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To the Graduate Council:

I am submitting herewith a thesis written by Carrie Norton Herring entitled "A Study of the Dietary Habits of Junior and Senior High School Girls in Four Rural Mississippi Communities." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Florence L. MacCleod, Major Professor

We have read this thesis and recommend its acceptance:

Ella J. Day, Jessie W. Harris

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

Nov. 8, 1934

To the Committee on Graduate Study:

I submit herewith a thesis by Mrs. Carrie Norton Herring, "A Study of the Dietary Habits of Junior and Senior High School Girls in Four Rural Mississippi Communities", and recommend that it be accepted for 9 quarter hours credit in fulfilment of the requirements for the degree of Master of Science, with a major in Nutrition.

Florence S. MacLeod
(Major Professor)

At the request of the Committee on Graduate Study, I have read this thesis and recommend its acceptance.

Ella J. Day

Jessie W. Harris

J. D. Ward
(For the Graduate Committee)

A STUDY OF THE DIETARY HABITS OF JUNIOR AND SENIOR HIGH SCHOOL GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

A THESIS

Submitted to the Graduate Committee
of
The University of Tennessee
in
Partial Fulfilment of the Requirements
for the degree of
Master of Science

by

CARRIE NORTON HERRING

June 1935

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The author is grateful to Miss Fannie Maude Cox, Miss Mildred Jack, and Miss Mattie Mathews for conducting the study in their respective communities.

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A STUDY OF THE DIETARY HABITS OF JUNIOR AND SENIOR HIGH SCHOOL GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

Part I. Purpose and Method of Study

Purpose of the Study

The purposes of this study of the dietary habits of junior and senior high school girls in four areas of Mississippi were:- (1) to gain information concerning the diets of girls living in their normal home environment and the relation of the diets to their energy output; (2) to find how, if at all, the general status of the family affected the dietaries; (3) to study the diets in relation to the supply of foods produced and stored in the homes for consumption; (4) to find, if possible, the effect of the diet upon the general health of the girls; and (5) to make comparisons of the communities upon the basis of the data collected.

It is hoped that the results of this study will be helpful to home economics teachers, home demonstration agents, relief agencies, and others interested in the nutritional welfare of adolescent girls.

Survey of Literature

Davies[1], in 1928, made a study of the food consumption of fifth grade children in two rural towns of Massachusetts with populations from 1,000 to 1,500 in an effort to ascertain what relationships could be found between the dietary habits of elementary school children and the state of their health. There were 275 rural school children included in this study, and the survey was made by means of visits to the homes, questionnaires filled in by the pupils at school, and by dental and medical examinations.

A standard for judging the diets of the children from the two towns was set up in which an optimum score of 100 was used. Twenty-four points were allowed for milk, 23 for cooked vegetables, 21 for fruit and raw vegetables, 14 for whole grain cereal foods, and 18 for meat and eggs. The diets were judged for qualitative factors only, with the exception of milk, which was judged on both a qualitative and quantitative basis. Judged on this standard, only 15 per cent of the children of one town and 24 per cent of those of the other town were considered to have diets suited to the needs of the body.

In this study records were made of the condition of the teeth, and these proved to be the principal

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1 Davies, E. S., The Food Consumption of Rural School Children in Relation to Their Health. Mass. Agric. Expt. Sta. Bull. 241 (1928)

data available for evaluation of the state of nutrition of the children. All dental examinations were conducted by able hygienists who used very careful methods of procedure. The results showed that, with other factors of the two towns much the same, the larger amount of milk consumed in the dairying region as contrasted with that consumed in the non-dairying region resulted in distinctly better teeth among the children whose diets were regularily reinforced with milk.

In 1929-30 Dickins[2] made a study of the food consumption of boys and girls in six typical agricultural high schools in Mississippi. This study included 75 boys and girls whose ages ranged from 15 to 19 years. The actual food eaten for thirteen consecutive meals was weighed, and the judging of the diets was done on the basis of the optimum score worked out by Davies[3]. Information was also obtained concerning the foods and amounts eaten between meals. Information as to the weight, height, and activity of the boys and girls was considered. The caloric intake was found to be sufficient for the majority of the boys and girls studied, as was also the protein, fat, and carbohydrate intake. Each group met the minimum daily phosphorus requirement. One group of boys and girls failed

2 Dickins, Dorothy, Food Consumption of Boys and Girls in Six Typical Agricultural High Schools of Mississippi. Miss. Agric. Expt. Sta. Bull. 292 (1931)

3 Davies, E. S., op. cit.

to get sufficient calcium. Vitamin A was found to be the most abundant and vitamin C the least abundant. In those schools where the greatest proportion of food was raised on the school farm the dietaries were more adequately meeting the needs of the pupils.

Dickins[4] also made a study of ten representative families from each of eight counties in two contrasting areas of Mississippi in 1926-27. Each community had one local supervisor. Foods bought as well as those produced on the farm were weighed as they were used. Menus used were recorded for a period of two weeks in each of four seasons. Physical examinations were made by a representative of the Mississippi State Board of Health, 82 per cent being made by one doctor.

The results of the dietary study showed a general average little above that necessary for energy, protein, and phosphorus requirements; calcium was well provided; iron was deficient in quantity; the vitamin A and B requirements were probably met, and vitamin C was low in the fall, winter, and early spring. There was little variation in nutritional values, and any variation found was due to a change in the amounts of milk and vegetables used. Families raising and selling large quantities of food products were shown to consume more than did

4 Dickins, Dorothy, A Study of Food Habits of People in Two Contrasting Areas of Mississippi. Miss. Agric. Expt. Sta. Bull. 245 (1927)

families who did not raise or sell to any extent. The average number of defects per child per family was higher for the families whose dietaries were below standard in two or more of the nutritive factors.

Description of the Areas Selected

For the purposes of this study, the state of Mississippi may be divided into four geographic regions.

I. The Coastal Plains Area, which constitutes the most extreme southern portion of the state, extends from the Gulf of Mexico northward for about seventy-five miles. Here the land is level or very slightly rolling, and because of the extensive rainfall, which averages over 60 inches[5] annually, the temperate winds from off the gulf, and the extremely warm climate, the agricultural pursuits are more varied than in any other region of the state. These factors are also influential in contributing to greater variations in living conditions. The principal agricultural pursuits are poultry farming, dairying, general trucking, cultivation of corn, sugar cane, satsuma oranges and other small fruits, as well as a great variety of vegetables.

II. The Delta Region, extending from the course of the Mississippi River eastward over the level alluvial soils until it reaches the bluff section, reaches its most

5 Bolton, Willa, The Geography of Mississippi, Fig. 6, p. 10, in Dodge-Lackey's Advanced Geography (Mississippi Edition), Rand McNally and Company, New York (1930)

extreme width at about the latitude of Greenwood. This section has a variation in rainfall of from 50 to 55 inches[5] per year in the southern and central part to about 45 or 50 inches[5] in the northern division. Cotton is the most extensively cultivated crop, with corn following next in importance. The range of living conditions extends from the plantation owner downward to manager, share-cropper, and common laborer.

III. The Northern Prairie Region is located by the Tennessee and Alabama boundary lines to the north and the east, the Delta Region on the west, and extends southward to Grenada on the western side and gradually slopes southward until it reaches the Alabama line at about the 33rd latitude. The rainfall in this entire region is between 50 and 55 inches[5] annually. The temperature sometimes drops to a few degrees below 0°F during the winter, thus limiting the agricultural activities to the more mild months of late spring, summer and fall. Cotton is the staple crop of the region, while corn and feeds, as hay and oats, are raised in abundance to support the increasingly large herds of dairy cattle. Sorghum cane is raised throughout the area. The pronounced hill sections are used extensively as pastures for hogs.

IV. The Central Region is centrally located between the Delta, Northern and Gulf Regions, and is bounded on the east by the Alabama border line. The rainfall

ranges between 50 and 55 inches[5] annually. Much of the land is rugged, being eroded until it is not suitable for agricultural purposes. Cotton, corn, hay, sugar cane, sorghum, hogs, and dairy cattle are the chief interests of the region as an agricultural section.

Financial Status of Families of Girls Studied

The author is using terms as follows:

1. Ownership of homes means the possession and control of an area of land, and the responsibility for the taxes and other obligations.

2. Renter means one who pays cash for the use of an area of land for a definite period of time, with responsibilities as agreed upon at the time of taking temporary possession.

3. Share-cropper means one who is not financially responsible, or who for some other reason prefers to be "furnished" for the year with tools, stock animals, housing facilities,and other necessities until the season of harvest, when he usually has these items checked against him and makes settlements to the owner as the produce is sold.

The following table will explain the relative conditions which prevailed in the families of the pupils studied, as well as give a comparison of the communities selected.

TABLE I. FINANCIAL STATUS OF THE COMMUNITIES

School	Number Pupils	Per Cent Owners	Per Cent Renters	Per Cent Share-Croppers	Region
Cale-donia	48	66.7	22.9	8.3	Northern Prairie
Coxburg	34	38.2	55.9	5.9	Central
McNiel	28	75.0	3.6	3.6	Gulf Coast
Morgan City	33	33.3	45.5	18.2	Delta

McNiel School had the highest per cent of home owners, Coxburg School the highest per cent of renters, and Morgan City School the highest per cent of share-croppers.

Description of the Schools Chosen

Caledonia School, in the Prairie Region, is located in the north-eastern part of Lowndes County. Its nearest town, Columbus, is also the county seat and is sixteen miles from the school. A gravel road connected the school with the other parts of the county. Twelve school trucks transported most of the 600 pupils to and from school. Two hundred and fifty of these students were in the high school department. Of the total of 28 teachers employed, 18 were doing high school work. The school had maintained a department for vocational home economics for the past six years. This department was housed in the building with the other high school work. There were about 450 families in the school district.

Coxburg School is in the Central Region and is located in the western part of Holmes County. The nearest town is Eden, a distance of eight miles; while Lexington, the county seat, is sixteen miles from the school. Dirt roads surrounded the school for a radius of about five miles. The district had about 88 square miles, and a total of approximately 300 families. Ten trucks and one car transported the 330 pupils to and from school. Fifty of these pupils were enrolled in the high school department. Ten teachers were employed, with three doing full-time high school work, and one doing part-time high school work. The school had maintained a department for vocation-

al home economics for nine years. This department was housed in the vocational building with the agriculture department.

McNiel School, located in the southern part of Pearl River County, had about 250 families. It is in the Gulf Coast Region. The community was more congested than the other communities, due to the location there of a branch of the State Experiment Station. It is 13 miles from the county seat, Poplarville. The district is 12 miles square. Nine trucks were used in transporting the 410 pupils to and from school. Eighty-five of these pupils were enrolled in the high school department. Of the 16 teachers employed, 6 were doing high school work. This school had maintained a vocational home economics department for 12 years, and it was housed in the vocational building.

Morgan City School, located in the northeastern part of Leflore County, is in the Delta section of the state. The nearest town, Ita Bena, is ten miles distant and the county seat, Greenwood, is 18 miles. There are 51 square miles and 6 river lots in the district, with a total of about 1200 families. There were five trucks to transport the 250 pupils to and from school, 75 of whom were in the high school department. Of the ten teachers employed, six were doing full-time high school work and one a part-time high school program. Both

dirt and gravel roads connected the school with the community at large. A vocational home economics department had been maintained for four years, and was housed in the vocational building.

Time Selected for Sending the Questionnaires

The investigator desired to accumulate data as to the menus being served in the homes and the foods being consumed by the girls at two definite seasons of the year--i.e., winter and spring. Due to the holidays during the year, such as Christmas, New Year and Easter, which might have influenced the type of diets, it was thought best to get the information as to the winter menus after the Christmas and New Year holidays. It was considered that at this time the families would be on a comparatively normal winter diet. Therefore, the first questionnaires were sent out to be filled in by the pupils on the week-end of January 19, 1934. The advantage here was two-fold:- (1) the menus and food consumption could be secured for a normal winter diet, and (2) it allowed time for those families who computed their family accounts on a fiscal year beginning January 1 to have completed such records.

The week-end of April 13 was selected for obtaining data for the spring menus. The author realized that this was a little early to get the benefits of the

fresh vegetables in some sections. To wait later would have meant that the schools running on an eight month term would have been closed and the possibility of securing the data would have been lost. McNiel School, in the Coastal Region, began earlier than the others where the questionnaire was being used, and consequently it was closed when the last set of questionnaires arrived.

Method of Choosing Schools and Distributing Questionnaires

The writer explained her problem to the State Supervisor of Vocational Home Economics and requested her advice in the selection of suitable schools for conducting the study. She suggested schools and teachers, keeping in mind the necessity for cooperation in an undertaking of this kind. From the suggested list the writer made final selections as follows:

1. Northern Prairie Region:-Caledonia School, Lowndes County.
2. Central Region:- Coxburg School, Holmes County.
3. Gulf Coast Region:- McNiel School, Pearl River County.
4. Delta Region:- Morgan City School, Leflore County.

Each school in the final choice had a total of fifty or more junior and senior high school girls.

Fifty questionnaires were mailed to the teacher of home economics at each school. Accompanying them was a letter of instruction to the girls, and a

general school questionnaire to be answered by the teacher. (See Appendix). Return postage was inclosed in a personal letter to the teacher.

Description of the Method Used in Scoring Menus

The score card used by Jones[6] in scoring the menus for children in Tennessee, which she based essentially upon the score card used by Davies[7] in her Massachusetts study, was used in scoring the menus of this study. In the present study a slight change was made in the Jones'[8] score card: i.e., instead of using citrus fruits exclusively, citrus fruits or tomatoes were given the same score. (See page 17 for Score Card).

An attempt was made to get menus for only four days: Saturday, Sunday, Monday and Tuesday. This was believed to give a fair representation of the diets during the days at home and at school. It seemed reasonable to expect that if a given food, such as milk, was served in each of these days that it would be served during the other days of the week; or if eggs were served twice during this period that they would be served at least once during the remainder of the week.

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6 Jones, B. L., Study of Foods Habits of Fifth Grade Children in Five Counties in Tennessee. Thesis (M. S.), University of Tennessee. (1933)

7 Davies, E. S., op. cit.

8 Jones, B. L., op. cit.

Forms for the food record, a sheet of directions for the teacher, as well as for the pupils, and the school questionnaire sheets to be used as a basis for gathering information for this study, were prepared under the direction of the Department of Nutrition, University of Tennessee. A copy of each form used is included in the Appendix.

The children filled out the questionnaires at home with the cooperation of the parents. They filled in the food record sheets following the eating of each meal.

Number of Girls Studied

There was a total of 143 girls studied in this survey. Their ages ranged from 11 to 21 years, 78.5 per cent being from 14 to 17 years of age. Of this number, 48 were from Caledonia School, 34 from Coxburg School, 28 from McNiel School, and 33 from Morgan City School.

Of the fifty questionnaires sent to the respective schools, returns were received as shown in Table 2.

TABLE 2. NUMBER OF QUESTIONNAIRES RETURNED BY DIFFERENT SCHOOLS

School	Winter	Spring
Caledonia	48	41
Coxburg	34	20
McNiel	28	None School closed
Morgan City	33	21
Total	143	82

The size of the families where the questionnaires were filled out ranged from three members to fourteen members. Seventy-five per cent of them ranged from four to eight members. McNiel School had the widest range in sizes, having all except the five-member size represented.

The families studied represented eighteen different occupational groups. The greatest diversification came in the McNiel School group, where thirteen different occupations were reported. Farming was the most general occupation, and was reported by 100 per cent at Coxburg School, 92 per cent at Caledonia School, 76 per cent at Morgan City School, and 59 per cent at McNiel School. The other occupations were as follows:- truck driver, common laborer, blacksmith, garage worker, saw mill operator, director of experiment station, road worker, railroad employee, ginner, woods foreman, manager of plantation, compress operator, teacher, preacher, secretary, fisherman, and miscellaneous worker.

PART II. RESULTS OF THE STUDY

The author made an attempt to study the quantity as well as the quality of the diets of the girls, but milk was the only food for which it was felt that fairly accurate quantitative data were obtained. The assumption was made that average servings of meats and meat substitutes, cereals and breads, vegetables, and fruits were eaten at each meal. It is believed that a fairly good picture of the qualitative character of the diets has been drawn from these data.

An attempt was also made to obtain reliable data concerning the cash income of the families and how much of the income was spent for foods, but it was felt that the results were not accurate enough to incorporate in this report. However, a general estimate of the financial conditions existing in each community may be made from Table I.

The report of the physical defects of the girls, which is incorporated in this study, is based upon the answers given by the girls in the questionnaire. It is felt that these data are fairly accurate.

The Optimum Score

The scoring system worked out by Davies[9], in which numerical numbers assigned to each of the five food groups were used in comparing one child's diet with that of another, was used in this study. These foods groups are given below with the numerical value assigned to each. In this study, the values are slightly different from those used by Davies[10] and are modified in one respect from the adaptation of Jones[11].

Optimum Score Card[12]

Food	Standard	Score Used in This Study	Score Used by Jones	Score Used by Davies
Milk	1 qt. a day	24	24	24
Vegetables				
Potato	Once a day			5
Other than potato or leafy	Once a day			10
Leafy	Four times a week			8
Green	Four times a week	8	8	
Other	Once a day	14	14	
Fruit				
Cooked	Once a day			7
Raw (or raw vegetable or canned tomato	Twice a day			14
Citrus fruit	Four times a week		8	
Citrus or tomato	Four times a week	8		
Other fruit	Once a day	11	11	

9 Davies, E. S., op. cit., p. 103
10 Ibid.
11 Jones, B. L., op. cit., p.12
12 Ibid.

Optimum Score Card (cont'd)

Food	Standard	Score Used in This Study	Score Used by Jones	Score Used by Davies
Bread and Cereals				
Whole grain	Twice a day			14
Bread	Twice a day	10	10	
Other cereal	Once a day	7	7	
Eggs	Three times a week	9	9	9
Meat	Once a day	9	9	9
		100	100	100
Tea or Coffee	deduct	10	10	10

According to Sherman[13], children between 5 and 16 years should receive from 22 to 32 per cent of their total caloric intake from milk, and he (Sherman)[14] says, "a quart of milk a day for every child was originally designed to ensure a protein supply appropriate in kind as well as adequate in amount". Milk is our "most nearly perfect food" and supplies, besides protein, a large part of the calcium and phosphorus in the diet, together with a good supply of vitamins A, B, and G. Therefore, milk is given the highest score of 24 points. Cocoa was given a score equal to that of milk, since in the rural districts it is generally made entirely of milk.

Vegetables, because of their mineral and vitamin content, have been given a score of 22, which is almost as high as that for milk. Vegetables other than the

13 Sherman, H. C., Chemistry of Food and Nutrition, Fourth Edition, The MacMillan Co., New York, (1932), Table 57.

14 Ibid, p. 511.

leafy ones contain a high energy content and may be used to some extent as a substitute for cereals.

Fruits used in the diet furnish the body with minerals and vitamins. Some of our non-citrus fruits furnish generous quantities of energy materials, as well as add bulk to the diet. Tomatoes and citrus fruits are especially good sources of vitamin C. An allowance of 19 points was made for fruits in the scoring.

Meats and meat substitutes, including eggs, fish, and cheese, were given a combined score of 18. Because of the value of eggs to the growing body, in furnishing vitamins A, D, and G and iron, they were given half of the score of the group.

Bread and cereals were given a combined score of 17. Whole grain cereals are more valuable in the diet than are the milled cereals, because of their higher vitamin and mineral contents.

A deduction of 10 points was made from those diets in which tea or coffee appeared.

A method of scoring such as has just been described makes it possible to represent the values of the dietaries of the children on a numerical basis.

Total Diet Scores Found in This Study

On the basis of the preceding score card, the winter diets of 143 girls and the spring diets of 82 girls were graded. A distribution of the final scores of each community will be found in Tables 3 and 4.

TABLE 3. SCORES OF WINTER DIETS OF 143 JUNIOR AND SENIOR HIGH SCHOOL GIRLS, BY COMMUNITIES

Score	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
20- 24	0	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	1	4	0	0	1	*
30-34	0	0	0	0	2	7	1	3	3	2
35-39	2	4	1	3	1	4	1	3	5	4
40-44	2	4	1	3	2	7	4	9	8	6
45-49	3	7	2	6	0	0	6	19	11	8
50-54	8	16	2	6	2	7	4	13	14	10
55-59	1	2	4	12	7	25	3	9	15	11
60-64	5	10	4	12	7	25	1	3	17	12
65-69	6	13	7	20	0	0	1	3	14	11
70-74	9	18	3	9	5	17	5	15	22	15
75-79	1	2	2	6	0	0	5	15	8	6
80-84	3	7	5	14	1	4	1	3	10	7
85-89	2	4	2	6	0	0	0	0	4	3
90-94	5	10	0	0	0	0	1	3	6	4
95-100	1	2	1	3	0	0	0	0	2	1
Total	48	100	34	100	28	100	33	100	143	100

* Less than 1 per cent

TABLE 4. SCORES OF SPRING DIETS OF 82 JUNIOR AND SENIOR HIGH SCHOOL GIRLS, BY COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
30-34	0	0	0	0			0	0	0	0
35-39	0	0	0	0			1	4	1	1
40-44	0	0	0	0			0	0	0	0
45-49	2	5	1	5			0	0	3	3
50-54	2	5	3	15			3	15	8	12
55-59	5	13	0	0			3	15	8	9
60-64	6	15	2	10			2	10	10	12
65-69	6	15	4	20			4	19	14	18
70-74	5	13	5	25			5	25	15	21
75-79	4	10	2	10			1	4	7	8
80-84	3	7	3	15			0	0	6	7
85-89	4	10	0	0			1	4	5	5
90-94	2	2	0	0			1	4	2	2
95-100	2	5	0	0			0	0	2	2
Total	41	100	20	100			21	100	82	100

Tables 3 and 4 show that 59 per cent of all the winter diets scored from 50 through 74 points on a scale of 100, as compared with 72 per cent for the spring diets. Eighty per cent of all the winter diets ranged within 50 to 100, while 97 per cent of the spring diets fell within the same range. Twenty-one per cent of all the winter diets fell within the range of 75 to 100, as against 24 per cent for the spring diets.

The highest individual winter score was 98, as compared with 96 as the highest in the spring. During the winter the lowest score was 25, while in the spring it was 37, on the scale of 100.

The writer attributed a portion of the low scores to the omission of meals. There were a number of omissions found in the menu reports. From the answers to the question, "What meal do you generally not eat during the day, if any?", tabulations show that a total of 41 per cent of the girls omitted one or more meals. Of these omissions, 21 per cent were for breakfast, 13 per cent for supper, and 7 per cent for dinner or school lunch. Table 5 shows the complete tabulations of meal omissions.

TABLE 5. OMISSION OF MEALS BY 143 JUNIOR AND SENIOR HIGH SCHOOL GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Meal	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Breakfast	5	10	10	29	8	29	7	21	30	21
Supper	3	6	6	18	3	11	6	18	18	13
Dinner or Lunch	5	10	3	9	2	7	0	0	10	7
Total	13	26	19	56	13	47	13	39	58	41

Thirty-two per cent of those giving reasons for meal omissions stated that they had no appetite. Other reasons for omitting meals were: "reducing," "got up too late," "truck came too early," "and no time to fix lunch."

Milk Scores

Tables 6 and 7 give a clear picture of the differences between the amounts of milk consumed by the girls of the four communities. Milk was scored on the basis of 24 points for one quart a day, and smaller quantities were scored in direct proportion. No credit was given for amounts of milk above a quart a day, since one quart is regarded as optimum for children eating a mixed diet. Cocoa was scored on a basis equal to milk, since it was assumed that it was made almost entirely of whole milk produced on the farm.

Of the 143 girls scored during the winter, 34 per cent consumed approximately one quart of milk a day, as compared to 40 per cent of the 82 girls scored in the spring. Fifteen per cent of the 143 girls consumed less than 1 cup of milk a day during the winter, while in the spring 11 per cent of the 82 girls used less than 1 cup of milk per day.

Fifty-four per cent of the girls scored from 17 to 24 points, or near the optimum value (3 cups or more per day), in the winter diets, with an increase of 1 per cent within the same range for the spring diets.

Therefore, there apparently was a slightly greater consumption of milk in the spring diets of the girls studied.

TABLE 6. MILK SCORES FOR WINTER DIETS OF 143 GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0- 4	4	8	4	12	5	18	7	21	20	15
5-8	4	8	3	9	2	7	1	3	10	7
9-12	9	18	8	23	10	36	8	24	35	24
13-16	0	0	0	0	0	0	1	3	1	*
17-20	11	22	5	15	8	28	4	12	28	20
21-24	20	44	14	41	3	11	12	37	49	34
Total	48	100	34	100	28	100	33	100	143	100

* Less than 1 per cent

TABLE 7. MILK SCORES FOR SPRING DIETS OF 82 GIRLS IN THREE RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0-4	3	7	1	5			5	24	9	11
5-8	5	12	1	5			1	5	7	9
9-12	9	22	6	30			5	24	20	24
13-16	0	0	0	0			1	5	1	1
17-20	8	20	2	10			2	9	12	15
21-24	16	39	10	50			7	33	33	40
Total	41	100	20	100			21	100	82	100

An all-the-year milk supply was reported in the homes of 100 per cent of the girls at Caledonia School, 82 per cent at Coxburg School, 60 per cent at McNiel School, and 84 per cent at Morgan City School. The records showed that 100 per cent of the families represented in all the school districts used milk for cooking purposes throughout the year. It is assumed that if the home did not have a milk supply that neighbors "divided milk" for use in cooking, or that the milk was purchased for this purpose. The fact that milk was used for cooking was of great importance to the 46 per cent of the girls using a pint or less of milk in the winter, and to the 44 per cent receiving a pint or less during the spring.

The reports showed that in the Coxburg School district the time of the year when the families were most frequently without a milk supply was during the months of February, March and April, while in the McNiel and Morgan City School districts the time when there was the greatest scarcity of milk was during the months of November, December and January. Caledonia School district did not report a scarcity of milk during any season of the year.

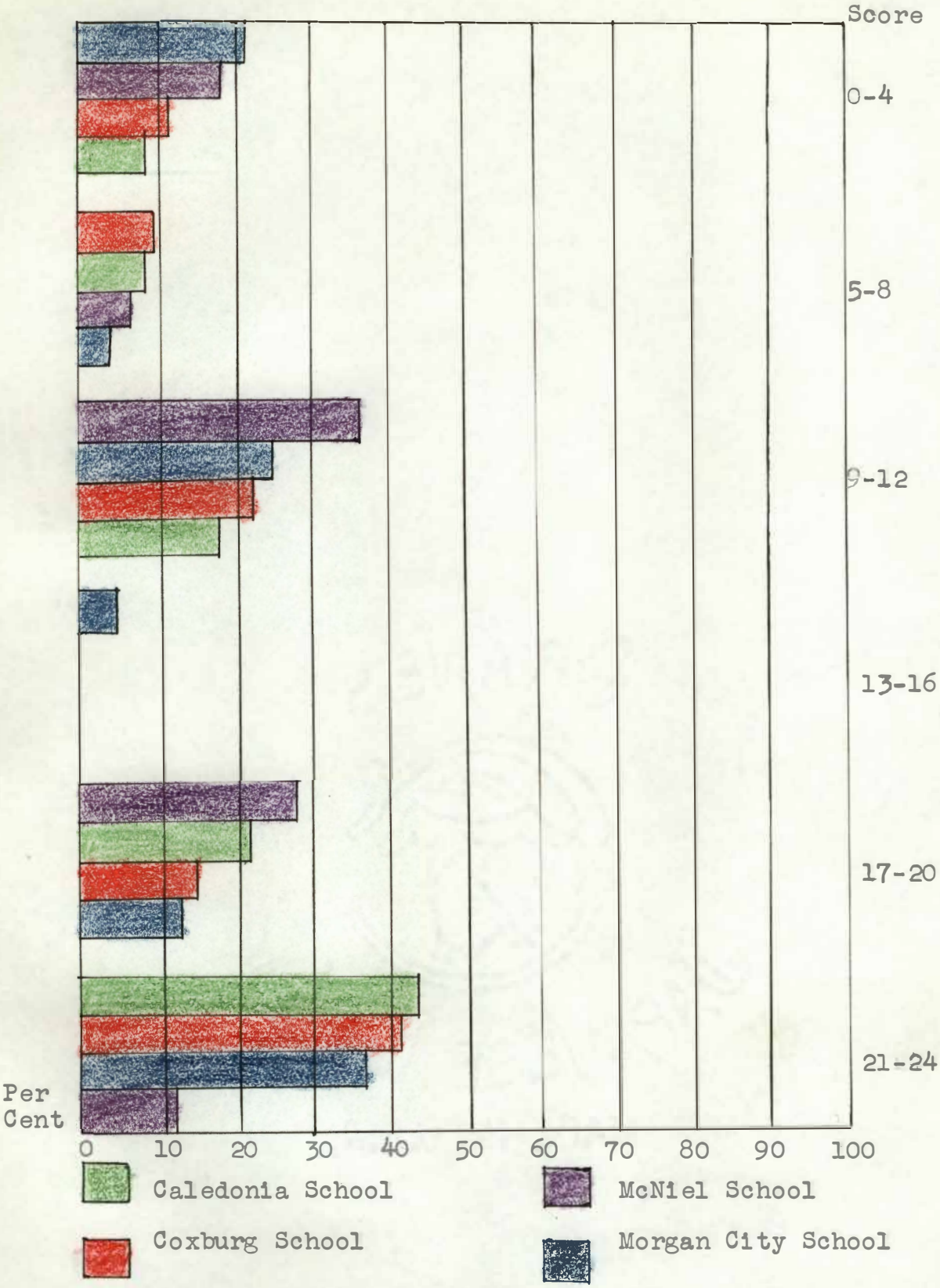

Chart No. 1. Distribution of Winter Milk Scores of 143 Girls in Four Rural Mississippi Communities

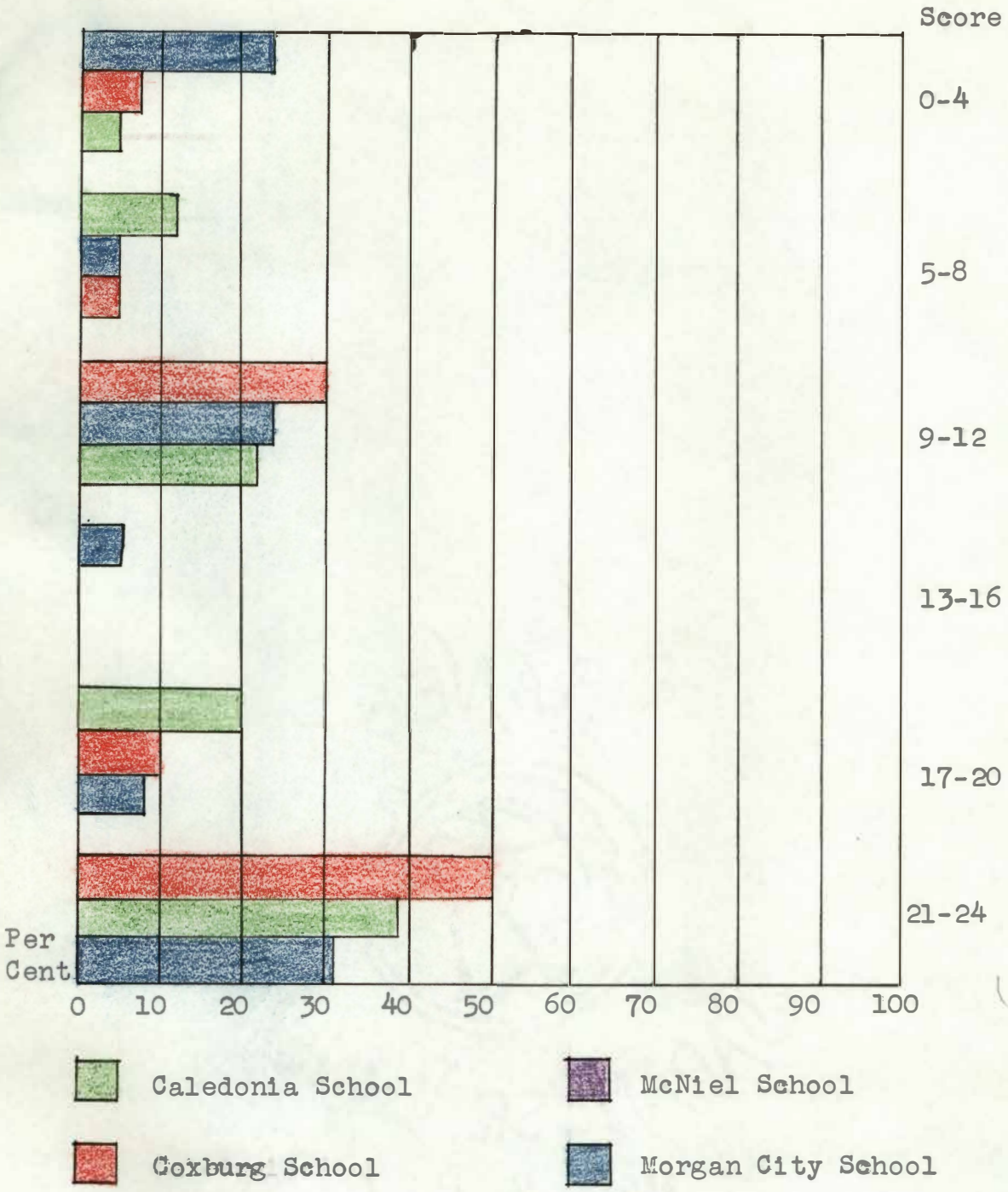

Chart No. 2. Distribution of Spring Milk Scores of 82 Girls in Three Rural Mississippi Communities

Vegetable Scores

Vegetables were scored on the basis of the pupil having consumed a green vegetable at least four times a week and one other vegetable once a day. Smaller amounts were scored in direct proportion. The green vegetables and other vegetables were given a combined total score of 22.

Tables 8 and 9 give a picture of the vegetable scores. In the winter 38 per cent of the vegetable scores for the 143 girls studied were between 18 and 22 points, or near the optimum value. In the spring 66 per cent of the diets of the 82 girls gave scores between 18 and 22. There was an increase of 26 per cent in the number of scores ranging from 18 to 22 in the spring over those for the winter. Vegetables were eaten by all of the girls. In every case where the score was 0 to 4 it was found that no green vegetables had been eaten.

In the winter the highest vegetable scores were found in the Coxburg School dietaries, while those for the other schools were about equal. In the spring the highest vegetable scores were found among the Morgan City School dietaries. The winter dietaries showed a gradual increase in scores from the very low to the higher scores. The Coxburg and Caledonia Schools had no scores as low as 0 to 4 points for the winter. In the spring scoring, Caledonia School was the only one with scores

TABLE 8. DISTRIBUTION OF WINTER VEGETABLE SCORES FOR 143 GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Cent
0-4	0	0	0	0	1	4	3	9	4	2
5-8	6	13	3	9	5	18	7	21	21	15
9-13	11	23	2	6	5	18	5	15	23	16
14-17	15	31	12	35	7	25	7	21	41	29
18-22	16	33	17	50	10	35	11	34	54	38
Total	48	100	34	100	28	100	33	100	143	100

TABLE 9. DISTRIBUTION OF SPRING VEGETABLE SCORES FOR 82 GIRLS IN THREE RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0-4	1	3	0	0			0	0	1	1
5-8	3	8	0	0			0	0	3	4
9-13	4	8	4	20			2	9	10	12
14-17	8	20	3	15			3	15	14	17
18-22	24	61	13	65			16	76	54	66
Total	41	100	20	100			21	100	82	100

from 0-8, and 11 per cent of these scores were found to be within this range. It is assumed that the more severe climate of the northern part of the state influenced the delay of early spring gardens in that particular section.

There were nine varieties of root vegetables reported grown in the four communities. Coxburg School reported the greatest variety, and Caledonia School reported a higher per centage of the families producing these vegetables than any other school. McNiel School reported the lowest frequency in the production of root vegetables. The root vegetables, in the decreasing order of their common occurrence, were: turnips, sweet potatoes, Irish potatoes, onions, beets, radishes, carrots, rutabagas, and parsnips.

Morgan City School led in the variety of green vegetables reported. Caledonia School reported the highest production and McNiel School the lowest. A list of the twelve green vegetables, appearing in the order of their declining frequency, was as follows: turnip greens, cabbage, lettuce, collards, beans, peas, mustard, spinach, okra, peppers, asparagus, and Swiss Chard.

The writer is of the opinion that some of the root and green vegetables were produced more commonly than was reported.

Thirty-five per cent of the families reported

the production of four varieties of root vegetables, which was the highest per centage of the families who reported the production of any given number of varieties.

Thirty-six per cent of the families reported the production of four varieties of green vegetables. This was the greatest per centage production of any given number of varieties. Only 7 per cent of the families reported that they did not grow any green vegetables.

The author made an attempt to find out approximately what quantity of vegetables were canned, pickled, dried or otherwise preserved for winter use in the homes studied. It is generally realized that farm women and girls do not keep accurate accounts of the foods stored for winter use, and that when records are kept they represent bulk rather than itemized products. In this study many of the reports were given in bulk, making it impossible to determine exactly what vegetables were stored in greatest quantity.

The investigator found from this study that foods for winter use were generally kept as follows:- beets, cucumbers, peppers, green tomatoes, and onions were usually pickled; cabbage was stored as sauer-kraut; beans, peas, and carrots were canned; and lima beans and black-eyed peas were more commonly dried. Caledonia and Coxburg Schools canned and dried a greater quantity and variety than either Morgan City or McNiel Schools.

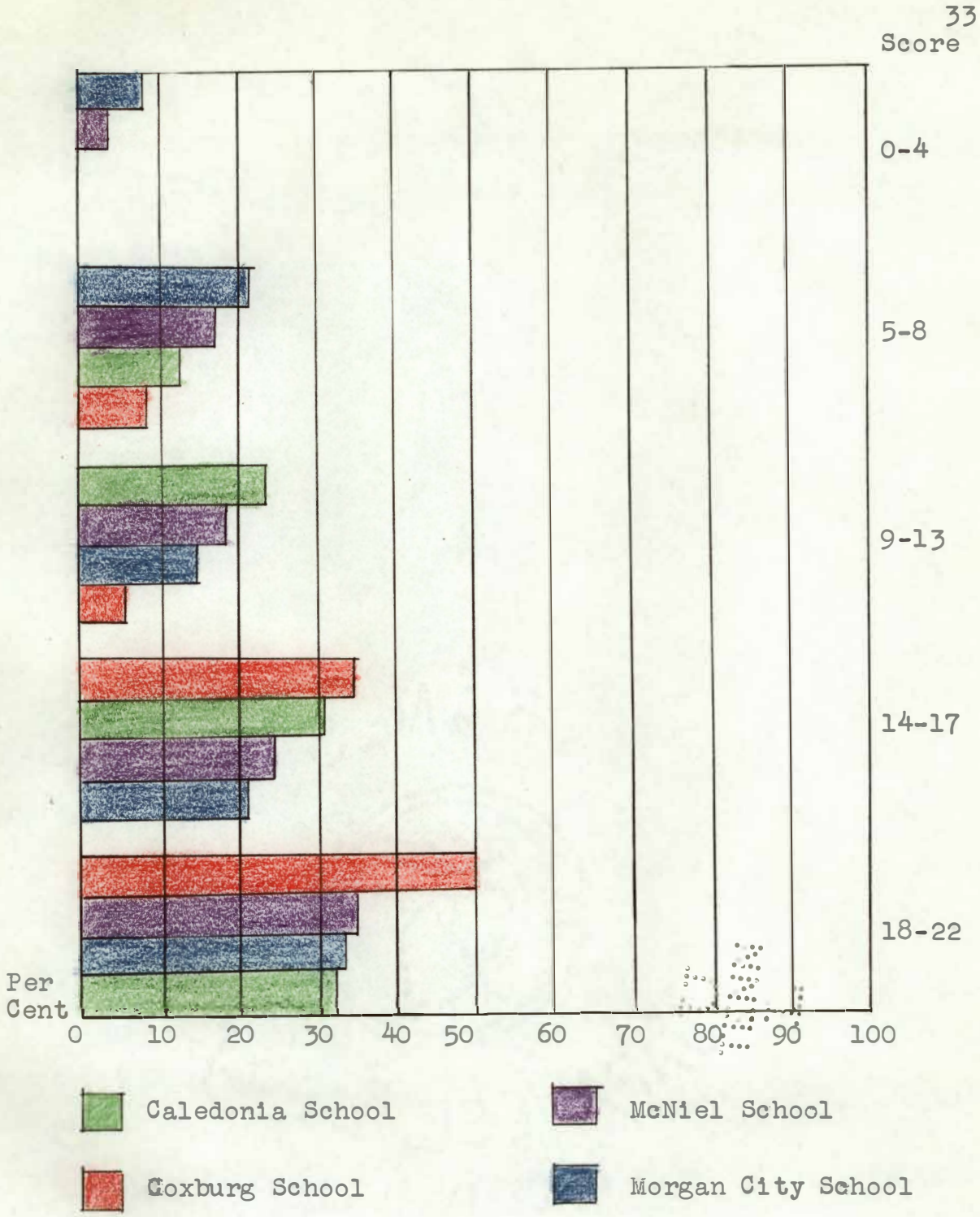

Chart No. 3. Distribution of the Winter Vegetable Scores for 143 Girls in Four Rural Mississippi Communities

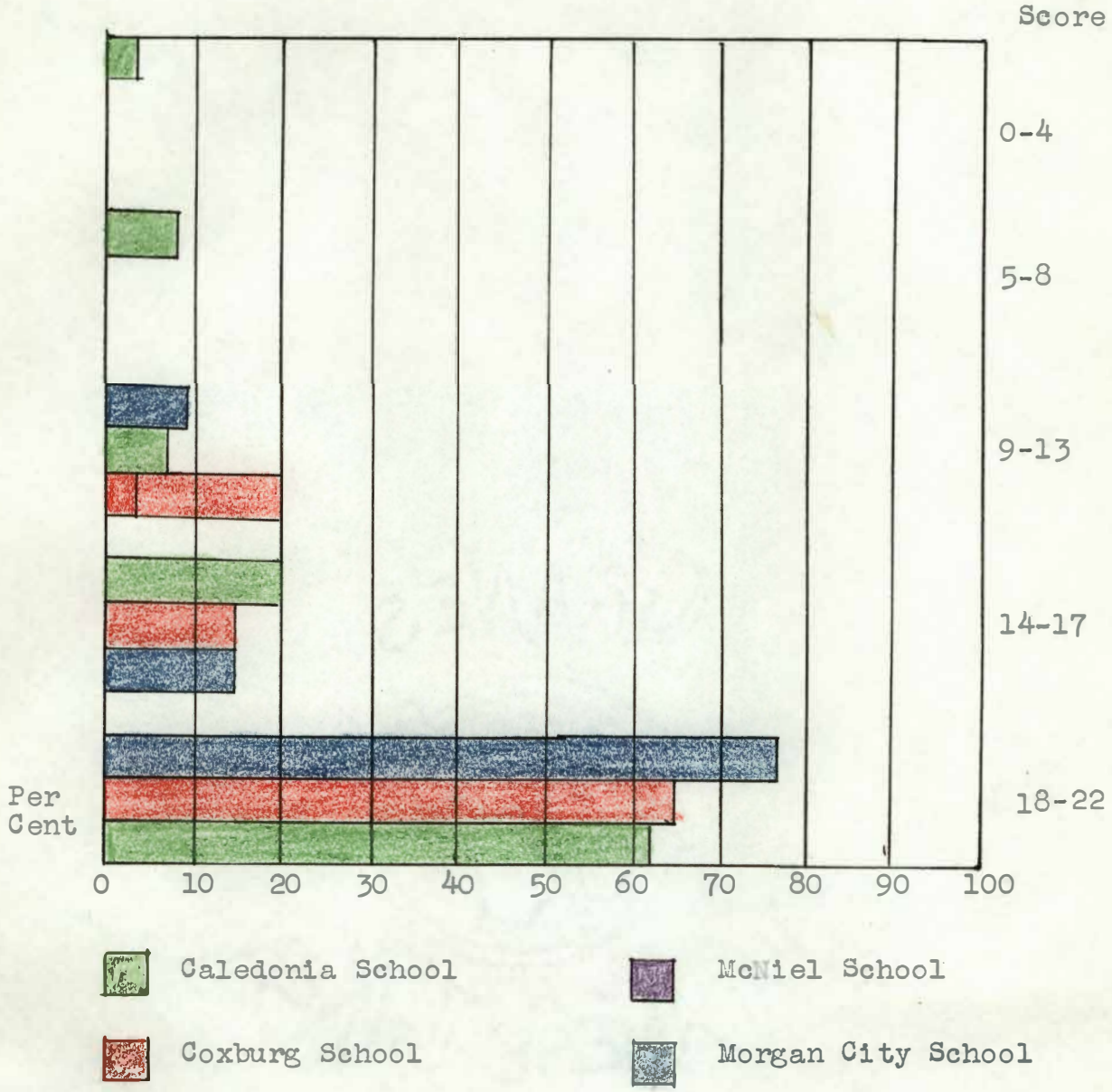

Chart No. 4. Distribution of Spring Vegetable Scores for 82 Girls in Three Rural Mississippi Communities

Fruit Scores

Citrus Fruits, including tomatoes, and non-citrus fruits were given a combined score of 19 points, when tomato or citrus fruits were served four times a week and one other fruit once per day. Smaller quantities were scored in direct proportion.

Table 10 gives the distribution of fruit scores for the winter diets, and Table 11 gives the distribution for the spring diets. It will be noted that 22 per cent of the diets of both spring and winter scored 0 to 4 points, showing the persistent non-use of fruits during two seasons of the year. Twenty-four per cent of the winter diets had scores of from 17 to 19 points, showing a good supply of fruits, while only 12 per cent of the spring diets had scores as high as 17 to 19. The spring scores showed Caledonia School leading, followed by Morgan City and Coxburg Schools respectively. The same rating was found in the winter diets with reference to school placing, and McNiel School was lowest. The diets were generally lower in citrus fruits and tomatoes than in other fruits. The scarcity of citrus fruits and tomatoes was more noticeable in the spring than in the winter diets.

Bananas were reported as being used in some of the diets. They were more popular in the school lunch than in other meals.

TABLE 10. FRUIT SCORES FOR WINTER DIETS OF 143 GIRLS FROM FOUR RURAL MISSISSIPPI COMMUNITIES

Score	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0-4	3	6	11	32	10	36	8	25	32	22
5-8	11	23	4	12	4	14	6	18	25	18
9-12	10	21	8	23	7	25	4	12	29	20
13-16	8	17	5	15	4	14	7	20	24	16
17-19	16	33	6	18	3	11	8	25	33	24
Total	48	100	34	100	28	100	33	100	143	100

TABLE 11. FRUIT SCORES FOR SPRING DIETS OF 82 GIRLS FROM THREE RURAL MISSISSIPPI COMMUNITIES

Score	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0- 4	2	5	9	45			7	34	18	22
5-8	6	15	4	20			4	19	14	17
9-12	17	41	5	25			5	24	27	33
13-16	9	22	1	5			3	14	13	16
17-19	7	17	1	5			2	9	10	12
Total	41	100	20	100			21	100	82	100

There were fourteen varieties of fruits grown in the four communities. Peaches were grown by 70 per cent of the families studied, and following in the decreasing order of production were apples, plums, pears, figs, grapes, tomatoes, strawberries, apricots, oranges, bananas, cherries, and cranberries. Tomatoes were classed as a fruit due to their high vitamin C content. The data show that the Caledonia School families produced more fruit than the other school families. Following in quantity production were Coxburg, McNiel and Morgan City Schools. The Caledonia and McNiel Schools produced the greatest variety of fruits and both produced the same number.

It is interesting to note that the greatest variety of fruits produced in any one family was 9, and that the most usual numbers produced were from three to six varieties. Ten per cent of the families studied did not report the growing of any fruits.

In attempting to find the kinds and amounts of various fruits stored for winter use, the investigator found the same thing to be true of the fruits as of the vegetables, in that many of the women and girls gave the report in bulk rather than in an itemized statement as to the amounts of canned, preserved, jellied, and pickled products for home use.

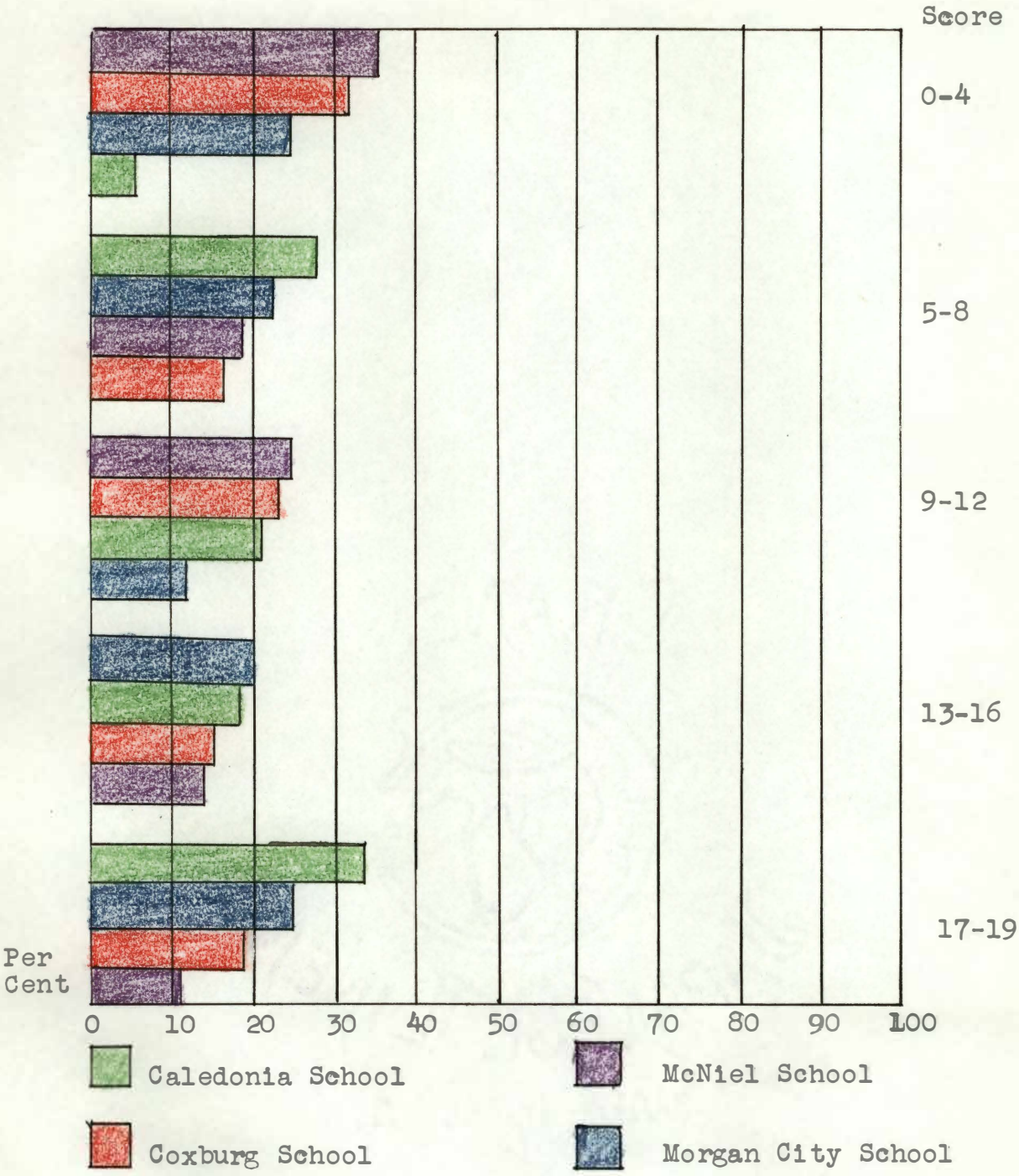

Chart No. 5. Distribution of Winter Fruit Scores for 143 Girls in Four Rural Mississippi Communities

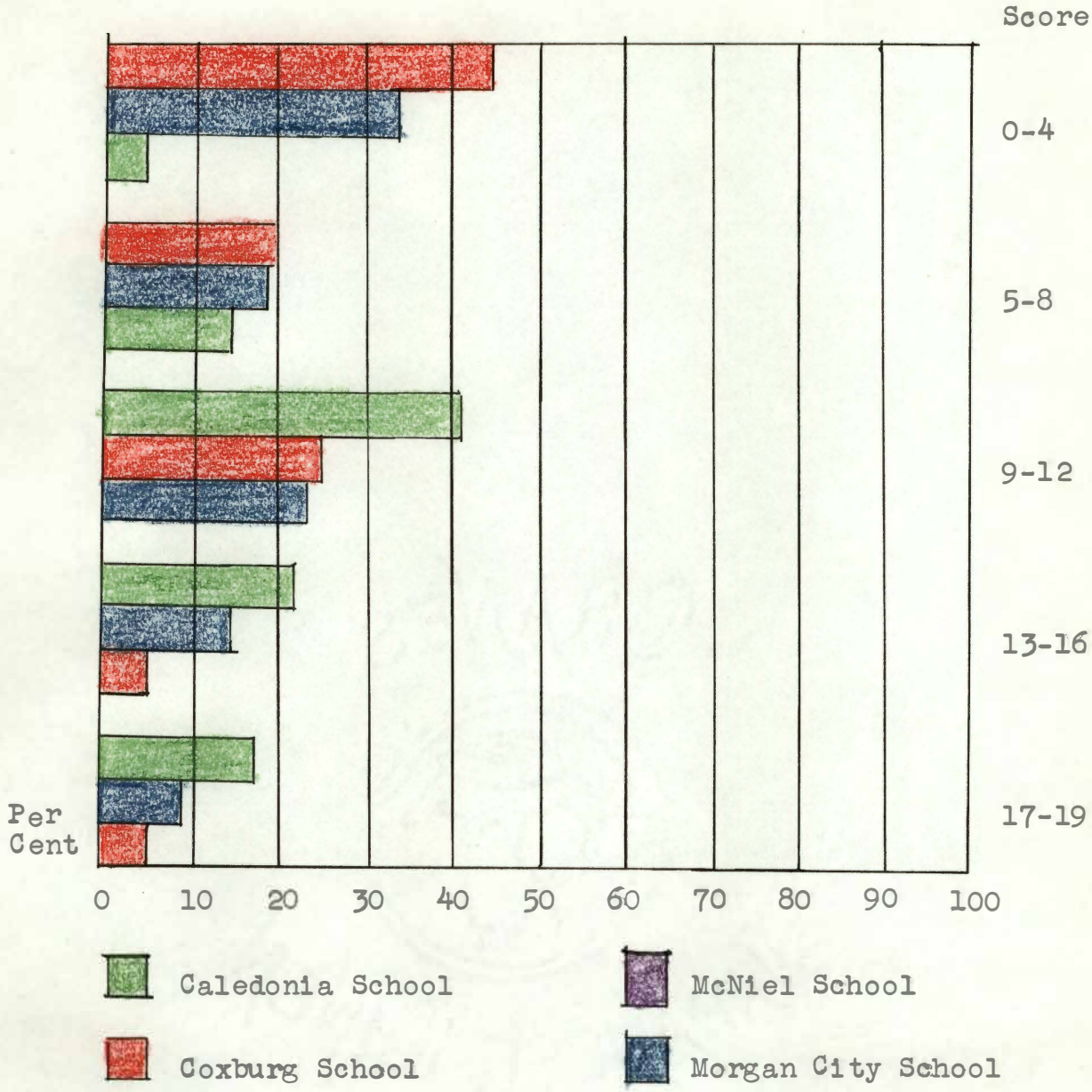

Chart No. 6. Distribution of Spring Fruit Scores for 82 Girls from Three Rural Mississippi Communities

In the itemized statements which were given it was found that tomatoes, peaches, apples, pears and plums were used for plain canning; that both sweet and sour pickles were made from peaches and pears; and that peaches, figs, apples, and pears were mentioned for preserving purposes. Blackberries held a proportionately large place in the canned fruits, as well as in the jams and jellies. Apple and grape jellies were frequently mentioned, and peach jelly was mentioned occasionally. The few strawberries that were preserved were in marmalade.

Dried fruits were more commonly found in the Caledonia School community, but these were usually dried peaches and apples. Other school communities reported relatively little or no dried fruits.

Egg and Meat Scores

All of the diets were scored on the basis of 9 points for meat once a day and 9 points for eggs taken three times a week. Smaller amounts were scored in direct proportion. No extra credit was allowed for meat eaten more than once per day, neither were any deductions made from the score for its use in the diet more than once per day. Cheese and fish, as meat substitutes, were scored on the same basis as meat when used instead of meat in the diets.

Tables 12 and 13 show that 70 per cent of the winter diets scored from 12 to 18 points, or near the optimum, as against 89 per cent of the spring diets. In the winter diets, 11 per cent of the scores were from 0 to 8 points, in contrast to 1 per cent of the spring diets. Most of the low rating during the winter was due to the lack of eggs in the diets. Caledonia was especially affected by the lack of eggs. It is possible that the less liberal use of eggs in all of the winter diets was due to the better market prices at the time, and to a non-production period, which would lead to the selling rather than to the use of eggs at home. The use of eggs in the spring diets was very liberal. Jones[15] found the same trend in the use of eggs in the diets of Tennessee children from Hamilton, Knox, and Rutherford Counties. Her findings show that due to the low price of eggs in the spring of

15 Jones, B. S., op. cit.

TABLE 12. EGG AND MEAT SCORES FOR WINTER DIETS OF 143 GIRLS FROM FOUR RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0-4	3	6	0	0	0	0	0	0	3	2
5-8	6	13	0	0	3	11	3	9	12	9
9-11	12	25	1	2	7	25	7	21	27	19
12-15	11	23	13	38	12	43	10	30	46	32
16-18	16	33	20	60	6	21	13	40	55	38
Total	48	100	34	100	28	100	33	100	143	100

TABLE 13. EGG AND MEAT SCORES FOR SPRING DIETS OF 82 GIRLS FROM THREE RURAL MISSISSIPPI COMMUNITIES

	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
Score	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
0-4	0	0	0	0			0	0	0	0
5-8	1	2	0	0			0	0	1	1
9-11	6	15	2	10			0	0	8	10
12-15	11	27	7	35			2	10	20	24
16-18	23	66	11	55			19	90	53	65
Total	41	100	20	100			21	100	82	100

1932 there was probably a liberal supply of eggs in their diets. The consumption of eggs improved the diets which were poor due to a low milk intake.

Meats were served three times a day in most of the homes. Many times there were two or more meats served at the same meal.

The meats commonly served in these diets were pork, chicken, beef, cheese, fish, rabbit, squirrel, liver, chitlins, kid and bird.

The questionnaire revealed that 100 per cent of the Caledonia and Coxburg School families studied produced their own pork and poultry products. McNiel School reported 89 per cent of the families producing their pork, and 94 per cent producing poultry products. In the Morgan City School 90 per cent of the families produced their own pork, and 97 per cent their poultry products.

Several families mentioned canning meats, as sausage, ham, beef, and chicken. No family mentioned the preservation of eggs for use out of season. Whether or not the pork supply produced was enough to carry the family over the entire year is not known. The investigator knows that the most frequently practiced method of keeping the home meat supply on the farm is salt curing and smoking, in so far as the pork supply is concerned.

The fact is revealed in this study that the meat scores were exceptionally high in comparison with

the other scores in the dietaries studied. This seems to be typical of American dietaries as a whole. Sherman[16] took the figures of the field workers from the United States Department of Agriculture and the New York Association for Improving the Condition of the Poor and showed that the average protein value of them was 106 grams per man per day. Earlier in his discussion he pointed out that 1 gram of protein per kilogram of body weight or 70 gms. per day, or about 10 per cent of the total caloric intake of the diets, is sufficient for both adults and children; providing, of course, that the protein is of the right kind.

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16 Sherman, H. C., op. cit., p. 521, 228.

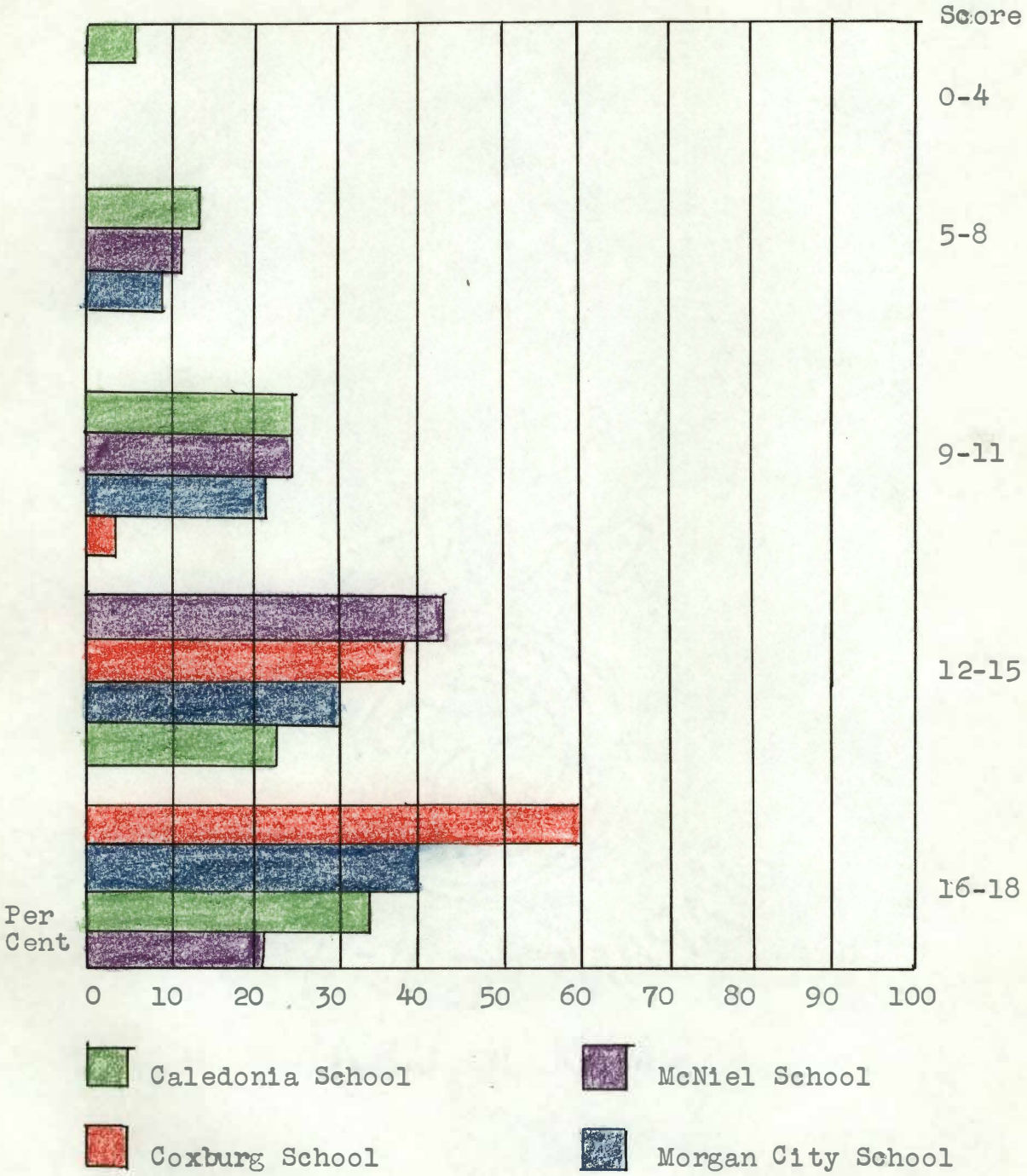

Chart No. 7. Distribution of Winter Egg and Meat Scores for 143 Girls in Four Rural Mississippi Communities

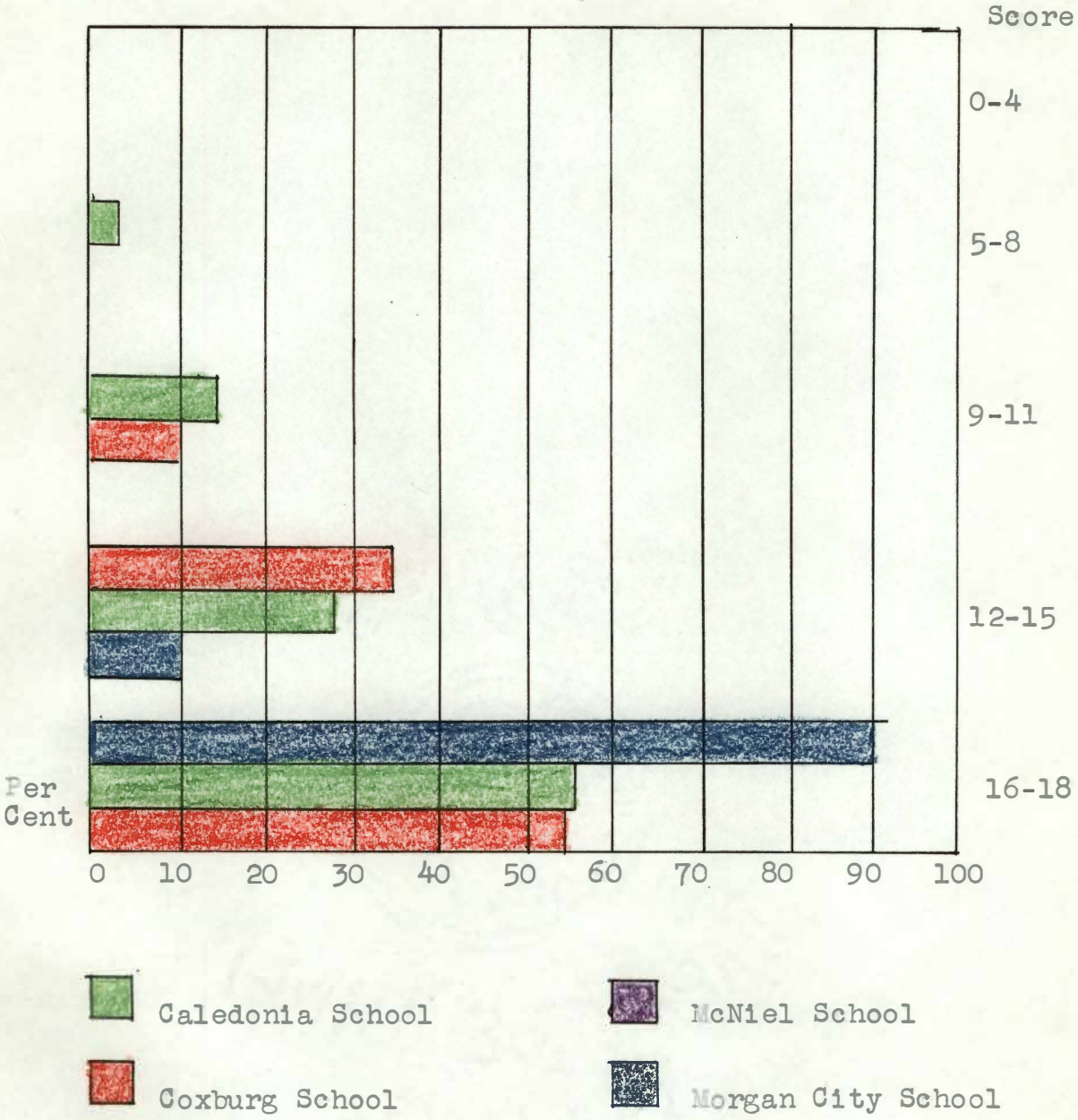

Chart No. 8. Distribution of Spring Egg and Meat Scores for 82 Girls in Three Rural Mississippi Communities

Bread and Cereal Scores

The scoring for bread and other cereals was as follows: 10 points were allowed for bread when taken twice per day, and 7 points were allowed for other cereals in the diet once daily. This gives a combined score of 17 points for bread and cereal. Rural families use comparatively small amounts of yeast breads, so that in this study the breads given the most consideration were biscuits and cornbread. Two biscuits were considered a serving. The writer is aware of the fact that cornbread is not made and served in any standard way, as for instance in muffins, and is harder to measure by servings. However, for this study it has been considered that a child eating one piece of cornbread as it is served in the ordinary rural home has had an ample serving. Smaller servings of bread were scored in direct proportion.

Tables 14 and 15 show the distribution of winter and spring bread and cereal scores. Four per cent of the winter and 6 per cent of the spring diets had scores of less than 10 points, showing that the children were getting no cereals other than bread, and were not eating bread as much as twice per day. This condition seemed to exist primarily among those who omitted meals during the day.

Also, 29 per cent of the winter and 28 per cent of the spring diets scored only 10 points, showing that these children used bread but did not have any other

TABLE 14. WINTER BREAD AND CEREAL SCORES FOR 143 GIRLS FROM FOUR RURAL MISSISSIPPI COMMUNITIES

Score	Caledonia School No.	Caledonia School Per Cent	Coxburg School No.	Coxburg School Per Cent	McNiel School No.	McNiel School Per Cent	Morgan City School No.	Morgan City School Per Cent	Total No.	Total Per Cent
6-9	0	0	0	0	2	7	3	9	5	4
10	8	17	16	47	4	14	14	42	42	29
11-14	13	27	13	38	9	32	10	30	45	31
15-17	27	56	5	15	13	47	6	18	51	36
Total	48	100	34	100	28	100	33	100	143	100

TABLE 15. SPRING BREAD AND CEREAL SCORES FOR 82 GIRLS FROM THREE RURAL MISSISSIPPI COMMUNITIES

Score	Caledonia School No.	Caledonia School Per Cent	Coxburg School No.	Coxburg School Per Cent	McNiel School No.	McNiel School Per Cent	Morgan City School No.	Morgan City School Per Cent	Total No.	Total Per Cent
6-9	4	10	1	5			0	0	5	6
10	8	19	7	35			8	38	23	28
11-14	9	22	8	40			6	29	23	28
15-17	20	49	4	20			7	33	31	38
Total	41	100	20	100			21	100	82	100

form of cereal in the diet. However, 36 per cent of the winter and 38 per cent of the spring diets showed scores of from 15 to 17 points, indicating a liberal use of breads and cereals.

From the reports given, the investigator found that breads served in the homes included the following: biscuit, cornbread, light bread, whole wheat bread, rolls, muffins, toast, and crackers.

In both the Caledonia and Coxburg School communities the report showed that 100 per cent of the families produced their own meal; at McNiel School 82 per cent, and at Morgan City School 84 per cent produced meal. The investigation did not attempt to show whether white or yellow meal was being used. The writer, from personal observation, has found the yellow meal to be prefered by some rural families. The corn is milled by local grist-mill operators and, therefore, is not bolted and contains all of the natural oils. The bran is sifted out at the time of using. Grits were reported by some families as being used for the breakfast cereal. They were ground from the family corn supply. Home grown rice was reported by 14 per cent of the McNiel School families. Oat meal or rolled oats was found to be the most popular breakfast cereal dish among those families using cereals. Other cereals reported for breakfast were corn flakes, rice, grits, and bran.

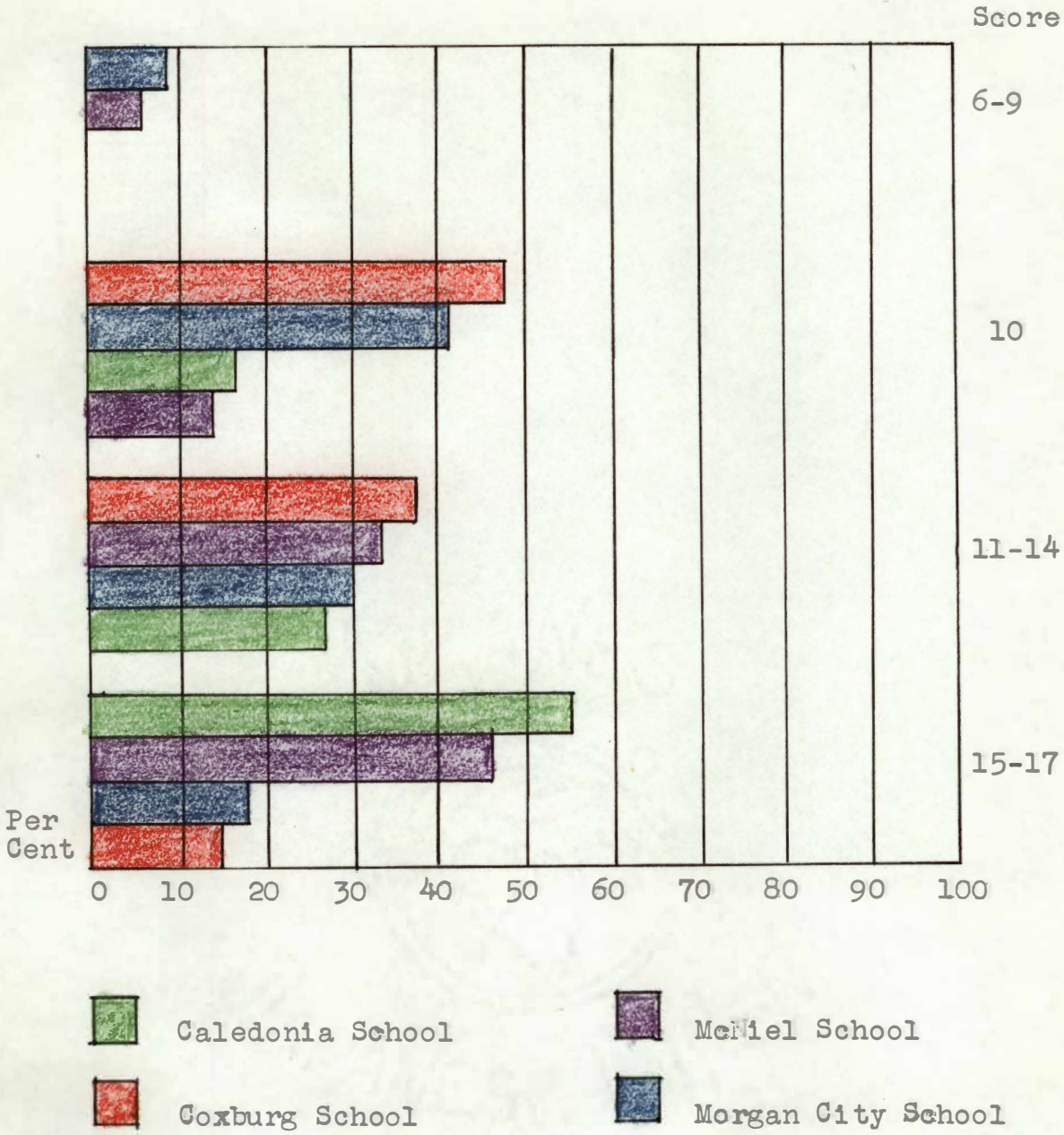

Chart No. 9. Distribution of Winter Bread and Cereal Scores for 143 Girls from Four Rural Mississippi Communities

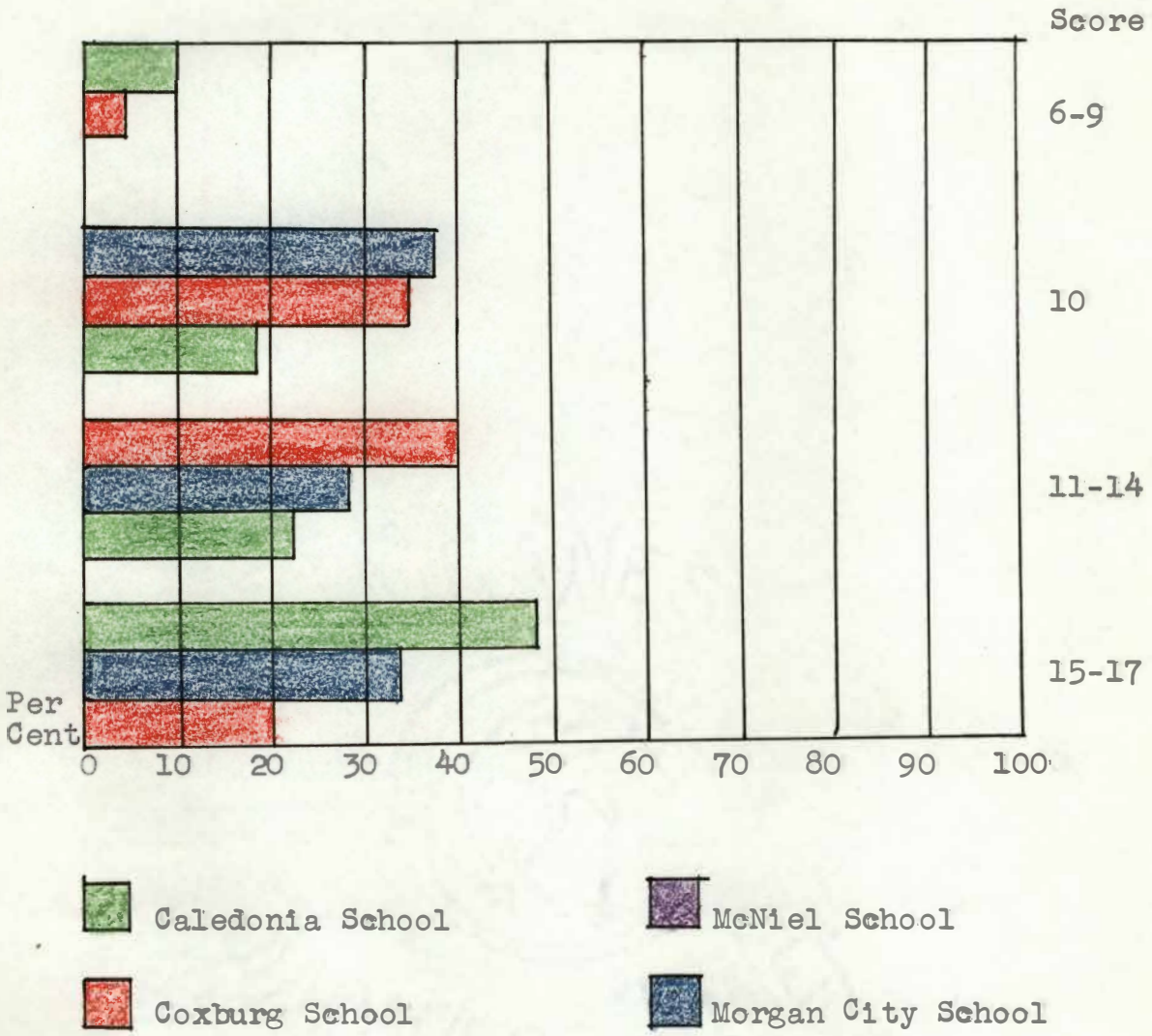

Chart No. 10. Distribution of Spring Bread and Cereal Scores for 82 Girls from Three Rural Mississippi Communities

Tea and Coffee Scores

It is a generally accepted fact that tea and coffee have no nutritive value other than the cream, milk, or sugar which are added. Such liquids fill space in the stomach and cause the child to do without foods of nutritional value. They have a stimulating effect upon the nervous system, and should not be included in the diet of children.

For the reasons stated above, in scoring the diets a deduction of ten points has been made from the total score when tea or coffee were found to have been used.

It was found that 42 per cent of the winter diets contained either tea or coffee. The spring menus showed that 40 per cent contained either tea or coffee. This seems to indicate that the habit of drinking such beverages is well established. It was noticeable that those children who used tea or coffee were using but very little milk, if any at all.

Comparison of Scores

Comparative tabulations showed that generally when the milk score was high the total score of the diet was high. Also, the higher the meat and egg, the fruit, and vegetable scores, the higher was the total score.

TABLE 16. GROUP SCORES FOR FOODS USED IN THE STUDY OF FOUR RURAL MISSISSIPPI COMMUNITIES

Group	Caledonia School	Coxburg School	McNiel School	Morgan City School
Milk, per cent of diets with scores from 17 to 24:				
Winter	66	56	39	49
Spring	59	60		42
Vegetables, per cent of diets with scores from 14 to 22:				
Winter	64	85	60	55
Spring	81	80		91
Fruit, per cent of diets with scores from 13 to 19:				
Winter	50	33	25	45
Spring	39	10		23
Egg and Meat, per cent of diets with scores from 12 to 18:				
Winter	56	98	64	70
Spring	83	90		100
Bread and Cereal, per cent of diets with scores from 11 to 17:				
Winter	83	53	79	48
Spring	71	60		62

Table 16 is a comparative tabulation of the two highest group scores from each of the previous tables, and gives, therefore, the per cent of diets giving near the optimum scores. It shows that Caledonia School had the highest milk scores for the winter, and Coxburg School for the spring; that Coxburg School had

the highest winter vegetable scores, and Caledonia School the highest in the spring; that Caledonia School had the highest fruit scores for both winter and spring; that Coxburg School had the highest winter meat and egg scores, and that Morgan City School had the highest spring meat and egg scores; and that Caledonia School had the highest bread and cereal scores for both winter and spring.

Table 17 gives a tabulation of the average scores of the winter diets of the girls studied, classified as to home owners, renters, and share croppers. It shows that there was no difference in the total average scores for the girls from homes owned and rented, and that the total average scores for the girls from homes of share croppers averaged 5 points higher than for the other groups.

TABLE 17. AVERAGE SCORES OF WINTER DIETS OF OWNERS, RENTERS, AND SHARE CROPPERS IN THE FOUR RURAL MISSISSIPPI COMMUNITIES STUDIED

Family Status	Caledonia School	Coxburg School	McNeel School	Morgan City School	Total Average
Owner	67	71	60	58	64
Renter	74	64	62	57	64
Share Cropper	62	78	62	72	69

Only the winter diets were tabulated, since the spring diets did not vary greatly from those of the winter, as shown by previous tabulations.

Outside Work Done

The results of the questionnaire showed that the girls did a variety of home tasks, as, for instance, the family laundering, planting and care of the vegetable garden, responsibility for the care of the yards, tending the flowers, bringing in stove wood, getting the supply of water for the home, milking, hoeing in the field, picking cotton, planting of parts of the crop, care of the poultry, nursing of afflicted relative, doing errands, caring for pet animals, and selling cold drinks.

Many of the girls reported the responsibility for several of these tasks as regular daily duties.

Physical Defects Found

TABLE 18. DISTRIBUTION OF RECOGNIZED PHYSICAL DEFECTS REPORTED BY 143 GIRLS IN FOUR RURAL MISSISSIPPI COMMUNITIES

Physical Defect	Caledonia School		Coxburg School		McNiel School		Morgan City School		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Underweight:										
6-10 lb:	12	25	9	26	3	11	3	9	27	20
11 lbs. and over	11	23	7	21	9	32	6	9	33	21
Overweight:										
6-10 lb:	4	8	3	9	1	4	0	0	8	6
11 lbs. and over	1	2	5	15	1	4	5	15	12	8
Decayed Teeth	1	2	20	59	5	18	2	6	28	19
Diseased Tonsils	1	2	11	32	2	8	3	9	17	12
Poor Eyesight	11	23	4	12	7	24	3	9	25	17
Defective Hearing	2	4	0	0	0	0	0	0	2	1

Table 18 shows the distribution of recognized physical defects among the 143 girls. It will be noted that 41 per cent of the girls reported a condition of underweight. The greatest amount of underweight was found to be 28 pounds, and was reported by several girls. Fourteen per cent of the group were overweight. The greatest overweight condition reported was that of one girl who was 29 pounds above normal for her age and height.

The questionnaire called for the age, height, and weight of the girls. From the answers received the

investigator made tabulations, using the Baldwin and Wood Weight--Height- -Age Table for Girls[16]. The per cents in Table 18 were based upon the winter report only. Considerable gain was noted by the investigator in some of the girls in her group by spring. No attempt was made to gain additional information for comparison with the winter weights.

In answering the questionnaires concerning the usual summer gains and losses in weight, 43 per cent reported a loss of 5 to 15 pounds; and 32 per cent reported a gain of from 2 to 10 pounds. The other 25 per cent either failed to answer the question or answered with "neither". The majority of the girls reported that they usually ate more foods such as vegetables, bread, milk, fruit and candy during the seasons when their working hours were increased or when the tasks were heavier.

A total of 45 per cent of the girls reported a normal weight, if normal is considered within the ten point range of five points above and five points below the figures quoted in the Baldwin-Wood table[17].

Sherman[18] quotes from the Keep-Well Leaflets of the Life Extension Institute as follows: "Pronounced underweight before the age of 25 is an unfavorable con-

16. Turner-Collins, Community Health, D. C. Heath and Company, New York (1928) p. 253.
17. Ibid.
18. Sherman, H. C., op. cit. p. 504.

dition, as it is often associated with lack of resistance to pulmonary affections and to other diseases of youth."

From the condition of underweight found in this study it seems apparent that some remedial measure should be taken. All of the girls studied were in a period of rapid physical development when a vigorous body is considered necessary for the many activities common to the adolescent period. A continuation of such a condition may be the possible cause of serious handicaps in later life.

It may be possible that the recent trends of fashion in dress may have been an influential factor in the continuance of an underweight condition. However, it seems reasonable to expect that a good nutritional program brought to bear on this phase of adolescent development may do a great deal to eliminate the handicaps of underweight and poor nutrition.

Adequate Scores

This study has so far mentioned optimum scores without any reference to adequate scores. It is perhaps realized by many that as nearly a perfect diet as possible should be the aim of those responsible for the providing of the foods. Many diets, as may be recognized by this study and others, are far from reaching a stage of perfection. A standard must be set by which deficient diets may be judged, that is a point below which it is not possible to go if we are to secure the best physical development. This standard may be termed an adequate diet. Bogert[19] differentiates between an adequate and an optimum diet as follows: "By an adequate diet we mean one which will maintain body weight (and provide for growth if necessary), while keeping the body in a moderately satisfactory state of health; the term optimal (best) diet is used to indicate such a diet as will promote maximum growth and a high degree of vitality and resistance to disease."

In order to find how many of the diets in this study can be grouped as adequate in regard to each of the five important food groups, an adequate day's diet was set up. It takes into consideration the standards for protein, calcium, phosphorus, iron and vitamins A, B, C, and G. The following adequate daily food allowance for food groups with their corresponding scores are those

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19 Bogert, L. J., Nutrition and Physical Fitness, Philadelphia and London, W. B. Sanders Co.(1932) p. 313.

adapted from the Davies[20] study and used in the Jones[21] study.

Adequacy of the Diets

Food	Amount	Score
Milk	3½ c. a day	20+
Vegetables		
Green vegetable	twice a week	17+
Other vegetable	once daily	
Fruit		
Citrus fruit or tomato	twice a week	16+
Other fruit	once daily	
Bread	twice daily	10+
Cereal	once a week	
Eggs	three times a week	15+
Meat	once daily	
	Total	78+

A diet adequate in respect to the five food groups would score 78+, while an optimum diet would score 100 points.

Tables 19 and 20 show the number of diets found approximately adequate in respect to each of the important food groups, tabulated by communities.

A general view of the diets showed that in the spring 5 per cent of them were superior to those of the winter in the milk supply, 27 per cent in vegetables, and 27 per cent in eggs and meat. The winter diets showed a superiority over the spring diets of 3 per cent

20 Davies, E. S., op. cit., p. 117
21 Jones, B. L., op. cit., p. 35

TABLE 19. ADEQUATE WINTER DIETS FOUND IN EACH OF THE FOUR RURAL MISSISSIPPI COMMUNITIES STUDIED

Food	Score	Caledonia School No.	Caledonia School Per Cent	Coxburg School No.	Coxburg School Per Cent	McNiel School No.	McNiel School Per Cent	Morgan City School No.	Morgan City School Per Cent	Total No.	Total Per Cent
Milk	20+	21	44	14	41	3	11	12	36	50	35
Vegetables	17+	16	33	24	71	8	29	11	33	59	41
Fruit	16+	17	35	5	15	3	11	10	30	35	24
Bread Cereals	10+	48	100	34	100	26	93	30	91	138	97
Eggs & Meat	15+	23	48	31	91	11	39	18	55	83	58

TABLE 20. ADEQUATE SPRING DIETS FOUND IN EACH OF THE THREE RURAL MISSISSIPPI COMMUNITIES STUDIED

Food	Score	Caledonia School No.	Caledonia School Per Cent	Coxburg School No.	Coxburg School Per Cent	McNiel School No.	McNiel School Per Cent	Morgan City School No.	Morgan City School Per Cent	Total No.	Total Per Cent
Milk	20+	16	38	10	50			7	33	33	40
Vegetables	17+	27	64	13	65			16	76	56	68
Fruit	16+	9	21	1	5			3	14	13	16
Bread Cereals	10+	37	88	19	95			21	100	77	94
Eggs & Meat	15+	31	74	18	90			21	100	70	85

in bread and cereal scores, and 8 per cent in fruit scores.

A total of three diets were found to be adequate in all of the five important food groups in the winter diets, 1 at Coxburg School and 2 at Morgan City School. A total of 4 diets were adequate in all respects in the spring, 2 at Caledonia School and 2 at Morgan City School. Several of the diets in each community were found to be adequate in some four out of the five food groups. The fruit and milk scores were more frequently found to be lacking than the other scores. Had the diets been scored on a quantitative basis as well, probably more of them would have been found adequate in all of the food groups.

The total average results showed that 95.5 per cent of the girls were receiving an adequate supply of bread and cereal, 71.5 per cent an adequate supply of eggs and meat, 54.5 per cent an adequate supply of vegetables, 37.5 per cent an adequate supply of milk, and 20 per cent an adequate supply of fruit.

So we see that bread, cereals, meats and eggs were more adequately furnished than the other food groups.

Concerning adequate and optional nutrition, Sherman[22] says: "...we see that adequacy alone is not a sufficient aim. It is true that we should seek to make all dietaries adequate; but having found or attained the adequate we should not rest content with that as if there were

22 Sherman, H. C., op. cit., p. 520.

nothing more to be learned or accomplished. Not merely adequate but rather optimal nutrition should be the aim."

Concerning the amounts of meats, sweets, and breadstuffs used in the dietaries just studied, and the deficiencies in respect to fruits, vegetables, and milk, the investigator quotes Sherman[23] again. "It becomes apparent that a dietary made up, as so many American dietaries are, too largely of breadstuffs, meats, sweets, and fats, may be satisfying to the palate and to the traditional demands for variety; may furnish ample quota of protein and calories, with fats and carbohydrates in any desired proportions, and yet may be inadequate because of faults in its mineral and vitamin content. We now understand how it is that fruits, vegetables, and especially milk in its various forms, serve (in ways which until recently could not be fully appreciated) to make good the deficiencies of breadstuffs, meats, sweets, and fats."

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23 Sherman, H. C., op. cit., p. 521.

Energy Value of the Diets Studied

The data obtained were not considered accurate enough to use for quantitative analysis of the diets, and, therefore, it was impossible to determine accurately the energy values. However, considering the existing underweight condition of the girls, as shown in Table 18, it could be generally concluded that at least 41 per cent of the subjects did not receive a sufficient number of calories for the activities performed.

The reports showed that there was a general gain in weight during the winter and spring and a loss of weight during the summer and fall. This might indicate that the winter and spring diets were more suited to the individuals and their activities than the diets of the other seasons.

Minerals

An adequate supply of minerals such as calcium, phosphorus and iron are very necessary in the diet. When the requirements of these three minerals have been met in the diet, it is generally considered that one may be reasonably certain of having obtained the other needed minerals. Foods which furnish these minerals also provide some of the others at the same time.

Again, it was impossible, with the information obtained, to form more than a general estimate of the mineral supply of the girls whose diets have been studied.

Bogert[24] says that minerals will be supplied adequately if a liberal amount of milk, eggs, fruits, and vegetables, especially green ones, are included in the diet.

Considering the inadequacy of fruits, green vegetables, eggs and milk in the diets, it is believed that the quantity of minerals supplied were insufficient to produce adequate nutrition, when the group as a whole was considered. Only 54.5 per cent of the diets reported an adequate supply of vegetables, 37.5 per cent an adequate supply of milk, and 20 per cent an adequate supply of fruits. Eggs were shown to be deficient in the winter diet especially.

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24 Bogert, L. J., op. cit., p. 195.

Vitamins

It was impossible to form more than a rough estimate of the vitamin content of the diets studied by checking the foods used which contained vitamins. No data were available with which to study the vitamin content of these diets in a quantitative manner.

Such foods as cornmeal, sugar, lard, bacon, vegetable fats, refined flour, polished rice and grits are known to contain deficient quantities of vitamins. Foods which have been proved to be good sources of vitamins are liver, fruits, whole grain products, dairy products, eggs, and vegetables, especially those vegetables having green and yellow coloring matter.

Vitamins considered necessary in the diet are A, B, C, D, and G, which serve the body as protective factors for producing body growth.

Vitamin A was probably more abundant in the diets studied than the other vitamins, since it is found in a variety of foods occurring in these diets. Whole milk, butter, carrots, cheese, liver, tomato, green beans, greens, sweet potatoes, and collards were the principal sources reported in this study. Due to the extensive use of sweet potato, collards, greens, and butter, together with a moderate use of milk, liver, tomato and cheese, it appeared that the supply of vitamin A might have been adequately met.

Vitamin B (B_1) was not found to be very abundant in the diets. The best sources reported in this study were peanuts, pork, sweet potatoes, and whole milk. The whole grain cereals (other than corn) were extremely lacking except for oatmeal, which was the whole grain cereal most frequantly used. It is thought that vitamin B (B_1) was not supplied sufficiently in these diets.

Vitamin C was thought to be the least adequately supplied of the vitamins, since the citrus fruits and tomatoes were used very sparingly in practically all of the diets studied. The cabbage used in these diets was usually cooked, and, therefore, was not a very potent source of the vitamin.

Vitamin D seemed to be very adequately supplied in the spring diets, due to the more frequent use of eggs. Where milk was supplied in good quantity it furnished a source of vitamin D. Sunshine could not be depended upon for vitamin D.

Vitamin G (B_2), which was furnished by eggs, milk, and vegetables, was probably supplied in moderate amounts in the diets studied.

It appeared that the girls in the Caledonia and Coxburg school communities probably had a more adequate supply of vitamins than those of the Morgan City and McNiel school communities.

Sweets and Fats

It was felt that a diet adequate in the five food groups considered would be adequate in supplying sweets and fats. Therefore, a separate study of these foods was not made. The consumption of sweets was high, being in the form of sorghum molasses, preserves, jelly, Louisiana syrup, cakes, and candy. Fried foods, butter, peanut butter, mayonnaise, and fat meats were the more popular sources of fats in these diets.

Summary

In this study of the dietary habits of junior and senior high school girls from four rural Mississippi communities, the following points are of special interest:

1. The data collected regarding the foods habits of the 143 girls in the winter and the 82 girls in the spring were regarded as giving a fair representation of the qualitative character of the diets.

2. Some of the information reported in the questionnaire as to the family life and general life of the girls was based upon recall factors, and was therefore subject to the usual inaccuracies of such a method.

3. The diets of the girls from the four communities were judged by a standard having an optimum score of 100, in which 24 points were allowed for milk, 22 for vegetables, 18 for meat and eggs, 19 for fruits, 17 for bread and other cereals, and in which 10 points were deducted from the total score when tea or coffee were consumed.

4. When the winter diets were taken as a whole and measured by the optimum score, it was found that 36 per cent rated from 70 to 100, 44 per cent from 50 to 70, and 20 per cent below 50 and above 25. The spring diets showed that 45 per cent had scores from 70 to 100, 51 per cent from 50 to 70, and 4 per cent below 50 and above 25.

5. Forty-one per cent of the girls reported the omission of either one or more meals during the day.

Twenty per cent of them omitted breakfast. The reason given by 32 per cent of the girls for omitting meals was lack of appetite.

6. In 34 per cent of the winter diets approximately a quart of milk per day was used, as compared with 40 per cent for the spring diets.

7. The winter diets showed 38 per cent of the vegetable scores to be near the optimum value, as compared with 66 per cent for the spring diets.

8. The fruit scores were very low. Twenty-two per cent of both the spring and winter diets had scores of from 0 to 4 points. The winter diets showed 24 per cent scoring near the optimum, as against 12 per cent in the spring. The diets were found to be especially deficient in citrus fruits and tomatoes.

9. Meat, more especially pork, was found to be used in abundance, being served at approximately each meal of the day. In the spring diets it was reported in more than one dish in a meal. The winter diets showed a lack of eggs, while in the spring diets eggs appeared in increased quantity. Meat and egg scores in the winter diets showed 70 per cent scoring near the optimum, while in the spring 89 per cent scored near the optimum.

10. The bread and cereal scores showed an average of 37 per cent of both winter and spring diets to be near the optimum value. In 28 per cent of the winter and 29 per cent of the spring diets bread was the only

cereal used. An average of 5 per cent of both winter and spring diets showed the use of too little bread and no other cereal.

11. Forty-one per cent of the girls consumed tea or coffee.

12. Comparative scores for optimum diets for the different communities showed that Caledonia School had the highest milk scores for the winter, and Coxburg School for the spring; Coxburg School was highest in winter vegetable scores, and Caledonia School in spring vegetables; that the fruit scores were highest in Caledonia School for both spring and winter; that the meat and egg scores were highest at Coxburg School in the winter, and at Morgan City School in the spring; and that the bread and cereal scores were highest at Caledonia School for both seasons.

13. The diets were scored by an optimum score with a total of 100 points, as cited above. They were also scored by an adequate score, having a total of 78+ points, of which 20+ points were allowed for milk, 17+ for vegetables, 16+ for fruits, 10+ for bread and other cereals, and 15+ for meat and eggs. No deduction was made in the adequate score for tea or coffee. Three winter and four spring diets were found to be adequate in all of the five food groups. Several in each community were adequate for some four of the groups. In all of the schools combined, 35 per cent of the winter and 40 per cent of the spring diets were adequate for milk, 41 per cent of the winter and 68

per cent of the spring diets were adequate for vegetables, 24 per cent of the winter and 16 per cent of the spring diets were adequate for fruits, 97 per cent of the winter and 94 per cent of the spring diets were adequate for bread and cereals, and 58 per cent of the winter and 85 per cent of the spring diets were adequate for meat and eggs.

14. Scores arranged as to home owning, renting, and share cropping families showed the owners and the renters to average 64 points, each. The share cropper family averaged 69.

15. Underweight, checked only by reports of the individual girls, was frequent in the areas studied. Forty-one per cent of the girls were found to be underweight to the extent of 6 to 28 pounds. Only 14 per cent reported an over weight condition of from 6 to 29 pounds. A more general loss of weight was reported for the summer and fall months when outside activities were more strenuous or more numerous.

16. The energy value of the diets did not seem to be sufficient for the group of girls studied.

17. It appeared that there probably was an insufficient amount of minerals included in the diets.

18. Vitamins A and G seemed to be more abundant in the diet than vitamins D and C.

19. Meats, sweets, and breadstuffs were apparently being used in too large amounts in the diets.

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A P P E N D I X

GENERAL INFORMATION CONCERNING THE SCHOOL

County in which school is located:_____

Location of school in the county:_____

Distance from nearest town:_____. Name of town:_____

Distance from county seat:_____. Name of town:_____

Size of school district:_____

Number of school trucks bringing children to school:_____

Approximate number of families in school district:_____

Number of pupils in high school department:_____

Number of high school teachers employed:_____

Number of grammar school pupils enrolled:_____

Number of grammar school teachers employed:_____

Kind of roads connecting the school with other communities (dirt, gravel, asphalt, concrete etc.):_____

Length of time school has maintained a vocational home economics department:_____

Housing facilities for home economics work (cottage, vocational building, with high school work etc.):_____

Directions for the Teacher

General: These blanks should be filled out by girls in the grades 9, 10, 11, and 12 until the entire fifty (50) blanks have been used. Should there not be enough girls in these grades to utilize all the blanks, the remaining number should be given to the girls of the eighth grade.

Questionnaires: Each girl is to be supplied with one copy of the questionnaire complete.

Friday, Jan. 19, '34: Give the questionnaires to the girls and have them begin to fill the blanks.

Teacher's explanation to the girls: Explain to each girl that she is to begin with the first page of the questionnaire and fill in each blank that she is sure she can fill in correctly on pages one and two. When she has done this, she is to take the questionnaire home with her and ask her mother to help her with any answers of which she is not certain.

Perhaps she may need also to consult her father concerning the last item on the second page: Family's approximate income for both (a) and (b).

Tell the girls that the information asked for will not be used in any way that will reveal the private standing of any family or individual; but will be used only for comparative information as to rural standards in Mississippi.

All information should be as accurate as possible and be based on the fiscal year from January 1, 1933 to January 1, 1934.

Menu forms on p. 3 & 4: Record food eaten on Saturday, Sunday, Monday, and Tuesday for filling in the menus. It is best to fill in the blanks for each meal immediately following the meal. Give the entire menu served to the family, and state opposite each food the amount eaten in the column "Amount

you eat" *"as clearly as possible, as for example--1 large apple, 1 c. cocoa, 1 large slice ham, 1 egg, number of biscuits, 1 piece of pie or cake, 1 serving of peas (green or dried), beans (string or dried), 1 glass of skim milk, 1 glass or sweet milk, 1 glass of buttermilk, 1 medium size sweet potato."

Wednesday: Take up all questionnaires and return as soon as possible.

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* Jones, B. L. op. cit. p. 51.

QUESTIONNAIRE

Name_____Grade____Age____Weight____Height____

Address_____County_____School_____

Parent's occupation_____Number in family_____

Home owner, renter, share cropper?_____

What physical defects, if any, do you have?_____

What school sports do you play well?_____

What fruits are produced at your home?_____

_____

What vegetables are produced at your home?
(a)Root_____

(b)Green_____

What meats are produced at your home?_____

_____

What meat substitutes are produced at your home?_____
(as cheese, eggs, fish, milk etc.)

_____

What fats are produced at your home?_____
(as butter, fat bacon, cream, lard)

What edible grains are produced at your home?_____
(as cornmeal, rice etc.)

What foods were canned, dried, or preserved at your home during the year of 1933? (Give dried foods in pounds, and others in quarts.)

FOOD	AMOUNT

(Should more space be needed, use back of this sheet.)

What is the average daily amount of milk produced at your home for the year?_____quarts.

Do you have milk all the year at your home?_____Yes, or No.

If not, what months do you not have milk?_____

How many cups of milk do you drink per day?_____

Is milk used for cooking purposes at your home?_____

What kinds of bread do you eat regularily?
(a) Breakfast (b) Dinner or Lunch (c) Supper

_____ _____ _____

What meal do you generally not eat during the day, if any?

_____. Give reason for omitting meals?_____

Do you sleep with windows open?_____If not, why?_____

Average amount of sleep you get at night?_____hours.

Do you sleep during the day?_____If so, how long?_____

What outside work do you do?

TYPE OF WORK DONE	MONTH	HOURS PER DAY

(Should other space be needed, use back of this sheet.)

Do you gain or lose weight during the summer?_____

If so, how much?_____pounds.

Do you eat more when you are doing outside work than at other times?_____.

If so, what foods generally are eaten?_____

Is your appetite generally good?_____-
Family's approximate income:

(a) Cash money from produce sold and other sources:$____

(b) Cash money spent for staple foods during the year:$____

-3-

WINTER

Menu	Amount you eat	Menu	Amount you eat
Saturday Breakfast		Sunday Breakfast	
Saturday Dinner		Sunday Dinner	
Saturday Supper		Sunday Supper	
Between meals		Between meals	

-4-

WINTER

Menu	Amount you eat	Menu	Amount you eat
Monday Breakfast		Tuesday Breakfast	
Monday Dinner		Tuesday Dinner	
Monday Supper		Tuesday Supper	
Between meals		Between meals	

-5-
SPRING

Menu	Amount you eat	Menu	Amount you eat
Saturday Breakfast		Sunday Breakfast	
Saturday Dinner		Sunday Dinner	
Saturday Supper		Sunday Supper	
Between meals		Between meals	

-6-

SPRING

Menu	Amount you eat	Menu	Amount you eat
Monday Breakfast		Tuesday Breakfast	
Monday Dinner		Tuesday Dinner	
Monday Supper		Tuesday Supper	
Between meals		Between meals	