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LUCILLE D. COCO,¹ MARGARET MOORE,² GRACE A. GOLDSMITH,³
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INTRODUCTION

The advent of the present war has served to make many Americans conscious of existing conditions which had not been fully realized previously. One of the most outstanding of these conditions is the development of a state of "nutrition-consciousness" throughout the country. This awakening had its beginning when the Selective Service Act went into effect, at which time it was discovered that approximately 400,000 out of every 1,000,000 registrants examined (40%) were unfit for general military service, with probably one-third of this number suffering from disabilities directly or indirectly concerned with nutrition.⁶

A research program was organized by the Louisiana Agricultural Experiment station in cooperation with several other agencies in the State for the purpose of studying the adequacies of diets served by various groups. The groups included in the studies thus far conducted are grade-school and high-school students throughout the State, Farm Security Administration families, and home demonstration club members' families. This bulletin, however, deals only with a study of the adequacy of diets of grade-school and high-school students. Similar studies dealing with the other groups mentioned above have already been reported.⁷

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⁶ Hershey, Lewis B., Selective Service and its Relation to Nutrition, *Proceedings National Nutrition Conference for Defense*, page 67, May, 1941, United States Government Printing Office, Washington, D. C.

⁷ Grigsby, Nora E.; McBryde, Laureame C. and Davis, Horace J.—*A Study of the Adequacy of Diets of Farm Security Administration Families in Louisiana*.—Nutrition Laboratories, L. S. U., Baton Rouge, La. (Mimeographed Leaflet).

⁸ Bryson, Bertha E.; Tucker, Clara, and Davis, Horace J.—*A Study of the Diets of Home Demonstration Club Members' Families in Twenty-Seven Parishes in Louisiana*.—Louisiana Bulletin No. 356, L. S. U. Experiment Station, Baton Rouge, La.

Collection and Analysis of Data

In collecting these data, a survey form was developed which, when properly filled out, showed the foods consumed at each meal for a one-week period. These record forms were distributed among the schools in New Orleans by the chairman of the Orleans Parish Nutrition Committee; the Crowley High School records were obtained by the principal of the Crowley High School; and the records from other grade schools and high schools throughout the State were collected by the State Department of Health. A total of 5,776 records were collected from New Orleans schools, 387 from the Crowley High School, and 545 from grade schools and high schools in other areas of the State. In the latter group, a relatively small number of records were obtained from numerous schools. Since the number of records obtained from any one school was insufficient to be considered representative of the entire school, they were all summarized into one group and are reported under the heading "Other Schools." These 545 dietary records were obtained from children who had been examined by officials of the State Department of Public Health and at the same time judged and classified in regard to their nutritional status.

In evaluating the dietary records obtained, a score card was developed which was patterned after the so-called Nutritional "Yardstick" or dietary "pattern." This "yardstick" was established by the Food and Nutrition Committee of the National Research Council at the National Nutritional Conference held in Washington, D. C., May 26-28, 1941. The Food and Nutrition Committee was composed of 28 outstanding authorities in the field of food and nutrition. The "yardstick" which the committee recommended as a guide for planning the daily menu may be summarized as follows:

- Milk, adults 1 pt., children $1\frac{1}{2}$ pts. to 1 qt.
- Eggs, 3 or 4 times per week.
- Meat, 1 serving (1 oz. at 1 yr. up to 3 ozs. for adults.)
- Vegetables, 2 servings. One green or yellow.
- Fruit, 2 servings. One citrus or tomato and one other, as apple, prunes, etc.
- Potato, one or more servings.
- Butter, or fortified oleomargarine. (100-500 calories).
- Whole grain or "enriched" cereal and bread, at least half of the intake.
- Sugar, fat, etc., to complete calories.

By combining the above "yardstick" with a more simple and less expensive dietary "pattern" proposed by workers in the United States Department of Agriculture, a score card was developed for evaluating the adequacy of the diets studied. This score card included the recommended servings of the protective foods (milk, eggs, lean meat, fresh vegetables, etc.) on a per-week basis as shown in Figure 1.

FIGURE 1. A SCORE CARD FOR DETERMINING THE ADEQUACY OF DIETS

	SERVINGS PER WEEK		
	Good	Fair	Poor
Milk.....	14 or more	8-13	7 or less
Butter.....	14 " "	8-13	7 " "
Eggs.....	5 " "	3- 4	2 " "
Lean meat or substitute*.....	7 " "	4- 8	3 " "
Vegetables			
Green, leafy, or yellow.....	7 " "	4- 6	3 " "
Others.....	7 " "	4- 6	3 " "
Potatoes.....	7 " "	4- 6	3 " "
Whole grain cereals.....	10 " "	5- 9	4 " "
Fruits			
Citrus fruits or tomatoes or.....	7 " "	4- 6	3 " "
Raw vegetables†.....	7 " "	4- 6	3 " "
Other fruits.....	7 " "	4- 6	5 " "

*Lean meat as such must appear in the menu at least four times per week. Meat substitutes include cheese, dried peas or beans, and soybeans.

†The only raw vegetables which may be included in this group are cabbage, green peppers, and radishes.

In applying the score card, each of the ten foods or food groups was scored as good, fair, or poor, depending on the number of times it was served during the week. A diet that measured up to the recommendations of the "yardstick" obviously scored good in all respects. If a food was served only one half as many times during the week as is recommended in the "yardstick" it was classed as poor. Foods that were served more than one half, but less than the recommended number of times per week, were classed as fair (Figure 1). This method of analysis made it possible to classify each of the ten foods as good, fair, or poor.

After classifying the foods individually, the total diet was classed either as good, fair, or poor. In making this classification, a simple method was developed whereby each of the ten foods was given a value of three, two, or one. All foods that were classed as good were given a score of three, all foods that were classed as fair were given a score of two, and all foods that were classed as poor were given a score of one. The scores of the individual foods were totaled to obtain a score for the whole diet. A diet that conformed to the "yardstick" in all respects received a score of 30. After scoring numerous diets and then calculating their compositions in terms of food nutrients (protein, vitamins, minerals, etc.) it was found that diets which received a total score of 25 or more were adequate in all known respects and therefore were classed as good. The diets that scored from 15 to 24 points were classed as fair, and those that scored 14 or less were classed as poor. In using this system of evaluating diets, a good diet may be defined as one which is adequate in all known respects. A poor diet is distinctly deficient in one or more of the food factors necessary for optimum health. Diets that were classed as fair may be defined as borderline diets. In many cases they do not supply enough of the various food factors—vitamins, minerals, and protein in particular—to meet adequately the requirements of the individual.

Results and Discussion

A summary of the adequacy of diets consumed by the three groups of grade-school and high students is shown in Table 1. There is very little variation in the per cent of diets that scored good. In each group, the number of diets that scored good was quite small. The students in Crowley High School had a higher percentage of diets scoring fair and fewer scoring poor than the students from other schools studied. The diets consumed by the negro students were extremely poor. Fifty-eight per cent of the diets of negro students in New Orleans scored poor, and 75 per cent of the diets of negro students in other areas of the State scored poor. These findings lead one to wonder why nutritional deficiency diseases are not more commonly recognized among negroes.

TABLE 1. A SUMMARY OF THE ADEQUACY OF DIETS CONSUMED BY GRADE-SCHOOL AND HIGH-SCHOOL STUDENTS IN LOUISIANA.

	WHITE			NEGRO		
	Good	Fair	Poor	Good	Fair	Poor
Crowley High School						
Number.....	56	283	48
Per Cent.....	14.5	73.1	12.4
New Orleans Schools						
Number.....	513	2751	1349	38	443	682
Per Cent.....	11.2	59.6	29.2	3.3	38.1	58.6
Other Schools						
Number.....	23	138	94	1	71	218
Per Cent.....	9.0	54.1	36.9	0.3	24.5	75.2

A summary of the adequacy of the diets in each of the 10 protective foods consumed by white students is given in Table 2. While there was considerable variation in the adequacy of diets consumed by white students in different schools, they all followed about the same general pattern. For example, the consumption of meat or meat substitutes in all three groups of diets came nearer meeting the present recommendations than any of the other foods. Likewise, the consumption of whole grain cereals was lower (tenth) in all groups than was any other food. Taking all of the diets of white students as one group, the consumption of milk ranked second (next to meat); green, leafy, or yellow vegetables ranked third; eggs ranked fourth; other fruit (other than citrus) ranked fifth; vegetables (other than green, leafy, or yellow) ranked sixth; citrus fruit, tomatoes and raw vegetables ranked seventh; butter ranked eighth; and potatoes ranked ninth. Seven of the protective foods scored good in less than 50 per cent of the diets studied. It is to be expected that the use of certain vegetables will vary at different seasons of the year; however, it is doubtful if seasonal variations will explain the relatively poor score most of these diets received. All of these records were obtained during the

TABLE 2. A SUMMARY OF THE ADEQUACY IN EACH OF THE TEN PROTECTIVE FOODS OF DIETS CONSUMED BY WHITE STUDENTS.

	CROWLEY HIGH SCHOOL			NEW ORLEANS SCHOOLS			OTHER SCHOOLS		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Milk									
Number	262	96	29	1936	1394	1256	125	84	46
Per Cent.....	67.7	24.8	7.5	42.6	30.2	27.2	49	32.9	18
Butter									
Number	73	94	220	1706	1072	1835	24	63	168
Per Cent.....	18.9	24.3	56.8	37	23.2	39.8	9.4	24.7	65.9
Eggs									
Number	125	138	124	990	1255	2368	82	80	93
Per Cent	32.3	35.7	32	21.5	27.2	51.3	32.2	31.4	36.5
Lean Meat or Substitute*									
Number	346	29	12	3688	548	377	186	46	23
Per Cent.....	89.4	7.5	3.1	79.9	11.9	8.2	72.9	18	9
Green, Leafy, or Yellow Vegetables									
Number	248	72	67	2266	1087	1260	67	68	120
Per Cent.....	64.1	18.6	17.3	49.1	23.7	27.3	26.3	26.7	47
Other Vegetables									
Number	149	125	113	1049	1089	2475	44	58	153
Per Cent.....	38.5	32.3	29.2	22.7	23.6	53.7	17.3	22.7	60
Potatoes									
Number	66	130	191	734	1428	2451	44	79	132
Per Cent.....	17.1	33.6	49.3	15.9	31	53.1	17.3	31	51.8

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TABLE 2 (Continued). A SUMMARY OF THE ADEQUACY IN EACH OF THE TEN PROTECTIVE FOODS OF DIETS CONSUMED BY WHITE STUDENTS.

	CROWLEY HIGH SCHOOL			NEW ORLEANS SCHOOLS			OTHER SCHOOLS		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Whole Grain Cereal									
Number	32	99	256	366	981	3266	13	58	184
Per Cent.	8.3	25.6	66.1	7.9	21.3	70.8	5.1	22.7	72.2
Citrus Fruit, Tomatoes, or Raw Vegetables†									
Number	114	116	157	1174	1000	2439	47	62	146
Per Cent.	29.5	30	40.5	25.4	21.7	52.9	18.4	24.3	57.3
Other Fruit									
Number	120	100	167	1478	1044	2091	63	63	129
Per Cent.	31	25.8	43.2	32	22.6	45.3	24.7	24.7	50.6
TOTAL DIET									
Number	56	283	48	513	2751	1349	23	138	94
Per Cent.	14.5	73.1	12.4	11.2	59.6	29.2	9.0	54.1	36.9

*Lean meat as such must appear in the menu at least four times a week. Meat substitutes include cheese, dried beans and peas, and soybeans.

†The only raw vegetables which may be included in this group are cabbage, green peppers, and radishes.

spring and early summer of 1942, at which time vegetables are relatively cheap and abundant in city markets. The Crowley area and other schools outside New Orleans have many pupils coming from rural areas where home gardens could have supplied an abundance of vegetables at this time of year.

A summary of the adequacy of diets in each of the 10 protective foods consumed by negro students is shown in Table 3. As a group, the diets consumed by the negro students were much poorer than those consumed by white students. The rank of the protective foods in these diets was quite similar to the diets of the white students with the exception of milk. The consumption of meat and meat substitutes ranked first as compared to the other foods, and scored good in approximately 70 per cent of the diets; eggs ranked second; green, leafy, or yellow vegetables ranked third; other fruit (other than citrus) ranked fourth; other vegetables including asparagus, cauliflower, turnips, etc., ranked fifth; potatoes ranked sixth; milk ranked seventh; citrus fruit, tomatoes, and raw vegetables ranked eighth; butter ranked ninth; and whole grain cereals ranked tenth.

From the results of this study it is difficult to say specifically which food factors are most often deficient in the diets of school children. The low consumption of whole grain cereals suggests a deficiency of vitamin B₁ (thiamin). The poor diets which were very low in all fruits and vegetables, milk, and butter, as well as whole grain cereals, would seem to be very low in minerals, all of the members of the B complex, vitamin C and vitamin A.

Nutritionists agree that the well defined deficiency diseases such as pellagra, resulting from a total lack of nicotinic acid; beriberi, resulting from a total lack of thiamine (vitamin B₁); or scurvy, resulting from a total lack of ascorbic acid (vitamin C) are of comparatively rare occurrence. There are, however, many indications of partial deficiencies which commonly occur in human diets, in varying combinations and in varying degrees. These include slow growth of the child; poor posture resulting from low muscle tone; underweight; fatigue; low resistance to infections; nervousness, restlessness and irritability; tender bleeding gums; scaly dry skin and skin eruptions; predilection to tooth decay; and some degree of night blindness. On the side of positive evidence, experience has shown that improvement of poor diets improves growth and general physical appearance of the child and increases physical endurance and mental alertness. Many teachers have reported that children show more interest, have more ability to concentrate, and decrease their absences due to illness, when a good school lunch program adds "protective foods" (foods having high mineral and vitamin content) to their diet. That the foundation of physical and nervous stamina for adult life are laid in childhood is a well known fact and good nutrition is one of the most important environmental factors contributing to optimum health and vigor throughout life.

It is worthy of mention that among the white children examined during the Public Health Department survey 13.4 per cent were judged to

TABLE 3. A SUMMARY OF THE ADEQUACY OF DIETS CONSUMED BY NEGRO STUDENTS IN EACH OF THE TEN PROTECTIVE FOODS

	NEW ORLEANS SCHOOLS			OTHER SCHOOLS		
	Good	Fair	Poor	Good	Fair	Poor
Milk						
Number	122	359	682	15	63	212
Per Cent.	10.5	30.9	58.6	5.2	21.7	73.1
Butter						
Number	63	219	881	3	7	280
Per Cent.	5.4	18.8	75.8	1	2.4	96.6
Eggs						
Number	186	314	663	44	90	156
Per Cent.	16	27	57	15.2	31	53.8
Lean Meat or Substitute*						
Number	796	229	138	205	56	29
Per Cent.	68.4	19.7	11.9	70.7	19.3	10
Green, Leafy, or Yellow Vegetables						
Number	292	312	559	20	73	197
Per Cent.	25.1	26.8	48.1	6.9	25.2	67.9
Other Vegetables						
Number	188	253	722	20	41	229
Per Cent.	16.2	21.8	62.1	6.9	14.1	79
Potatoes						
Number	93	203	867	29	59	202
Per Cent.	8	17.5	74.5	10	20.3	69.7
Whole Grain Cereals						
Number	78	201	884	1	41	248
Per Cent.	6.7	17.3	74.5	.3	14.1	85.5
Citrus Fruits, Tomatoes or Raw Vegetables†						
Number	113	163	887	16	41	233
Per Cent.	9.7	14	76.3	5.5	14.1	80.3
Other Fruit						
Number	226	210	727	25	53	212
Per Cent.	19.4	18.1	62.5	8.6	18.3	73.1
TOTAL DIET						
Number	38	443	682	1	71	218
Per Cent.	3.3	38.1	58.6	.3	24.5	75.2

*Lean meat as such must appear in the menu at least four times per week. Meat substitutes include cheese, dried peas or beans, and soybeans.

†The only raw vegetables which may be included in this group are cabbage, green peppers and radishes.

be in "Poor" or "Very Poor" nutritional condition while 24.4 per cent of the negro children examined during the same survey were judged to be in "Poor" or "Very Poor" nutritional status.* Dietary records from children examined in this survey are summarized in Tables 2 and 3 of this paper under the heading "Other Schools."

Practical Recommendations

In order to make satisfactory changes in the food habits of the family, every homemaker must first obtain a general knowledge of the nutritional needs of the individual. This information can be obtained from the College of Agriculture at the Louisiana State University, from the parish Home Demonstration agent, from the Farm Security agent, from local home economics teachers in the public schools, from Red Cross Nutrition classes (if they have been organized in the community), or from the United States Department of Agriculture.

By securing reliable information in regard to proper methods of cooking, the homemaker can reduce losses of minerals and vitamins in cooking and thereby improve the nutrition of the family. This information can be secured from the sources mentioned above.

The homemaker should learn how to get the largest possible nutritional value from the money she can afford to spend for food. She should demand from her grocer enriched foods in the lines where these are obtainable. She should know which foods have a high nutritive value in proportion to their cost.

Many families living in rural areas could well produce their own milk, meat, and eggs and thus secure a more abundant supply of these important foods than their incomes will permit them to buy. Adequate amounts of these foods require a considerable portion of the food money when they must be purchased. If they can be produced at home this money is available for other needs.

Home gardens, where these are possible, carefully planned and properly cared for, can be one of the cheapest and most dependable methods of insuring a supply of fresh vegetables throughout most of the year. In some areas farm orchards are a practical source of fruits.

Where home gardens, orchards, poultry and hogs or cattle are practical, canning of some fruits and vegetables, proper storage of others, canning and curing of meats, home preservation of eggs and possibly home drying of some products should be more commonly practiced to provide an adequate supply of these foods in seasons when they are not available in sufficient quantity or variety in the fresh state. In some communities a canning kitchen or canning equipment are available for a small fee.

School lunches should provide as much protective foods as possible to supplement home diets which are often inadequate in this respect.

* Margaret Moore—Personal Communication.