

A STUDY OF THE RELATION
OF HEALTH HABITS AND DIET TO TEETH AND GROWTH
IN THREE RACES OF TEXAS THIRD-GRADE CHILDREN

by

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INTRODUCTION

Clinical investigations and research indicate that proper diet and health habits of children influence both growth and condition of teeth. Good physical development including sound teeth depends not only upon adequate food and absence of physical defects, but upon right amounts of sleep, fresh air, and outdoor play.

Children of the white race have usually been used as subjects for these studies although some work has been done with negroes. Mexican children have more recently been investigated. For the past four years two extensive nutrition projects which include the three races have been in progress in Texas.

There is a somewhat general opinion that Mexican children have good teeth but are subnormal in stature; that negroes have good teeth but a high incidence of bony defects, probably of rachitic origin; and that white children have poor teeth but good physical development. It has been suggested that the Mexican diet consists largely of beans, peppers, cereals including tortillas, and onions; the negroes' chief articles of food are salt pork, meal with other corn products, and greens; while the diet of the white

race is thought to be more adequate but to contain a preponderance of soft, non-chewy foods.

The purpose of this study was to ascertain if possible something of the diet and health habits of the children of the three races in relation to their growth and the condition of their teeth.

WORK IN THE FIELD

Growth studies have been made by various countries of the world for sociological, military, pedagogical, and physiological purposes. The subjects for these investigations have been persons of various races and ages as well as animals. The group method is usually employed in such research, although a few individual studies have been made.

The first scientific work relating to the physical growth of children was made by Quetelet in Belgium in 1836. He devised some formulae which when applied to height and weight showed the rate of human growth.

A variety of factors have been found to affect growth. These include heredity, physical defects and disease, hours of sleep, the amount and character of the food intake, age, sex, race, season, the ductless glands, environment, habits of elimination, the degree and kind of physical activity,

and sunlight. Coudreau at Paris in 1869 probably made the first study showing the influence of diet on growth.

Two factors have given impetus to the study of the relation of diet to growth and health. One is the newer knowledge of nutrition much of which has been obtained through animal experimentation. The other is the result of two large-scale physical examinations - one for the men who served in the World War, the other for school children as part of the Children's Year program of 1918.

Groups of children varying in size from several thousand to as few as one or two have been used as subjects for research. Many of the earlier studies consisted of obtaining heights, weights, and ages of groups of children and drawing certain conclusions from these data. A study was made by Baldwin (2) which included many children of various ages for the purpose of establishing height and weight standards. These are used to help determine the physical status of children.

Since these standards have been based almost entirely upon the white race, some authorities have felt the need for racial measurements. There is a somewhat general opinion that unfortunate environment and the occurrence of rickets affect a child's weight and height. Since both of

these conditions are apt to be present among negroes it might be expected that if the racial factor were not dominant, such children would be short and thin. Mustard and Waring (15) analysed the height and weight records of 1,650 negro and 4,101 white school children in Tennessee. They found that not only were the negroes somewhat taller than the white children but they showed a tendency to gain weight more rapidly so that their average weight was in excess of that for the white children of 6 to 16 years. Although comparable data available for these two races are scanty, these investigators suggest that negroes have a growth cycle which differs in many respects from that of white children.

While yearly gains in height and weight are indicative of normal growth, some workers have noted that there is a tendency to rely too much on these standards for determining a child's physical condition. Whitacre (27) in a study of Mexican, negro, and white school children selected 100 of the latter race to determine some factors which might affect the accuracy of weight. In following the weights from month to month, the data showed that greatest accuracy is attained by weighing the child in a known amount of clothing, at approximately the same hour of the day each month, and with his

urinary bladder empty.

Growth, according to Emerson (7), proceeds best when physical defects are early detected and promptly corrected. He believes that the greater the number of defects, the less the gain in weight. Increase in height and weight is regarded as one indication of normal growth.

Rose (21) states that weight is affected more quickly than height by poor heredity, physical defects, bad hygiene, poor diet, and disease. She maintained records for 29 children who lived for three years or more in an institution which provided medical attention. The children were underweight and had signs of rickets upon entrance. Proper diet and remedial care resulted in a steady improvement of all with many reaching the estimated normal weight and some exceeding it.

A great many individual foods have been considered in relation to physical growth. Milk, one of the more complete foods, has received much attention. Rose (23) states that it contains the greatest assortment of nutritive substances of all single food materials, and constitutes the foundation upon which an adequate diet can most safely and easily be constructed. She further believes that it should furnish more than a third of the total daily calories and the greater part of the calcium as well as a good half of the

daily phosphorus.

A study was made by Orr (16) using four groups of school children. In addition to their regular diet the children of group I were given three-fourths of a pint of whole milk daily; those of group II, the same amount of skim milk; group III, biscuits equal in calories to the skim milk. Group IV was used as a control. The children were measured and weighed monthly throughout one school year. The results showed that there was a 20.0 per cent increase in both height and weight in the groups using milk. It was found that the skim milk gave nearly the same gains as did the whole milk. The gains made by children who ate the biscuits as a supplementary feeding did not differ materially from the control group.

An extension of this study, reported in the Journal of the American Medical Association, was carried on by Leighton (13) for the purpose of determining the height and weight changes of 20,000 school children between the ages of 5 and 12 years. For over a period of 4 months, 25 per cent of the children received a daily supplemental feeding of three-fourths pint of raw milk, another 25 per cent of them received a similar amount of pasteurized milk for the same length of time. The other 10,000 children were used as a

control group. The results showed that the addition of milk caused an increase in the rate of growth both in height and weight above that of the controls. The raw and the pastuerized milk gave equally good results. Some evidence of an improvement in the general health and physique were noted.

Sherman and Hawley (25) determined, by means of balance studies, the rate of storage of calcium and phosphorus in normal children of different ages and the nature and amount of the intake required to support optimum storage of these elements in the growing child. The subjects included 21 children between the ages of 3 and 14 years. These investigators found that better storage was secured with a quart of milk a day than with a pint and a half. Vegetable foods were then substituted for half the milk in quantities to give the same amount of calcium as the milk they replaced. In no case was the calcium of vegetables utilized as well as that of milk. This did not indicate that a liberal amount of vegetables should not be used in the diet but that they should be used in addition to the milk.

Eggs, like milk, contain valuable growth material. It is believed they should occupy an important place in the diet of children. Rose (22) conducted a study with two groups of preschool children over a period of 21 months

using eggs as the variable in the diets. The results showed a positive though not large difference in the percentage of hemoglobin and in the number of red blood cells in favor of the children receiving egg, and a close parallelism between these blood findings and the general physical improvement of the children.

Some dietary studies have been made using children of various ages and races as subjects. The general purpose of several of these has been to determine possible relations between physical condition and diet.

Roberts (18) in 1922 made a dietary study of 256 children between the ages of 2 and 11 years who lived in a mountainous section of Kentucky. She found nearly three-fourths of the children living on diets of either questionable adequacy or certain inadequacy. Milk was used sparingly and fruits and vegetables occupied a minor place in the diets. Only 45 per cent of the children were having sufficient sleep.

Whitacre and Terrill (28) are working on a project to determine the correlation between the type of diet eaten by a school child and his height-weight-age status and quality of teeth. The subjects include 3,000 white children, 250 Mexicans, and 850 negroes. The results thus far obtained from the diet records of 636 of these white children and

199 of the negroes show no consistent relationship between season and any one food. Partial results for dental conditions for 1,118 white children and 397 negroes show that 27 per cent of the white children and 42.0 per cent of the negroes had perfect teeth. Defective six-year molars were found in 40 per cent of the white children and 50 per cent of the negroes.

A study was made by Winters (29) which included 75 Mexican children of preschool age. The information was secured through daily home visits and the assistance of the mothers. The diets were checked for adequacy as to energy, protein, minerals, and vitamins. Two-thirds of the group had a calorie intake 66.6 per cent below the accepted requirements for children of this race and age, whereas the protein for the group was only 18.6 per cent under standard. The diets were from 10 to 50 per cent deficient in calcium, phosphorus, and iron. Almost two-thirds of them were 40 per cent or more below the standard for calcium. Too little milk, butter, eggs, and leafy vegetables were used to insure adequate vitamin A. Beans, potatoes, and tomatoes supplied to some extent vitamins B and C. The chief source of vitamin D was sunshine and the diets were decidedly lacking in vitamin E. According to this study the Mexican preschool

child evidently subsists largely on beans, potatoes, cereals, and coffee.

Davies (6) made a survey of elementary school children of two Massachusetts towns which were comparable in size and in medical facilities but one was a dairy town. She found that the teeth of the children from the dairy community were in much better condition than were those of the group from the non-dairy town.

Kappes (12) analyzed some of the dental records of Rochester, Minnesota school children supplementing the information so obtained by conferences with the parents of these children in an effort to determine some factors causing dental caries. Two groups, based on the condition of the teeth, between the ages of 5 and 13 were selected. The teeth of one group of children were considered perfect while those of the other were in poor condition. The difference in the data obtained in the two groups is not striking. Heredity, infectious diseases, and care of the teeth did not appear to be important. A diet composed largely of fruits and vegetables was the only factor that seemed to be of definite significance in preventing caries.

Clark (5) found in an examination of 2,500 rural school children that the highest percentage of carious teeth oc-

curred among those of 7 and 8 years of age.

Bunting (4) made a study of three groups of Michigan children to determine the effect on carious teeth of both diet and therapeutics. Groups I and II were given varied diets including milk, vegetables, and fruit daily with no sugar but that used in preparation of the food. In addition to the dietary control an antiseptic mouth wash was used daily. Group III was given the mouth wash twice daily as part of the school routine but no attempt was made to alter their diets. The data obtained from this experiment show that active caries was almost arrested among the children of groups I and II while 50 per cent of group III showed evidences of active caries. He states that of the two methods used, diet was by far the most effective in the control of caries.

Boyd et al.(3) reported that they had been able to stop the development of caries in the teeth of diabetic children who had been receiving carefully controlled diets high in fruits and vegetables. In order to find out what the factors were in the diet that arrested the caries an extension of this first study was made using normal subjects. Five children in private homes were placed on a diet which contained proteins, carbohydrates, and fats in liberal

amounts. Some specific foods served daily were one quart of milk, an egg, an orange, one teaspoon codliver oil, one ounce of butter and two or more servings of succulent vegetables or fruit. Candy was eaten only after meals. Foods that would displace the prescribed diet were prohibited. At the end of ten weeks caries had been arrested in each case. All but one child, who had some type of ear infection, gained an average of over one-half pound in weight each week. The results caused the investigators to believe that improved dental conditions were dependent not on any one factor but on proper balance of all food factors.

A statistical study of 191 cases including children and adults was reported by Hanke (10). These subjects received a diet consisting of one to two pints of milk, small amounts of meat, fresh fruits and vegetables including lettuce, the juice of one-half lemon plus enough orange juice to make one pint, and from one to two eggs daily. He found that 104 of the patients showed improved dental conditions and 60 of this number at the end of 8 months showed no traces of new caries. He particularly emphasized the use of vitamin C in the diet.

PROCEDURE

A total of 93 third-grade children of the white, negro, and Mexican races served as subjects for this study. They were enrolled in four of the elementary schools of Wichita Falls, Texas. The white children represented two types of homes - good income and low income - and were thus divided into two groups according to economic status. The negro children were a cross-section of the more progressive members of their race while the Mexicans were typical of the usual Mexican home found in cities of this size.

The school superintendent and principals favored such a study. The teachers gave generously of their time for the surveys, were anxious to make clear to the pupils the data desired, and encouraged the children to be accurate in giving the information.

The work began in October and was completed in May. No preliminary visits were made to the school rooms. The project was carried on indirectly as part of the school health program.

The method of measuring the children as recommended by Whitacre (27) was explained to all the teachers previ-

ous to the initiation of the work. This was done in order that the teacher might arrange the time for weighing and, when possible, have the children back from the toilet at the hour scheduled. Before being weighed the children were sent to the toilets if this had not been done previously, after which they removed their shoes, sweaters, coats, and pocket contents. They were weighed at the same hour of the day every six weeks.

The weight of clothing was not controlled. However, since these children dress more uniformly throughout the year than is customary in colder sections of the country it was felt that this factor did not affect the weights greatly.

Continental platform scales were used for weighing the children. A yard stick, checked by a physician's standard, attached to the wall and a specially made square were used for measuring height. The investigator weighed and measured the children and the teacher recorded the results.

Special forms (pages 19 to 31, inclusive) were used for securing data. These included blanks for recording the diet records, food likes and dislikes, health and food habits, height and weight measurements, and the results of dental and physical examinations. The diet blanks showed the kind of food eaten, the approximate amount, and the time of eating. To insure accuracy, groups of food usually eaten at

the designated meal were listed. Approximate amounts were indicated by underscoring words placed after each food. Space was allowed for the child to state the kind. Digits were used wherever possible to assist in making the records.

For one-day periods at three different times of the year - December, March, and May - each child reported his daily food intake in this manner. The information concerning the food eaten at the noon meal was secured after lunch. In order to eliminate some of the inaccuracies which might result with lapse of time, two of the blanks - one recording the foods eaten between meals and the other, those for the evening meal - were sent home with the child. He brought his completed records to the teacher the next morning. Upon his arrival at school he recorded the foods eaten for breakfast.

The information concerning the food likes and dislikes and the health and food habits was secured during a class period. Before filling in the blanks each statement was read and comments made in order to remove any doubt from the child's mind and to encourage him in accuracy.

Before using, the dental examination blanks were ap-

proved by two dentists. The medical examination blanks were likewise approved by two pediatricians. Both were used at a school examination to determine their effectiveness before employing them in this problem.

Arrangements were made for physical and dental examinations for the four groups. The negro children were examined by a physician and a dentist from their race. The Mexicans received this service at the spring preschool round-up held at their school. The white groups were examined in routine procedure at their respective buildings.

A score card was devised based on generally accepted standards by which the diets of the children could be evaluated. It was felt that this score card, while not coinciding entirely with that of other workers, was adapted to this particular problem. It was further recognized that any dietary score is somewhat arbitrary but, as is pointed out by Roberts (19) this method not only facilitates the work of evaluating diets of different character but results in total scores which permit of comparison.

Milk, potatoes, and other vegetables - both raw and cooked - fruits, cereals, eggs, small amounts of meat or fish, and butter were the foods considered necessary in the diet each day. It was assumed that a score of 60 or above

would probably indicate the occurrence of these essential foods in liberal amounts. Such diets were classed as adequate. The milk minimum for these was 2-1/3 cups daily for each child. The diets classed as questionable were those scoring between 40 and 60. As many as two or three of the essential foods were lacking in these while the milk minimum was set at 1-1/3 cups. The inadequate diets lacked from three to seven of the necessary foods. Their milk content was low, seldom exceeding one cup.

Unless mention is made to the contrary, data were compiled for only those children having complete physical, dental, and food and health habit records as well as two or more diet sheets.

Form I-A
Breakfast

Name _____ Grade _____ School _____ Date _____

1. Draw a line under the number of cups or glasses of milk which you drank for breakfast this morning: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2.
2. Draw a line under any of these that you drank for breakfast this morning: cocoa tea coffee buttermilk.
3. Draw a line under the number of cups or glasses of water you drank for breakfast this morning: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2.
4. Draw a line under what you ate and under how much you ate of these foods for breakfast this morning:

Potatoes	one helping	two helpings	
Bacon	1 piece	2 pieces	3 pieces
Ham	large piece	small piece	
Cooked cereal	one dish	two dishes	- kind _____
Dry cereal	one dish	two dishes	- kind _____
Beans	one dish	two dishes	
Tomatoes	one dish	two dishes	cooked raw
Light bread	1	2	3 4 5 pieces
Toast	1	2	3 4 5 pieces
Biscuits	1	2	3 4 5 6
Cornbread	1	2	3 4 pieces
Cookies	1	2	3 4 5 - what kind _____
Pie	small piece	large piece	- kind _____
Doughnuts	1	2	3 4
Syrup	a little	a lot	
Greens	one dish	two dishes	
Apples	how much _____	cooked	raw
Prunes	one dish	two dishes	
Oranges	$\frac{1}{2}$ orange	1 orange	some juice
Grapefruit	$\frac{1}{2}$ grapefruit	1 grapefruit	
Butter	yes	no	

Write on these lines the names and tell how much you ate of anything else for breakfast this morning:

5. I ate my breakfast this morning at _____ o'clock.
6. I got up this morning from my bed at _____ o'clock.
7. I did not eat breakfast this morning. True False

Form I-B
Lunch

Name _____ Grade _____ School _____ Date _____

1. Draw a line under the number of cups or glasses of milk that you drank for dinner or lunch today: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2
2. Draw a line under any of these that you drank for dinner today: cocoa tea coffee buttermilk.
3. Draw a line under the number of cups or glasses of water that you drank for dinner today: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2.
4. Draw a line under what you ate and under how much you ate of these foods for dinner today:

Beans	one helping	two helpings		
Potatoes	one helping	two helpings		
Soup	large dish	small dish	what kind	_____
Greens	large helping	small helping		
Gravy	little	much		
Turnips	one helping	two helpings		
Lightbread	1	2	3	4 slices kind _____
Cornbread	1	2	3	4 5 pieces
Biscuits	1	2	3	4 5 6
Syrup	little	much		
Cookies	1	2	3	4 5 6
Chili	little	much		
Pickles	$\frac{1}{2}$	1	$1\frac{1}{2}$	2 were they small large
Butter	little	much		
Cabbage	one helping	two helpings	raw	cooked
Lettuce	much	little		
Tomatoes	one helping	two helpings	raw	cooked
Carrots	one helping	two helpings	raw	cooked
Onions	one helping	two helpings	raw	cooked
Celery	much	little		
Sweet Potatoes	one helping	two helpings		
Black-eyed Peas	one helping	two helpings		
Doughnuts	1	2	3	
Meat	large piece	small piece	lean	fat
Egg	1	2	3	
Cheese	much	little		

Form I-B cont'd

Write on these lines the names and tell how much you ate of anything else for dinner or lunch today:

5. I ate my dinner today at _____ o'clock.

6. I ate my dinner today at home, bought it from the cafeteria, brought it from home.

7. I did not eat dinner today. True False

Form I-C
Supper

Name _____ Grade _____ School _____ Date _____

1. Draw a line under the number of cups or glasses of milk which you drank for supper last night: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2.
2. Draw a line under any of these that you drank for supper last night; cocoa tea coffee buttermilk.
3. Draw a line under the number of cups or glasses of water that you drank: 0 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2.
4. Draw a line under what you ate and under how much you ate of these foods for supper last night:

Meat	large piece	small piece	lean	fat
Eggs	1 2 3			
Fish	large piece	small piece		
Whole wheat bread	1 2 3 4	slices		
White bread	1 2 3 4	slices		
Biscuits	1 2 3 4	5		
Soup	large dish	small dish	milk	water
Potatoes	one helping	two helpings		
Turnips	one helping	two helpings	cooked	raw
Cabbage	one helping	two helpings	cooked	raw
Greens	one helping	two helpings		
Red beans	one helping	two helpings		

Form I-C cont'd

Black-eyed peas	one helping	two helpings	
Okra	one helping	two helpings	
Tomatoes	one helping	two helpings	cooked raw
Green beans	one helping	two helpings	
Pie	one piece	two pieces	what kind _____
Cake	one piece	two pieces	what kind _____
Ice cream	one dish	two dishes	
Bananas	1	2	3
Apples	1	2	3 cooked raw
Prunes	one dish	two dishes	

Write on these lines the names and tell how much you ate of anything else for supper last night:

5. I ate my supper last night at _____ o'clock.

6. I went to bed last night at _____ o'clock.

7. I did not eat supper last night. True False

Form II
Between Meals

Name _____ Grade _____ School _____ Date _____

1. Draw a line under any of these that you eat between meals and tell how much you ate from the time you began to work on these tests until you returned them to your teacher:

<u>Food</u>	<u>How much</u>	
Candy	_____	
Ice cream	_____	
Bread and butter	_____	
Sandwich	_____	what kind _____
Milk	_____	
Cocoa	_____	
Crackers	_____	
Fruit	_____	kind _____
Chili	_____	
Doughnuts	_____	
Pickles	_____	
Turnips	_____	

2. Write on these lines anything else you ate between meals and tell how much you ate:

_____	_____
_____	_____
_____	_____

3. Draw a line under the time that you usually eat between meals:

never	almost never
before going to bed	at recess
coming to school at noon	just on Saturdays
coming to school in the morning	after school

Form III
Food Likes and Dislikes

Name _____ Grade _____ School _____ Date _____

Food	I like and eat:	I do not like: but eat	I do not: eat	I have not tasted
Apples	:	:	:	:
Bananas	:	:	:	:
Prunes	:	:	:	:
Oranges	:	:	:	:
Peaches	:	:	:	:
Apricots	:	:	:	:
Grapefruit	:	:	:	:
Raisins	:	:	:	:
Pears	:	:	:	:
Grapes	:	:	:	:
Blackberries	:	:	:	:
Cherries	:	:	:	:
Lemons	:	:	:	:
Plums	:	:	:	:
Strawberries	:	:	:	:
Figs	:	:	:	:
Cantaloupes	:	:	:	:
Watermelon	:	:	:	:
Oatmeal	:	:	:	:
Grits	:	:	:	:
Rice	:	:	:	:
Shredded Wheat	:	:	:	:
Dwarfies	:	:	:	:
Cream of Wheat	:	:	:	:
Post Toasties	:	:	:	:
Malt-O-Meal	:	:	:	:
Cornmeal Mush	:	:	:	:
Macaroni	:	:	:	:
Hominy	:	:	:	:
Grape Nuts	:	:	:	:
Lettuce	:	:	:	:
Tomatoes	:	:	:	:
Carrots	:	:	:	:
Green Beans	:	:	:	:
Turnips	:	:	:	:
Cabbage	:	:	:	:
Pinto Beans	:	:	:	:
Celery	:	:	:	:

Form III cont'd

Food	I like and eat:	I do not like but eat	I do not eat	I have not tasted
English Peas	:	:	:	:
Beets	:	:	:	:
Okra	:	:	:	:
Spinach	:	:	:	:
Onions	:	:	:	:
Squash	:	:	:	:
Corn	:	:	:	:
Greens	:	:	:	:
Potatoes	:	:	:	:
Green Pepper	:	:	:	:
Cauliflower	:	:	:	:
Sweet Potato	:	:	:	:
Asparagus	:	:	:	:
Steak	:	:	:	:
Ham	:	:	:	:
Bacon	:	:	:	:
Chicken	:	:	:	:
Fish	:	:	:	:
Salt Pork	:	:	:	:
Liver	:	:	:	:
Eggs	:	:	:	:
Cottage Cheese	:	:	:	:
Cheese	:	:	:	:
Peanut Butter	:	:	:	:
Tamales	:	:	:	:
Frijoles	:	:	:	:
Pudding	:	:	:	:
Cake	:	:	:	:
Pie	:	:	:	:
Jello	:	:	:	:
Cookies	:	:	:	:
Ice Cream	:	:	:	:
Doughnuts	:	:	:	:
Candy	:	:	:	:
Coffee	:	:	:	:
Milk	:	:	:	:
Cocoa	:	:	:	:
Tea	:	:	:	:

Form III cont'd

Food	I like	: I do not like	: I do not	: I have not
	and eat:	but eat	: eat	: tasted
Biscuits	:	:	:	:
Cornbread	:	:	:	:
Whole Wheat Bread	:	:	:	:

Form IV
Health Habits

Name _____ Grade _____ School _____ Date _____

1. Draw a line under your usual bedtime: 7 7:30 8 8:30
9 later.
2. Draw a line under what you usually wear when you sleep:
your clothes your underclothes your night clothes.
3. Draw a line under the words that tell with whom you
sleep: alone your brother your sister your mother
your father.
4. Draw a line under the number of windows in the room
where you sleep: 0 1 2 3 4.
5. Draw a line under the time when you sleep with your
windows open: when it is warm every night.
6. Draw a line under the time when you usually get up:
Before 6 at 6 6:30 7 7:30 after 7.
7. Draw a line under when you eat breakfast:
every morning never only when you are hungry just when
you have time.
8. Did you eat supper last night? yes no At what
time _____.
9. Did you eat breakfast this morning? yes no At what
time _____.
10. Did you eat dinner today? yes no At what time _____
11. Draw a line under the number of glasses of water you
drank before breakfast this morning: 0 $\frac{1}{2}$ 1.

Form IV cont'd

12. Draw a line under the number of glasses of water you drink in a day usually: 0 1 2 3 4 5 6 7 8.
13. Draw a line under the word that tells how you eat:
fast slow medium.
14. Draw a line that tells about you at mealtime: I am
never hungry I am always hungry I am not very hungry.
15. Draw a line under the words that tell how much you play
out of doors: 1 hour 2 hours all the time
not very much.
16. Draw a line under the times when you usually wash your
hands: before breakfast before dinner before supper
after going to the toilet.
17. Draw a line under the number of baths that you take each
week: none two three more than three one every day.
18. Draw a line under the times you brush your teeth each
day: never before breakfast before going to bed
before school.
19. Draw a line under the words true for you:
I have a tooth brush. yes no
20. Draw a line under what is true for you about your
bowels: they move every day they do not move every
day I take medicine for this.
21. Draw a line under the words that are true for you:
standing tall makes me tired. yes no.

Form -V
Weight Record

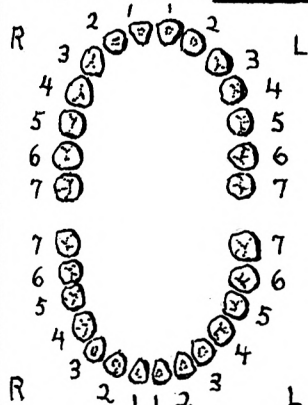
Name _____ School _____ Date _____
Age: yrs. _____ mos. _____ Sex _____

Date of	:	:	:	:	:	:
Measurements:	:	:	:	:	:	:
Height	:	:	:	:	:	:
Weight	:	:	:	:	:	:

Form-VI
Dental Record

Name _____ School _____ Date _____
Age: yrs. _____ mos. _____ Sex _____

CODE



C - cavity
X - extraction advised
A - abscessed tooth
F - filling present
PF - pits and fissures present
PE - permanent tooth gone

1. Mouth breathing - marked, moderate, none
2. Malocclusion - marked, moderate, none
3. Ability to masticate - normal, fair, poor
4. Gingivae - normal, inflamed, badly inflamed
5. Stains - absent, slight, extensive
6. Calculus - absent, slight, extensive
7. Food deposits - absent, present
8. Types of teeth - normal, syphilitic, rachitic, devoid enamel
9. Other abnormality of teeth _____
10. General condition of teeth - good, fair, poor
11. Number of permanent teeth - upper _____ lower _____
12. Number of "six-year" molars: upper left _____ lower left _____ upper right _____ lower right _____
13. Evidence of care by dentist - orthodontia, cleaning, fillings
14. Prophylaxis _____
15. Examining dentist _____

Form-VII
Physical Examination Record

Name _____ School _____ Date _____
Age: yrs. _____ mos. _____ Sex _____

1. Nutrition - excellent, good, fair, poor, very poor
2. Fat - obese, plump, medium, thin, emaciated
3. Muscles:-
Tone - firm, medium, flabby
Development - normal, medium, flabby, undeveloped
4. Skeletal Development: (frontal
Head - normal, asymmetrical, bosses - (parietal
Shoulders - normal, round, winged scapulae, drooping
Chest - normal, narrow, flat, asymmetrical, pigeon,
funnel, beaded ribs, Harrison's groove
Spine - normal, lordosis, scoliosis, kyphosis
Extremities - normal, enlarged epiphyses, knock-knees,
pronated feet, everted feet, flat feet
5. Skin:
Color - clear, sallow, rosy, pale, bronze
Condition - normal, scaly, rough, dry, over-moist,
pediculosis, scabies, eczema, infected
sores, ringworm, impetigo, acne, boils
6. Eyes - normal, dull, skin puffy under eyes, con-
junctivitis, strabismus
7. Ears - normal, discharge L R, cerumen L R, punctures
L R
8. Tonsils - normal, enlarged, inflamed, pitted, exuding,
buried, absent
9. Adenoids - normal, enlarged, obstructing breathing
10. Mouth - normal, defective palate, hare-lip
11. Tongue - normal, tongue-tie, moist, dry, coated
12. Nose - normal, obstructed, discharge, allergic symptoms
13. Glands: Cervical - normal, left palpable, right palpable
Axillary - normal, left palpable, right palpable
Inguinal - normal, left palpable, right palpable
Thyroid - normal, palpable, characteristic
symptoms
Thymus - normal, palpable
Submaxillary - normal, left palpable, right
palpable
14. Heart - normal, irregular rhythm, impaired muscle
sounds, organic murmurs

Form-VII cont'd

15. Lungs - normal, slightly impaired, greatly impaired,
d'Espine's sign
16. Abdomen - normal, distended, relaxed, tender, liver
or spleen enlarged
17. Hernia - absent, umbilical, inguinal
18. Genitalia - normal, undescended testes, phymosis, needs
circumcision, vaginal discharge, adhesions
19. Nervous System: Stability - normal, fair, poor
Stutter, chorea, paralysis, spasticity
Nervous habits - absent, biting nails,
pinching skin
20. Mucous Membranes - normal, slightly pale, very pale
21. Posture - normal, relaxed
22. Immunizations:
- a. Smallpox - satisfactory evidence - yes no
Date _____
- b. Diptheria - satisfactory evidence - yes no
Date _____

Recommendations: _____

Examining physician _____ Date _____

Score For Judging Diets

Food	:	Standard	:	Optimum
	:	Servings per Day	:	Score
Milk				
One glass	10			
Two glasses	15	one quart		25
Three "	20			
Four "	25			
Vegetables				
Potatoes	4	two besides potato		20
Green, leafy	6	preferably one green		
Raw (or cooked		and one raw		
tomatoes)	6			
Other	4			
Fruits				
Cooked	6	two, one citrus		15
Raw (citrus or	6	or tomatoes		
tomatoes add 3)				
Egg		one		5
Meat (or second egg)		one		5
Other protein		one		5
Whole grain products				
Breakfast food	10	one or more		15
Bread	5			
Butter				
One meal	3	each meal		5
Other meals each	1			
				100

Deduct				
Coffee or tea		each cup		5
Sweets between meals		each time		3
Other less desirable				
foods between meals		each time		2

RESULTS AND DISCUSSION

The material obtained had certain definite limitations incident to the method of securing the data. Chief among these were: (1) the amount of food eaten was not quantitative to any great extent; (2) it represented but three days of any child's diet; (3) the accuracy was somewhat limited by the child's memory and honesty; (4) the subjects were too few in number, especially in the Mexican group; and (5) the Mexican children were somewhat older than the majority of those of the other groups.

It has been found impractical to attempt to obtain quantitative food records in such cases. Children cannot determine the amounts with accuracy and it is impossible for one worker to collect the data personally from such a large number of children within the time allowed for the study. However, the approximate amount of milk used and a rough indication of the quantities of some other foods may be secured by this method.

Although the diet records covered only a three-day period, and may have varied more than the usual diets of the children, it was believed that they were fairly typical of the food eaten by the family. As a further precaution

the data were collected on school days which precluded variations which might have occurred in the diet as a result of holidays, Saturdays, or Sundays.

The question of the accuracy of the records is to be considered in such a study and probably has some influence on the data secured. Whitacre (28) compared a record of a child's lunch in the school cafeteria made by a trained worker with one made by the child later in the afternoon and found that 58 per cent of the material was identical and 35 per cent agreed within five points. It is assumed that these records are comparable in accuracy with those obtained by Whitacre.

The small number of subjects used in this study is foremost among the points open for criticism, particularly with the Mexican group. However, it is believed that all the children were typical of their respective races in this city, and for that reason the data are of value, at least for this section of the country. The Mexicans were older than the majority of these third-grade children. This may have been the result of the time needed to learn the English language or absence from school while picking cotton or both. Since they were older, dentition had progressed farther, and the average yearly gain was apt to

be greater. This makes direct comparison difficult but the results are representative of the diet and health habits of the third-grade children of this community. A variety of factors of diet and health were considered which might influence the child's growth or condition of teeth. These are discussed in the material which follows:

Principal Items Occurring in the Meals for Three Days

Studies in the field of nutrition have established the fact that diets limited to few foods are apt to prove inadequate to meet the body's need for growth. A varied diet is, therefore, to be recommended since it prevents monotony which may result in a food intake too low for body needs. It also provides a factor of safety for those persons lacking a knowledge of food values.

The extent to which the necessary foods, i.e., milk, potatoes, and other vegetables - both raw and cooked - fruits, cereals, eggs, small amounts of meat or fish, and butter were present in the diets studied as shown in Table I. Included in this same table are desserts, coffee, and quick breads. There is reason to think that an excess of any one of these three last-named foods may crowd out the more essential ones.

TABLE I
SUMMARY OF THE NUMBER OF TIMES THE PRINCIPAL ITEMS OF FOOD
APPEARED IN THE MENUS FOR THREE DAYS

Food	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num-	per	num-	per	num-	per	num-	per
	ber	cent	ber	cent	ber	cent	ber	cent
Total meals eaten by children during period	244	100.0	152	100.0	309	100.0	55	100.0
Milk	183	77.0	116	76.3	166	53.7	27	49.0
Vegetables, cooked	81	34.1	56	36.8	55	17.7	11	20.0
Vegetables, raw	34	14.9	14	9.2	27	8.7	13	23.4
Potatoes	51	20.9	34	23.0	55	17.8	13	23.4
Fruit, citrus (or tomatoes)	50	20.5	17	11.0	35	11.3	16	29.0
Fruit, non-citrus	52	21.3	31	20.0	82	26.5	11	20.0
Eggs	40	16.3	25	16.0	58	18.7	16	29.1
Meat and other proteins	120	49.1	70	46.0	130	42.0	35	63.6
Desserts, including sweets	64	26.2	28	18.3	68	22.0	14	25.4
Whole grain breakfast foods	28	11.4	29	19.0	39	12.6	5	9.0
Whole grain breads	8	3.0	19	12.0	71	22.9	7	12.7
White bread	163	66.8	88	57.2	165	53.4	23	41.8
Biscuits	35	14.3	21	13.8	31	10.0	3	5.4
Butter	85	34.8	71	47.3	64	20.3	16	29.1
Coffee, tea	15	0.6	10	6.5	1	0.3	12	21.8

Milk occurred in these diets more often than any other single food. It was found in 77 per cent of the meals of white group I, in 76 per cent of those of white group II, in 54 per cent of the meals of the negro children, and in 49 per cent of those of the Mexicans. It is apparent that too little milk was being used by all the groups. The diets of both white groups were most adequate in this respect.

The following percentages indicate the occurrence of tea and coffee in the respective diets: white group I, 0.6 per cent; white group II, 6.5 per cent; the negroes, 0.3 per cent; and the Mexican children, 21.8 per cent. The more frequent occurrence of these items in the Mexican diets suggests an inverse relation existing between coffee and milk which is apt to be found in dietary studies among the foreign born.

Fruits and vegetables were used rather generously by the four groups, appearing in the meals of white group I, 91 per cent of the time; of white group II, 77 per cent; of the negro group, 65 per cent; and of the Mexican children, 92 per cent. Tomatoes occurred frequently in the Mexican diets, in some instances twice a day. This agrees with Winters' (29) statement that Texas Mexicans use tomatoes freely.

Potatoes showed small variation among the groups in

the number of times eaten. Recognized standards indicate that this item, because of its high food value and its economy, should be included daily in the diet. None of the groups ate as many potatoes as is recommended.

Whole grain products did not occupy an important place in any of the dietaries. According to accepted standards they should have been eaten more often than the reports indicated.

An egg each day, or at least several times a week, is recommended for elementary school children. They were not used this often. The Mexican group ate them more frequently than did the other three groups.

It is generally believed that small quantities of lean meat should be eaten daily. Some authorities on child feeding suggest that meat four times a week is sufficient for children. The number of times meat occurred in the menus indicates these children were above this standard. Roberts (9) states that too frequent use of meat may crowd out other essential foods. This danger may have been present in some cases inasmuch as the amounts consumed in this study were not known.

The results of checking the menus to determine to what extent the essential foods were absent from the diets are shown in Table II:

TABLE II
ESSENTIAL FOODS* ABSENT FROM THE DIETS

Children :		Number of Essential Foods Lacking							
Group	Total	None	One	Two	Three	Four	Five	Six	
White I	32	5	10	11	1	2	3	0	
White II	17	5	4	2	2	3	1	0	
Negro	37	2	7	11	10	2	2	3	
Mexican	7	3	2	0	2	0	0	0	

*Milk, eggs, potatoes and other vegetables - both raw and cooked- fruits, cereals, meat, and butter were regarded as the essential foods.

According to Roberts' (9) standard if more than four of the "needed foods" were absent the diets were classed as inadequate. Applying the same suggestion to this study, it would indicate that only 16 of the diets, or 17.2 per cent, were inadequate among the four groups.

Diet Scores

The food records of the 93 children for the three one-day periods were scored and graded. The distribution of scores is found in Table III. The diets of 69 per cent of white group I, 46 per cent of white group II, 59 per cent of the negro children, and 28 per cent of the Mexicans scored between 40 and 60.

TABLE III
DIET SCORES OF THE 93 CHILDREN

Range	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
15-19					1	3.0		
20-24	1	3.1	1	6.0	1	3.0		
25-29	2	6.2	1	6.0	2	5.0	2	29
30-34			1	6.0	5	13.5		
35-39	2	6.2	2	11.7	6	16.2	1	14
40-44	1	3.1	1	6.0	3	8.1	1	14
45-49	7	21.9	3	17.6	10	27.0		
50-54	8	25.0			2	5.0	1	14
55-59	6	18.7	4	23.0	7	19.0		
60-64	2	6.2	1	6.0			2	29
65-69			1	6.0				
70-74	2	6.2	2	11.7				
75-79	1	3.1						
Total	32	100.0	17	100.0	37	100.0	7	100

Since the standards set up for judging the adequacy of the diets were not severe it might be expected that a large number of the children would have adequate diets. Table IV shows that only 15.6 per cent of white group I, 23.5 per cent of white group II, 3.0 per cent of the negroes, and 29.0 per cent of the Mexican children had adequate diets. Inadequate and questionable diets were eaten by 84.4 of white group I, 76.5 of white group II, 97.0 per cent of the negroes, and 71.0 per cent of the Mexicans.

TABLE IV
NUMBER OF CHILDREN RECEIVING THE THREE GRADES OF DIET

Diet	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
Adequate	5	15.6	4	23.5	1	3.0	2	29.0
Questionable	22	68.8	8	47.3	21	56.8	2	29.0
Inadequate	5	15.6	5	29.2	15	40.2	3	42.0
Total	32	100.0	17	100.0	37	100.0	7	100.0

According to these ratings, the number of inadequate diets, was higher than were indicated when Roberts' (9) standard was used, in this case, 28, or about 30 per cent of the total.

Food Likes and Dislikes

A summary of the food likes and dislikes is given in Table V. There was no single food of the 79 listed liked by every child. However, five foods - potatoes, ice cream, chicken, ham, and pie - were liked by 99 per cent of the 93 children. A total of 41 foods had been tasted by none of the children. This group included some of the more essential as well as easily accessible foods such as liver, cottage cheese, peanut butter, whole wheat bread,

TABLE V
SUMMARY OF FOODS LIKED AND DISLIKED

Food	Average Number of Foods																
	Total:	Liked and Eaten				Disliked but Eaten				Not Eaten				Not Tasted			
	Foods:	Group				Group				Group				Group			
	List- ed	White I :	White II :	Ne- gro	Mexi- can	White I :	White II :	Ne- gro	Mexi- can	White I :	White II :	Ne- gro	Mexi- can	White I :	White II :	Ne- gro	Mexi- can
Fruits	18	15.4	16.2	15.6	17.0	1.3	.3	0.9	0.4	1.1	1.5	1.8	0.4	0.2	0.0	0.2	0.1
Vegetables	21	15.0	18.8	17.0	15.4	2.1	.5	1.6	2.8	2.6	1.1	1.4	1.4	1.3	0.6	1.0	1.2
Cereals	12	8.0	10.3	9.5	9.8	1.3	.1	0.9	0.3	1.3	1.3	0.3	0.7	1.4	0.0	1.3	1.5
Milk	1	1.0	1.0	.9	1.0	0.0	.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Breads	3	2.7	2.8	2.8	2.8	0.1	.1	0.0	0.0	0.2	0.6	0.2	0.1	0.0	0.6	0.0	1.2
Meats, cheese, nuts	14	11.2	12.5	11.8	11.8	0.6	.3	0.5	1.7	1.7	0.4	0.8	0.0	1.2	0.7	0.8	0.4
Desserts, sweets	8	7.8	7.7	7.5	7.8	0.1	.1	0.1	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.1	0.2
Coffee, tea	2	0.8	0.7	0.2	1.0	0.0	.0	0.0	0.0	0.7	1.3	1.6	0.0	0.5	0.0	0.1	1.0

carrots, green beans, spinach, and apricots. This suggests that the children were being deprived of valuable foods that should occur in their diets.

Vegetables. Lettuce, tomatoes, corn, and potatoes were the best liked vegetables. Turnips, peas, okra, onions, and greens were the most disliked by all the groups of children. In a total of 21 vegetables listed, 15 were liked and eaten by white group I, 19 by white group II, 17 by the negro children, and 15 by the Mexicans.

Fruits. The best-liked fruits as indicated by the four groups of children were oranges, bananas, peaches, grapes, and watermelons. Cherries, pears, and figs were the least liked. In all, 15 of the 18 fruits listed were eaten by white group I, 16 by white group II, 16 by the negro children, and 17 by the Mexican group.

Milk and Cocoa. Milk was liked and used by all but two children, one in white group I, and one in the negro group. Cocoa was also well liked. It was found that only three children, two from white group I, and one from white group II, did not like it.

Meat, Eggs, and Other Proteins. The data showed that 11 of the 14 proteins listed were liked and eaten by white

group I, 12 of white group II, 12 by the negroes, and the same amount by the Mexican children.

Grain Products. The children of white group I liked 8 of the 12 cereals listed; white group II liked 10; the negro children 10; and the Mexican group, 10 of them.

Desserts. Desserts were popular. The number liked by white group I, by white group II, the negro group, and the Mexican children was 8, 8, 8, and 8 respectively from a total of 8.

Tea and Coffee. Half of the Mexican children liked these beverages while only 40 per cent of white group I, 37 per cent of white group II, and 10 per cent of the negroes so indicated. In contrast, Roberts (19) in her study of preschool children of Gary, Indiana found that 67 per cent of the negroes, 63 per cent of the native white, and 15 per cent of the foreign born did not drink it. Reynolds (17) noted in her investigation of Virginia school children that 60 per cent of the white children and 10 per cent of the negroes used this beverage daily. Winters (29) stated that 75 per cent of the Texas preschool children of her study drank coffee daily.

Seasonal Variation in Foods Eaten

The results of an attempt to check the diets for seasonal variation in the use of certain of the foods more essential for growth and tooth formation are shown in Table VI. Milk, vegetables, eggs, and fruits were the foods considered. While there was some variation in the number of times these foods occurred in the diets in the three one-day periods it did not seem significant.

TABLE VI

SEASONAL VARIATION IN FOODS EATEN

Seasonal use of certain foods	Children							
	White				Negro		Mexican	
	Group I		Group II					
	:num-: :ber	:per :cent	:num-: :ber	:per :cent	:num-: :ber	:per :cent	:num-: :ber	:per :cent
December								
Milk	28	88	13	76	29	78	5	71
Vegetables	26	81	15	88	29	78	7	100
Fruit	28	88	13	76	28	76	4	57
Eggs	16	50	7	41	25	68	5	71
March								
Milk	31	97	14	82	29	78	5	71
Vegetables	30	94	16	94	27	73	6	86
Fruit	26	81	14	82	29	78	5	71
Eggs	19	59	8	47	16	43	6	86
May								
Milk	28	88	14	82	27	73	5	71
Vegetables	28	88	16	94	32	86	6	86
Fruit	22	69	12	70	28	76	5	71
Eggs	17	53	9	53	20	54	6	86

Summary of Food Habits

Breakfasts. Investigators have found that the no-breakfast habit is prevalent among school children. Lack of food does not seem to account for this as much as the child's failure to eat it. It is believed that those who habitually go without or with too scanty a breakfast will scarcely be able to eat enough food in the remaining meals for their daily needs. Roberts (20) makes the statement that the no-breakfast habit may become the direct cause of undernutrition.

The majority of the children of this study ate breakfast. The figures given in Table VII show that 94 per cent of white group I, 82 per cent of white group II, 97 per cent of the negro group, and 100 per cent of the Mexicans ate breakfast daily. One child from white group I reported he ate this meal when hungry and one from the negro group only when he had time. The results indicate that breakfast was eaten about an equal number of times by the children of these three races.

Water. A minimum of four glasses of water a day is recognized as essential for health. It was noted that 81 per cent of white group I drank this amount or more daily;

TABLE VII
SUMMARY OF FOOD HABITS

Habit	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
Breakfast								
Daily	30	94	14	82	36	97	7	100
When hungry	1	3	0	0	0	0	0	0
When have time	0	0	0	0	1	3	0	0
No report	1	3	3	18	0	0	0	0
Water								
Four or more glasses								
daily	26	81	13	93	33	89	5	71
Less than 4 glasses								
daily	6	19	1	7	4	11	2	29
Before breakfast	20	63	11	78	32	89	7	100
Eating habits								
Fast	2	6	0	0	2	5	0	0
Slow	2	6	5	36	18	48	4	57
Medium	28	88	9	64	17	47	3	43
Appetite								
Never hungry	2	6	0	0	3	8	1	14
Always hungry	17	53	3	22	12	32	4	57
Not very hungry	13	41	11	78	22	60	2	29

Table VII cont'd

	: num-	: per	: num-	: per	: num-	: per	: num-	: per
	: ber	: cent	: ber	: cent	: ber	: cent	: ber	: cent
Meals eaten during three-								
one-day periods								
Breakfast	80	93	51	100	104	93	20	95
Lunch	83	96	51	100	101	90	15	71
Supper	81	95	51	100	104	95	20	95
Times "between meal" eat-								
ing occurred on records								
No eating	13	15	19	37	20	18	11	52
After school only	69	81	30	59	86	77	10	48
More promiscuously	4	4	3	4	5	5	0	0

93 per cent of white group II, 89 per cent of the negro group and only 71 per cent of the Mexican group.

It has been found that drinking water before breakfast stimulates the appetite. The data showed that 63 per cent of white group I, 78 per cent of white group II, 89 per cent of the negro children, and 100 per cent of the Mexicans reported drinking water before breakfast.

The records were checked to see if those drinking more water used less milk. The results, appearing in Table VIII, indicate a probable correlation.

Table VIII

THE USE OF MILK AND WATER BY THE CHILDREN

Group	: Drinking milk : daily per cent	: Drinking four or : more cups water: : daily per cent	: Drinking water : each morning : before breakfast per cent
White I	78	63	81
White II	76	78	93
Negro	53	89	89
Mexican	49	100	71

Eating Habits. Hurried eating may limit the child's intake of food. Longer chewing has been thought to be a more efficient stimulus to gastric secretion. Finely chewed food is made soluble and absorbed more quickly.

These are some of the arguments, according to Roberts (20), against hasty eating.

The child who eats his food slowly is apt to become interested in some other activity before he has finished his meal. This will probably result in a food intake too small for his actual needs. A medium speed of eating was reported by 89 per cent of white group I, 64 per cent of white group II, 47 per cent of the negroes, and 43 per cent of the Mexicans. More than 50 per cent of the Mexican group, 48 per cent of the negro children, 36 per cent of white group II, and only 6 per cent of white group I reported themselves as slow in eating. It is to be remembered that speed of eating is apt to be relative and it is probable that these children were too immature to place themselves with any great degree of accuracy. Also the length of time spent at the table may have been confused with the rate of eating.

Number of Meals Eaten. The majority of the children in each group ate three meals daily. Dinner was eaten more often by all the groups than breakfast or lunch. An average of 95 per cent of the total days' meals was eaten by white group I, 100 per cent by white group II, 92 per cent by the negroes, and 87 per cent by the Mexicans. Fewer

lunches were eaten by the negroes and the Mexicans than by the whites. In white group II, three of the children received lunches from the day nursery and one, or possibly more, from the school, which may account for their good showing. The number of meals missed indicated that the daily food intake at meal time, with the exception of white group II, which reported missing no meals, was not adequate for any one group and may account for the large amount of eating after school. This is not in keeping with the recommendation of authorities on child feeding who believe that three regular meals each day are an important factor in child health.

Eating Between Meals. Both regular and promiscuous types of "between meal" eating were indicated in the records. The majority reported eating after school which, in this case, would be after 3 P. M. Only four of the children stated that they ate at other times, such as on the way to school or before going to bed.

Table IX shows the frequency of eating each type of food during the three one-day periods for which records were made. Candy was eaten 83 times, fruit, 74; sandwiches, 68; and milk, 50 times by the four groups. Other foods appeared less often.

Table IX

FOODS EATEN BETWEEN MEALS

Group	Number of Times Eaten During Three Days										
	Total										
	Children:	Fruit:	Milk:	Sand-wiches:	Pastries:	Ice cream:	Candy:	Nuts:	Pop corn:	Crackers:	Other Foods
White I	32	30	14	18	5	5	22	5	2	8	7 ¹
White II	17	9	9	13	5	1	17	2	0	4	9 ²
Negro	37	33	21	35	6	3	41	1	0	8	6 ³
Mexican	7	2	6	2	0	1	3	0	0	0	3 ⁴
Total	93	74	50	68	16	10	83	7	2	20	25

1. Pop, cheese, pickles, egg, bacon
2. Brown sugar, pickles, meat, chili, tea
3. Pickles, beans, greens, biscuits
4. Chili

The frequency with which the children ate suitable foods, less suitable foods, or refrained from eating between meals appears in Table X. The Mexican group ate the fewest times between meals. This is not to be interpreted as a case of better food habits. The income level of the average Mexican home along with the types of food found in it would be apt to make "piecing" difficult. Winters (29) reported that the Mexican preschool child subsists largely on beans, potatoes, cereals, and coffee. Also, he probably has less money to spend for extra foods.

TABLE X

SUMMARY OF BETWEEN-MEAL EATING HABITS

Frequency of Eating	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
Suitable foods*	62	48.6	31	35.6	89	51.1	10	35.7
Unsuitable foods**	54	41.2	37	42.5	65	37.3	7	25.0
None	13	10.1	19	21.8	20	11.5	11	39.2

* Fruit, milk, and sandwiches with simple fillings

** Candy, sweets, chili, pickles, and tea

The negro children ate more of the desirable extra foods than did any other group. This too may have been the result of income rather than good food habits, since those

eaten would, in most cases, be found in the home and not require money in the hands of the children to purchase. White group I ate suitable foods 49 per cent of the time and unsuitable foods 41 per cent. The probable reason that suitable foods predominated in this group is, that as a result of higher income and better parental education, more foods of that type were available.

White group II ate the highest proportion of unsuitable foods. As a rule, children of this income level often spend small amounts of money at the neighborhood stores. The children may also reserve part of their lunch money to buy candy. There is less available food for piecing in the home. Perhaps the mother is away from home and the child has less supervision. This group ate suitable foods 36 per cent of the time and unsuitable ones 43 per cent. They did not eat between meals 22 per cent of the time. Only two children, one from the Mexican group, and one from white group II reported no eating between meals on the three one-day periods. Roberts (19) found that 80 per cent of the preschool children of Gary ate between meals; 55 per cent of them ate suitable foods and 25 per cent ate unsuitable ones.

Summary of Health Habits

Tooth Brushes. Table XI shows that tooth brushes were owned by 100 per cent of white group I, 93 per cent of white group II, 92 per cent of the negroes, and 86 per cent of the Mexicans. It also indicates that 97 per cent of white group I, 100 per cent of white group II, 94 per cent of the negro children, and 86 per cent of the Mexicans studied, who owned tooth brushes, used them one or more times daily. The four groups showed little difference in the care of the teeth.

Sleep. The children reported their usual bedtime, rising time, and some of the conditions under which they slept. The hours for going to bed ranged from 7 to 9 P.M. in each group with the majority of the children retiring between 8 and 9 each evening. When the children for this study were grouped according to age by the Roberts' plan (20), those of white group I fell into two levels, 6-7 years, and 8-9 years. The minimum daily standards of these were $11\frac{1}{2}$ and 11 hours of sleep respectively. Less than one-fifth of these children were receiving the full amount of sleep.

White group II fell into three age-levels, 8-9, 10-11,

TABLE XI
SUMMARY OF HEALTH HABITS

Health Habits	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num-	per	num-	per	num-	per	num-	per
	ber	cent	ber	cent	ber	cent	ber	cent
Brush teeth								
Not at all	1	3	0	0	2	6	1	14.0
Once a day	10	32	6	43	13	35	3	43.0
Twice a day	9	29	3	21	9	24	2	29.0
Three times a day	11	36	5	36	13	35	1	14.0
Owens tooth brush	32	100	13	93	35	92	6	86.0
Does not own brush	0	0	1	7	2	6	1	14.0
Sleeping garments								
Day clothes	0	0	0	0	0	0	0	0.0
Underclothes	1	3	4	29	1	3	1	14.0
Night clothes	31	97	10	71	36	97	2	29.0
No report	0	0	0	0	0	0	4	57.0
Sleeping conditions								
Alone	10	31	1	7	14	38	0	0.0
With another child	14	44	12	86	18	48	2	29.0
With adult	7	22	1	7	5	14	2	29.0
No report	1	3	0	0	0	0	3	42.0
Windows open								
Every night	26	81	10	71	31	84	5	71.4
In warm weather	6	19	4	29	6	16	1	14.3
No report	0	0	0	0	0	0	1	14.3

Table XI cont'd

	: num- : ber	: per : cent	: num- : ber	: per : cent	: num- : ber	: per : cent	: num- : ber	: per : cent
Hours sleep								
More than eleven	3	9.3	3	21.0	3	8.0	0	0.0
Ten to eleven	27	84.4	8	58.0	27	73.0	4	57.0
Less than ten	2	6.2	3	21.0	7	19.0	3	43.0
Outdoor play								
One hour	1	3.0	3	21.4	6	16.2	1	14.2
Two hours	7	22.0	1	7.1	6	16.2	1	14.2
All the time	19	59.0	7	50.0	23	62.1	3	43.0
Very little	5	16.0	3	21.4	2	5.4	1	14.2
No report	0	0.0	0	0.0	0	0.0	1	14.2
Wash hands								
Before meals	32	100.0	14	100.0	36	97.0	5	72.0
After toilet	29	90.0	5	36.0	26	70.0	1	14.0
No report	0	0.0	0	0.0	1	3.0	0	0.0
Baths each week								
One	1	3.0	5	36.0	1	3.0	2	28.5
Two	16	50.0	5	36.0	13	35.0	3	42.8
Three	5	16.0	3	21.0	5	13.0	2	28.5
More than three	3	9.0	0	00.0	11	30.0	0	0.0
Daily	7	22.0	1	7.0	7	19.0	0	0.0
Bowel movements								
Daily	26	81.0	9	53.0	28	76.0	3	43.0
Not daily	6	19.0	8	47.0	9	24.0	2	28.5
Laxative	3	9.0	7	41.0	5	13.0	0	0.0
No report	0	0.0	0	0.0	0	0.0	2	28.5

and 12-13 years respectively. Only 36 per cent of the younger children received 11 hours of sleep daily. In the 10-11 year-group 50 per cent, and in the older, 100 per cent had sufficient sleep.

None of the negro children of 6-7 years received $11\frac{1}{2}$ hours of sleep which is believed to be a suitable amount. Only 12 per cent of the 8-9 year-group met their standard. Adequate sleep was reported by 33 per cent of the 10-11 year old children. None of the children in the next age-group met the standard of 10 hours of sleep.

The Mexican children fell into two groups, those 12-13 years of age, and those 14 years or older. In the younger group 80 per cent met the quota of 10 or more hours of sleep daily, while 100 per cent of the older group fulfilled their requirement.

It was noted that 31 per cent of white group I, 7 per cent of white group II, 38 per cent of the negroes, and none of the Mexicans slept alone, while 44 of white group I, 86 per cent of white group II, 48 per cent of the negroes, and 29 per cent of the Mexicans slept with brothers and sisters. The remainder of each group slept with adults.

None of the children reported sleeping in their day clothes. Regular sleeping garments were used by 97 per cent of white group I, 71 per cent of white group II, 97 per

cent of the negroes, and 29 per cent of the Mexicans. The others slept in their underwear.

Fresh air. It was found that 81 per cent of white group I, 71 per cent of white group II, 84 per cent of the negro children, and 71 per cent of the Mexican group slept with windows open every night. Roberts (19) noted that the children of white parentage had better bedroom ventilation than did those of foreign birth. An average of two or more hours a day outdoors was spent by 81 per cent of white group I, 57 per cent of white group II, 72 per cent of the negro children, and 57 per cent of the Mexicans. Economic conditions may have permitted the children in white group I more freedom for outdoor play. Roberts (18) found that some of the Kentucky children who had inadequate clothing were out of doors less in the winter time. Standards for the amount of time that a child should spend outdoors vary somewhat but it is usually recommended that it should be no less than two hours. It would appear that these children were not getting as much time outside as is recommended.

Habits of Cleanliness. Handwashing before meals was practiced by 100 per cent of both white groups, 97 per cent of the negro children, and 72 per cent of the Mexicans. The habit of washing hands after going to the toilet was not well established in all groups inasmuch as only 90 per

cent of white group I, 36 per cent of white group II, 70 per cent of the negroes, and 14 per cent of the Mexicans reported observing this habit.

Two baths a week were taken by 50 per cent of white group I, 36 per cent of white group II, 35 per cent of the negro group, and 43 per cent of the Mexican children. None of the children of any group reported less than one bath weekly, while 22 per cent of white group I, 7 per cent of white group II, 19 per cent of the negroes, and none of the Mexicans reported daily bathing. Frayser, (9) found in her study of South Carolina children that 21 per cent of the white children and 2 per cent of the negro children had daily baths.

Bowel Movements. This factor was considered since it has a close relation to a child's food intake. A daily bowel movement was reported by 81 per cent of white group I, 53 per cent of white group II, 76 per cent of the negro group and 43 per cent of the Mexican children.

The data were analyzed to determine if any relation existed between the amount of fruits and vegetables eaten and the occurrence of constipation. Of a total of six children in white group I, who reported no daily bowel movement, four had three or more servings of fruit and vege-

tables daily. In white group II three such children ate three or more servings daily and five had less. Only one negro child had three servings whereas eight ranged from more than one to none. Of two Mexican children reporting this condition, one had more than three servings and one less.

Posture. The children were asked if standing erect made them tired. The reports showed that 12 per cent of white group I, 35 per cent of white group II, 19 per cent of the negro children, and 14 per cent of the Mexicans, so indicated. There is probably a relationship between posture and nutrition but it is difficult to evaluate since improvement in one may lead to improvement in the other.

Presence of Physical Defects

The total number of physical defects in the 92 children examined, without regard to their relative severity, is shown in Table XII.

It was found (Table XIII) that seven of the children were free from defects; one from white group II, and six from the negro group. An average of 5.1 defects per child was found in white group I, 3.1 in white group II, 3.1 in the negro, and 1.7 in the Mexican.

TABLE XII

SUMMARY OF PHYSICAL DEFECTS

Defects	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num-	per	num-	per	num-	per	num-	per
	ber	cent	ber	cent	ber	cent	ber	cent
None	0	0	1	6	6	16	0	0
Underweight	8	25	4	23	9	24	2	33
Overweight	1	3	0	0	0	0	0	0
Carious teeth	27	87	11	65	22	59	3	50
Poor nutrition	1	3	2	12	9	24	0	0
Diseased tonsils and adenoids	23	72	10	59	17	46	6	100
Poor posture	17	53	2	12	20	54	0	0
Flabby muscles	3	9	0	0	21	57	0	0
Enlarged glands	25	78	11	65	2	5	0	0
Round shoulders	24	75	5	29	7	19	0	0
Spine and chest	20	63	5	29	14	37	1	16
Heart	1	3	0	0	1	3	0	0
Lungs	0	0	0	0	1	3	0	0
Abdomen	19	59	4	23	3	8	0	0
Total	166		54		126		12	
Total of children	32	100	17	100	37	100	17	100

TABLE XIII
SUMMARY OF DISTRIBUTION OF PHYSICAL DEFECTS

Defects	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
None	0	0	1	6	6	16	0	0
One	2	6	4	24	2	6	1	17
Two	3	9	2	12	4	11	5	83
Three	1	3	6	36	7	19	0	0
Four	5	15	0	0	9	24	0	0
Five or more	20	66	4	24	9	24	0	0
Av.per child	5.1		3.1		3.1		1.7	
Total chil- dren	32	100	17	100	37	100	7	100

No relation appeared to exist between the condition of the tonsils and the state of nutrition of the children. A good nutrition rating was given to 49 per cent of the children of white group I with bad tonsils, 45 per cent of white group II, 17 per cent of the negroes, and all of the Mexican children. Medical authorities state that diseased tonsils do not in every case impair nutrition but the consensus of opinion is that they often obstruct the breathing which in turn causes an oxygen intake too small for good oxidation. They may also serve as a source of focal infection. The idea that faulty nutrition may cause abnormal tonsils should be kept in mind when considering the relation between diet and tonsils.

The results of the analyses of the data to determine if possible any correlation between the number of physical defects and the grade of diet showed that fewer defects were found in the children whose diets were scored as adequate. In all, 18 per cent of the defects found in white group I, 33 per cent of those of white group II, 2 per cent of those of the negroes, and 27 per cent of those of the Mexicans were found among the children who ate an adequate diet. A slight relationship appeared to exist between these two factors.

Condition of Teeth

A summary of the condition of the teeth is shown in Table XIV. No cavities or other defects were found in 13 per cent of the children of white group I, 29 per cent of white group II, 29 per cent of the negro children, and 33 per cent of the Mexicans.

Some findings from studies made by others have been compared with these in Table XV.

TABLE XIV
SUMMARY OF CONDITION OF TEETH

Number Defects	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num-	per	num-	per	num-	per	num-	per
	ber	cent	ber	cent	ber	cent	ber	cent
Cavities								
Temporary teeth	25	81.0	10	58.0	18	45.0	2	33.0
Permanent teeth	15	48.0	7	41.0	5	13.0	4	66.0
Both	13	42.0	6	35.0	1	3.0	2	33.0
None	4	13.0	5	29.0	11	29.0	2	33.0
"six-year" molars	16	51.6	7	41.2	6	16.3	3	50.0
Inflamed gums	4	13.0	0	0.0	1	3.0	0	0.0
Abscesses	2	6.0	0	0.0	0	0.0	0	0.0
Stains	14	45.0	1	6.0	4	11.0	0	0.0
Malocclusion	4	13.0	7	41.0	8	21.0	1	16.0
Carious mouths	27	87.1	11	58.8	22	59.5	3	50.0
Cleaning needed	31	100.0	15	88.2	23	62.2	1	16.0
Total children	31*	100.0	17	100.0	37	100.0	6*	100.0

*One child not examined

TABLE XV
NUMBER OF CHILDREN WITH CARIOUS TEETH

Study	Children :		
	White	Negro	Mexican
	per cent	per cent	per cent
Winters (29)			41.0
Sterling (26)		64.4	
Frayser (8)	36.0	38.0	
Present			
White I	87.0	71.0	67.0
White II	71.0		

Each of the above investigators found a higher percentage of children without defects than were indicated in this third-grade study. The incidence of dental caries among the children in the United States is, according to Howe (11), about 95 per cent. The subjects in all the above studies appeared to be somewhat below this figure.

An average of 2.9 carious teeth for each mouth examined was found in white group I, 2.2 in white group II, 1.2 in the negro group, and 1.0 in the Mexican. The average number of decayed teeth for each carious mouth of white group I was 3.4; of white group II, 3.5; of the negro children, 2.0, and of the Mexicans, 2.0. Winters (29), working with Mexicans, found an average of 1.2 decayed teeth for each mouth examined, and 3.0 for each carious mouth. Some authorities suggest that the condition of the six-year molars determines the state of nutrition of

children of this age.

Only 48 per cent of white group I had sound six-year molars, while 59 per cent of white group II, 84 per cent of the negro children, and 50 per cent of the Mexicans had these four molars free from cavities.

Abscesses were found only in the mouths of two children of white group I. Both of these had a liberal amount of milk. One child had citrus fruit each of the days studied, the other but once. Butter and eggs occurred in both diets.

Four cases of inflamed gums were indicated in white group I and one in the negro group. The diets of two of these white children were adequate in milk and vitamin C-rich foods; those of the other two were low in vitamin C and one was lacking in milk. The diet of the negro child contained some milk but was low in vitamin C. Dental authorities believe that the teeth and their supporting structures are the first tissues affected by vitamin C deficiency.

Stained teeth did not occur frequently among the groups but were most common in white group I. As yet there is no definite evidence that this condition is influenced by diet.

Malocclusion, according to some authorities, may be

caused by poor habits of a neuro-muscular nature, by poor care of the temporary teeth, or by imperfect jaw development. The fewest children, 17 per cent, with this defect were in white group I. The greatest number, 46 per cent, was found in white group II, while 20 per cent each of both the negro and the Mexican children showed this condition.

Milk. The results of tabulations made in an effort to correlate conditions of teeth with amounts of milk used are indicated in Table XVI. They indicate that the children receiving more liberal amounts of milk had better teeth. Those drinking little or no milk rated lower than the ones who drank two or more cups except in white group II, wherein, 67 per cent of the children using milk generously had cavities in contrast with 60 per cent of those who drank little milk.

Among the children drinking two or more cups of milk a day, 17 per cent of white group I, 33 per cent of white group II, 55 per cent of the negroes, and 50 per cent of the Mexican children had no cavities. With an average of less than two cups daily, 11 per cent of white group I, 40 per cent of white group II, 45 per cent of the negroes, and 50 per cent of the Mexicans had sound teeth. Seemingly inconsistent with these results, the children in both white groups used more milk than did the other two groups. Yet,

TABLE XVI

RELATION TO THE TEETH OF THE AMOUNTS OF MILK USED

Condition of Teeth	Children Using More than 2 Cups Daily								Children Using 2 Cups or Less Daily							
	Group								Group							
	White I	White II	Negro	Mexican	White I	White II	Negro	Mexican	White I	White II	Negro	Mexican	White I	White II	Negro	Mexican
	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent	num- ber	per- cent
Cavities																
Temporary teeth	17	77	7	58	4	37	0	0	7	78	3	60	13	50	1	25
Permanent teeth	10	45	6	50	1	9	1	50	7	78	1	20	5	19	2	50
Both	8	36	5	42	0	0	0	0	1	11	2	40	9	35	2	50
None	3	17	4	33	6	55	1	50	1	11	1	40	5	46	1	50
Inflamed gums	3	14	0	0	0	0	0	0	6	67	1	20	1	4	1	25
Abscesses	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stains	10	45	1	8	2	18	0	0	4	44	0	0	2	8	0	0
Malocclusion	3	14	4	18	3	14	0	0	1	11	3	60	5	38	1	25
Total children	22	71	12	70	11	30	2	33	9	29	5	30	26	70	4	67

the teeth of the negro and the Mexican children were in better condition. The most significant findings were not between races, but within the groups themselves. More children were free from cavities in each case, with the exception of white group II, among the groups who drank more milk regardless of race.

Fruits and Vegetables. It was noted (Table XVII) that the children having two or more servings of fruit or vegetables daily had fewer cavities than those who ate smaller amounts. Reynolds (17) found in her Virginia study of 323 negro and 462 white children that 40 per cent of the negro and 15 per cent of the white children had good teeth. Since she found the diets of the two races comparable she suggests that the higher percentage of perfect teeth in the negro group may be a manifestation of racial growth or a nutrition cycle differing from the white race. Schenck (24) obtained similar results in a study of Norfolk, Virginia school children. He attributed the better condition of the negroes' teeth to a low consumption of sweets and to an abundant use of green vegetables. This confirms the generally prevalent idea that vitamin C is a factor in maintenance of teeth.

Mellanby (14) states that vitamin D is an important factor in building teeth. While little is known concerning

TABLE XVII

RELATION TO THE TEETH OF THE AMOUNTS OF FRUITS AND VEGETABLES EATEN

Condition of Teeth	Children Eating 2 to 4 Servings Daily								Children Eating Less Than 2 Servings Daily							
	Group								Group							
	White I		White II		Negro		Mexican		White I		White II		Negro		Mexican	
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
Cavities																
Temporary teeth	18	75	6	50	10	42	1	20	6	86	4	80	7	54	0	0
Permanent teeth	14	58	5	42	4	17	2	40	3	43	2	40	2	15	1	100
Both	12	50	4	33	1	4	1	20	2	29	2	40	0	0	0	0
None	4	17	5	42	11	46	2	40	0	0	1	20	4	31	0	0
Inflamed gums	3	12	0	0	0	0	0	0	1	14	0	0	1	8	0	0
Abscesses	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stains	10	42	1	9	3	13	0	0	4	57	0	0	1	8	0	0
Malocclusion	4	17	6	50	4	17	1	20	0	0	1	20	4	31	0	0
Total children	24	76	12	70	24	65	5	83	7	24	5	30	13	35	1	17

the vitamin D intake of these children, the probability is that they all received sufficient sunshine for protection and many of them, the Mexicans in particular, included eggs in their diets. Table XVIII summarizes the relation of carious teeth to diet. Positive correlations were indicated for white group I and the Mexican children, but none were evident for white group II or the negroes.

Other factors, including neglect to clean the teeth, were probably present but the absence of tooth-forming substances in the diets was possibly a direct cause of caries. Only 12 of the 91 children examined by the dentist were eating adequate diets. Of the remainder, 53 reported questionable, and 26 inadequate diets, so it is apparent that the tooth-forming foods, especially milk, eggs, fruits, and vegetables, were lacking in the diets of many of the children.

Relation of Sleep to Growth

A study was made of the amount of sleep each child received and the number of pounds gained during the year. Table XIX shows no apparent relationship.

TABLE XVIII

SUMMARY OF CARIOUS TEETH AS RELATED TO GRADE OF DIET

Group				Grade of Diet								
				Adequate			Questionable			Inadequate		
				: Children :			: Children :			: Children :		
	Chil- dren :	Cavities	: Children : receiving:	with cavities	: Children : receiving:	with cavities	Children receiving	with cavities	: Children : receiving:	Children receiving	with cavities	: Children : receiving:
	number:	num- ber :	per cent:	number	num- ber :	per cent:	number	num- ber :	per cent:	number	num- ber :	per cent:
White I	31*	27	87	5	4	80	22	20	91	4	4	100
White II	17	11	64	4	4	100	8	4	50	5	3	60
Negro	37	22	59	1	1	100	21	10	48	15	11	73
Mexican	6*	4	67	2	0	0	2	2	100	2	2	100

*One not present for dental examination.

TABLE XIX

SUMMARY SHOWING RELATION OF AMOUNT OF SLEEP TO GROWTH

Amount of Sleep	Amount Gained by Children During Year											
	White						Negro			Mexican		
	Group I			Group II								
	no.:	lb.	in.	no.:	lb.	in.	no.:	lb.	in.	no.:	lb.	in.
More than 11 hours	3	3.8	0.8	3	3.3	1.3	3	5	1.7	0	0	0.0
Between 10 and 11 hrs.	27	4.3	1.3	8	3.9	0.5	27	5.2	1.4	4	7.6	0.8
Less than 10 hours	2	4.7	0.8	3	2.3	1.2	7	6.3	1.8	3	3.8	0.8
Total children	32			17			37			7		

TABLE XX

SUMMARY SHOWING RELATION OF DEGREE OF APPETITE TO GROWTH

Degree of Appetite	Amount Gained by Children During Year											
	White						Negro			Mexican		
	Group I			Group II*								
	no.:	lb.	in.	no.:	lb.	in.	no.:	lb.	in.	no.:	lb.	in.
Never hungry	2	6.5	1.1	0	0	0	3	6	1.0	1	6.5	0.1
Always hungry	17	4.0	0.9	3	3.2	1.3	12	5.7	1.7	4	6.2	0.9
Not very hungry	13	3.5	1.4	11	3.1	1.1	22	4.6	1.8	2	5.1	0.9

* No report for 3 children

Relation of Appetite to Growth

The results of a study to discover a possible relation between degree of appetite and amount of growth is shown in Table XX. The children classed as "always hungry" made slightly better gains in weight than those "not very hungry". However, those reported as "never hungry" made better gains than did either of these. The gains in height show similar variation. It is thus seen that in this study there is no consistent relation between degree of appetite and rate of growth.

Relation of Weight to Grade of Diet

The weights of the four groups of children in relation to diet are seen in Table XXI. Of the 12 children who ate adequate diets 4 were below the average weight standard; 10 of the 53 children who received questionable diets were underweight as were 10 of the 28 children with inadequate diets. While there seemed to be a slight relationship between the grade of diet and the weights of the negro and Mexican children, this did not hold true with the white groups. The latter is in accord with the findings of Roberts (20) and Ahmann (1) who concluded that weight is, in many cases, not influenced by grade of diet.

TABLE XXI

SUMMARY SHOWING RELATION OF WEIGHT TO GRADE OF DIET

Diet	Children							
	White				Negro		Mexican	
	Group I		Group II					
	num- ber	per cent	num- ber	per cent	num- ber	per cent	num- ber	per cent
Adequate								
Total children	5	100	4	100.0	1	100	2	100
Underweight	2	40	1	25.0	0	0	1	50
Overweight	0	0	0	0.0	0	0	0	0
Correct weight	3	60	3	75.0	1	100	1	100
Questionable								
Total children	22	100	8	100.0	21	100	2	100
Underweight	5	23	1	12.5	4	19	0	0
Overweight	1	4	0	0.0	0	0	0	0
Correct weight	15	73	7	87.5	17	81	2	100
Inadequate								
Total children	5	100	5	100.0	15	100	3	100
Underweight	1	20	2	40.0	5	33	2	67
Overweight	0	0	0	0.0	0	0	0	0
Correct weight	4	80	3	60.0	10	67	1	33

Relation of Rate of Growth to Grade of Diet

Table XXII shows that the children of white group I who ate adequate diets made greater gains in weight than did the remainder of the group who ate less adequate diets. They exceeded the other three groups slightly in both weight and height.

In the same way, that part of each group receiving a questionable grade of diet made as good or better gains in both weight and height than did those whose diets were classed as inadequate. The Mexican children who received inadequate diets were an exception making slightly better gains in height.

These findings apparently support to some extent the usually accepted idea of a relationship between growth and diet.

TABLE XXII

SUMMARY SHOWING RELATION OF RATE OF GROWTH TO GRADE OF DIET

Group	Grade of Diet								
	Adequate			Questionable			Inadequate		
	: av. gain :			: av. gain :			: av. gain :		
	:no.children:	per child:		:no.children:	per child:		:no.children:	per child:	
		lb. in.			lb. in.			lb. in.	
White I	5	4.6	1.2	22	4.4	1.8	5	3.9	1.0
White II	4	2.8	0.9	7	3.6	1.3	5	3.2	1.3
Negro	1	3.3	1.0	21	6.0	1.7	15	5.1	1.7
Mexican	2	2.9	0.9	2	8.4	0.4	3	6.4	1.0

SUMMARY

In this study of the relation of health habits and diet to teeth and growth in three races of Texas third-grade children the following points were noted:

1. Milk, potatoes, whole grain products, eggs, fruits, and vegetables did not appear as frequently nor as liberally as accepted standards suggest. Meat was included more often than is desirable.

2. Among the more valuable of the 41 foods not tasted by any of the children were liver, cottage cheese, peanut butter, carrots, spinach, and apricots.

3. There was no evidence of seasonal variation in the foods eaten.

4. Only 12 children or 13 per cent of the 93 subjects were eating adequate diets.

5. The majority of the children in each group ate three meals daily. However, the high frequency of "between meal" eating indicates poor food habits or inadequate meals or both.

6. The variation in the practice of health habits was not wide.

7. The most common physical defects were carious teeth, diseased tonsils, enlarged glands, and faulty posture. White group I averaged 5.1 defects; white group II, 3.1; the negro children, 3.1; and the Mexicans, 1.7 per child.

8. Regardless of race, a positive relation between the condition of the teeth of the children and the use of liberal amounts of fruits, vegetables, and milk is suggested.

9. No relation between amount of sleep or degree of appetite and growth was observed.

10. The grade of diet apparently was not a factor in underweight conditions.

11. The diet appeared to influence amount of growth to some extent but not uniformly.

CONCLUSION

This health habit and diet study of three races of Texas third-grade children in relation to teeth and growth indicates that there were greater variations from the accepted standards within the groups than there were between the groups.

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