
41 months	38.2	32.5	33	± 0
38 months	36.2	30.7	31	± 0
38 months	37.5	34	32	+ 6.2
37 months	36	28.2	31	— 9
36 months	35	29.5	29	± 0
45 months	36.5	33.1	31	+ 6.8
43 months	35.8	26.5	32	— 17.1
43 months	37.5	28.5	32	— 10.9
36 months	34	27.1	27	± .0
Four to Five-year Boys				
53 months	35.7	28.7	31	— 7.4
60 months	41.8	33.7	39	— 13.5
48 months	38.8	32.5	35	— 7.1
57 months	36.5	30	31	— 3.2
50 months	36.4	28.2	31	— 9
57 months	39.2	29	35	— 17.1
54 months	41	33	38	— 13.1
55 months	37.7	28.3	34	— 16.7
52 months	37.2	33	32	+ 3.1

TABLE XVI—(Continued)

DEVIATION FROM STANDARD WEIGHT OF MEXICAN PRE-SCHOOL CHILDREN—GROUP OF 198

Age	Height	Weight, Pounds	Standard Weight, Pounds	Variation Percentage
54 months	39.3	35.1	35	± 0
48 months	40.5	36	36	± 0
54 months	38	33.5	34	± 0
50 months	38	30	33	— 9
58 months	36.7	28	32	—12.5
59 months	42.5	36.1	39	— 7.4
50 months	39.3	33.7	35	— 4
60 months	42.2	41	39	+ 5.1
50 months	37.6	30.7	32	— 4
57 months	37	31	32	— 3.1
57 months	40.2	36.7	36	± 0
53 months	39	32.5	35	— 7.1
51 months	38	30	33	— 9.1
48 months	39.5	30.7	35	—12.3
58 months	41	35	38	— 7.9
48 months	40	38.5	36	+ 7
54 months	41.7	36.3	39	— 7

BLANK FOR RECORDING GENERAL DATA

Name ..... Date .....

Address ..... Date of birth .....

1. Prenatal care .....
   - Health of mother during pregnancy .....
   - Diet .....
   - Physician consulted .....
2. Birth .....
   - Full time or premature .....
   - Normal or abnormal .....
3. Feeding during first year .....
   - Breast .....
   - Bottle: type of mixture .....
   - Supplements .....
     - Cod liver oil .....
     - Tomato juice .....
     - Cereal ..... vegetables ..... meat .....
   - Regularity of feeding .....
   - Appetite .....
   - Age of weaning .....
4. Feeding after first year .....
   - Milk ..... Food dislikes .....
   - Cereals ..... Meat .....
   - Fruits ..... Candy .....
   - Vegetables ..... Cod liver oil .....
   - Appetite ..... Tomato or orange juice .....
5. General health .....
   - Colds .....
   - Other infections .....
   - Teeth ..... Tonsils .....
6. Data from physical examination .....
7. General comments .....

Blank for Recording Food Consumption of Pre-School Children

A Dietary Study

Name _____ Date of birth _____

Date _____ Height _____

Weight _____

Directions for Keeping Dietary

1. Put down what child actually eats.
2. Measure in cup or tablespoon.
3. Abbreviations: c=cup; T=tablespoon; t=teaspoon.

Day

BREAKFAST		DINNER	
Food	Amount	Food	Amount
SUPPER		BETWEEN MEALS	
Food	Amount	Food	Amount

COMMENTS

INDEX