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A STUDY OF THE FACILITIES, SANITATION, SERVICES,  
AND PERSONNEL IN THE SCHOOL LUNCH PROGRAMS  
OF FIVE FLATHEAD COUNTY TOWN SCHOOLS  
FOR THE 1957-58 SCHOOL YEAR

by

JOSEPH H. ESLICK

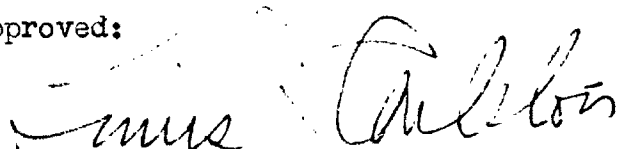
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1957

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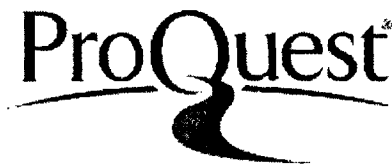


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## CHAPTER I

### THE PROBLEM AND PURPOSES OF THE STUDY

The significance of the problem. The problem of sanitation in the school lunch kitchen is particularly acute in Montana since many programs are operating with limited funds and feeding increased enrollments without necessary features or personnel.

School lunch services have grown rapidly in the past seven years. For example, in 1949, Montana school lunch kitchens served 3,055,375 meals to the children participating in the school lunch program.<sup>1</sup> In 1956, the school lunch kitchens in Montana served 5,571,986 meals to over 40,000 school children.<sup>2</sup> This shows an increase of over two and one-half million meals served per year. During the 1954-56 biennium, the consumption of milk by Montana school children who participated in the hot lunch program increased by 4,962,802 half-pints and is steadily growing.<sup>3</sup>

Good food, plenty of it, and the right kind are particularly

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<sup>1</sup> State Department of Public Instruction, Your Schools Today and Goals for Tomorrow (Biennial Report of the Superintendent of Public Instruction of Montana 1952-54, Butte: McKee Printing Company, 1954), p. 64.

<sup>2</sup> State Department of Public Instruction, Your Schools Today and Their Achievement (Biennial Report of the Superintendent of Public Instruction of Montana 1954-1956, Butte: McKee Printing Company, 1956), p. 24.

<sup>3</sup> Ibid.

important during the years in which the child is growing and developing. The underlying purpose of the school lunch program is to serve children the very best food that is produced. The end results of a good lunch program are improved national health, and increased consumption of the products of the farms.<sup>4</sup>

That these purposes are considered important is shown by the agreement signed by the school district and the State Department of Public Instruction for the establishment of a school lunch program in which the school district agrees that adequate facilities will be provided for conducting the program, and for the storage of United States Department of Agriculture commodities.<sup>5</sup> These commodities are free of cost to the school lunch program. Schools have only to pay transportation from Helena to their school and in addition, a small handling or reshipping charge. The State Department of Public Instruction lists seven points which are to be considered when establishing a school lunch program. Points one and three which are relevant to this study require that adequate space and equipment must be provided to serve the estimated number of children, and the physical facilities must be such that adequate sanitary precautions can be observed.<sup>6</sup>

Section Two of the National School Lunch Act, passed by Congress,

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<sup>4</sup>State Department of Public Instruction, "A Brief Outline of the Montana School Lunch Program" (Helena: State Department of Public Instruction), p. 5. (Mimeographed).

<sup>5</sup>Ibid., p. 3.

<sup>6</sup>Ibid., pp. 1-2.



and signed by the president in June, 1946, states:

It is hereby declared to be a policy of Congress, as a measure of national security, to safeguard the health and well-being of the nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other food, by assisting the states through grants-in-aid and other means, in providing an adequate supply of foods and other facilities for the establishment, maintenance, operation, and expansion of non-profit school lunch programs.<sup>7</sup>

Health, which is the first of the seven cardinal principles of Education, must be maintained among our school children. The school lunch program can aid in doing this by providing nutritious meals, prepared and served in a sanitary manner.

The purpose of the study. The purposes of this study were (1) to set up a plan for checking sanitary conditions and equipment in school lunch kitchens; (2) to apply the plan to the lunch kitchens of the schools in Flathead County; (3) to examine school lunch kitchen practices and equipment as recommended by authorities and determine what standards should exist in the schools to be studied; (4) to compare situations found in Flathead County schools with those recommended by authorities; and (5) to make administrators and lunch personnel more aware of sanitary conditions in kitchens and make recommendations for the improvement of unsatisfactory conditions.

#### ASSUMPTIONS, DELIMITATIONS, LIMITATIONS, DEFINITIONS OF TERMS

Assumptions: Through the use of literature of authorities in

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<sup>7</sup>"57,000 Schools in National School Lunch Program," Locomotive Engineers Journal, 88:247, April, 1953.

the field of feeding, kitchen facilities, and personnel of school lunch programs it is assumed that a suitable check list can be constructed. By using this check list it is assumed that valid conclusions can be reached.

Delimitations. The study was confined to the school lunch kitchens of five selected schools in Flathead County. The schools under study were Somers, Whitefish, Columbia Falls, Flathead County High School, and Bigfork. These schools, located within a small area, made it possible for data to be collected by personal observation by the researcher.

Limitations. The study of sanitation, facilities, services, and personnel of the school lunch programs was limited to five of the larger schools in Flathead County. This study does not include the dining facilities of these schools because of a similar study conducted of dining facilities in Ravalli County in 1951.<sup>8</sup> The study was limited to one observation of each school lunch program and it was possible that some features of the lunch program such as appearance of personnel, handling of food and the fact that the kitchen supervisor knew in advance that the observation was to be made could change the daily procedure.

The results of the check list were based upon how the researcher saw and interpreted conditions in the five lunch programs studied.

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<sup>8</sup> Russell D. Giesy, "A Study of the Sanitary Conditions in the School Lunch Programs of Six Ravalli County Town Schools for the 1950-51 School Year" (Unpublished professional paper, Montana State University, Missoula, 1953), p. 3.

## PROCEDURES AND POSSIBLE OUTCOMES

The use of related literature. Literature on the current sanitary practices in the school lunchroom kitchens was used to establish an ideal standard for the receiving, storing, preparing, serving, and cleaning involved in serving the meals. By establishing desired standards, yardsticks for evaluating the sanitary practices in the school lunch kitchens were provided.

Collection of data. The data for this study was collected by a personal check list. This method was used in order to secure more accurate results since a questionnaire could have been answered as the lunch room supervisor would have liked conditions to have been rather than as they actually were.

Treatment of data. The data collected are reported in Chapter III. In Chapter III the existing conditions in the five lunch kitchens under study are compared with those recommended for the ideal lunch room kitchen by authorities in the school lunch field.

Possible outcomes. As will be pointed out in the final chapter, this study led to recommendations (1) for improvement of the sanitary conditions in the school lunch kitchens studied; (2) for changes in the arrangement of equipment so that cleaning would be facilitated; and (3) for re-arrangement of equipment so that the kitchen could be used more effectively in preparing and serving meals.

## CHAPTER II

### RECOMMENDED STANDARDS FOR THE SCHOOL LUNCH PROGRAM:

#### FACILITIES, SANITATION, SERVICES AND PERSONNEL

The purpose of a school lunch program is to provide a wholesome, adequate noon meal for pupils while they are attending school.

Through the use of literature by authorities in the field of school feeding and sanitation, recommended standards will be developed in this chapter pertaining to facilities, sanitation, services, and personnel.

#### KITCHEN

The purpose of the kitchen is to provide a separate area for the preparation of school lunches. Preparation of school lunches in the home economics room or gymnasium is not desirable.

The kitchen should be located adjacent to the receiving, dining, and serving areas, and easily accessible to the food storage area.<sup>1</sup>

"The size of the kitchen is determined by the number to be served."<sup>2</sup> Approximately two to two and one-half square feet of floor

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<sup>1</sup>United States Department of Agriculture, A Guide for Planning and Equipping School Lunchrooms, (Agricultural Marketing Service PA292. Washington D. C.: United States Department of Agriculture, 1956), p. 16.

<sup>2</sup>Mary DeGarmo Bryan, The School Cafeteria (New York: F. S. Crofts and Company, 1946), p. 266.

area per meal served daily will provide adequate space.<sup>3</sup> Rectangular kitchens provide the most efficient use of space and it is desirable for the length to be not more than twice the width.<sup>4</sup>

Floors. Floors and floor coverings are available in many materials, designs, and colors. Floors form a part of the background of rooms and should harmonize with walls and furnishings in color and type. They must also meet many other requirements, chief among which are utility, durability, and resiliency. Floors should be impervious to moisture, grease, and food stains; they should also be non-slippery and resistant to scratches and acid, alkali, or organic solvents. The coloring should be permanent, and the cost of maintenance and upkeep relatively low. Many different types of floors and floor coverings are used in institutional food services. Common among these are wood, concrete, terrazzo, quarry and asphalt tile, rubber tile, and linoleum.<sup>5</sup>

Concrete floors are not satisfactory.<sup>6</sup> They are fatiguing to walk or stand upon, absorb grease, are cold in appearance, crack easily, and, if painted, require frequent refinishing.<sup>7</sup>

Terrazzo may be used for dining rooms and kitchen floors, although lack of resiliency and the noisiness of clatter on its hard surface render it not so well suited to food service units as

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<sup>3</sup>United States Department of Agriculture, loc. cit.

<sup>4</sup>Ibid.

<sup>5</sup>Bessie Brooks West, Levelle Wood, Food Service in Institutions (New York: John Wiley and Sons, Incorporated, 1950), pp. 462-63.

<sup>6</sup>Bryan, op. cit., p. 252.

<sup>7</sup>West and Wood, op. cit., p. 464.

it is to entrances, corridors, and stairways in public buildings.<sup>8</sup>

Three types of resilient floorings are frequently used to good effect as regards appearance and utility—linoleum, rubber tile, and the so-called asphalt tiles. These may be selected in squares of contrasting colors. If care is used in maintenance and in cleaning, and if they are properly laid on perfectly dry cement, these floorings will be durable. They reduce noise and are pleasing in appearance.<sup>9</sup>

Ceramic tiles are manufactured from plastic clay, dust pressed, and unglazed. Such tiles have about the same amount of resiliency as cement, terrazzo, and maple, and slightly more than quarry. These tiles are highly resistant to wear of all kinds, are non-absorbent, easily cleaned, and give a pleasing effect. The greatest disadvantages in their use are that they are non-resilient and slippery when wet.<sup>10</sup>

The preferred material for the kitchen floor is quarry tile. This material is sometimes fatiguing to stand upon while working, but it is more durable and requires less maintenance than resilient types of floor covering.<sup>11</sup>

Walls and ceilings. The walls and ceilings of school lunch kitchens should be planned to provide a sanitary background. The entire wall may be plastered and finished with enamel or enamel paint. For food preparation rooms, walls of glazed tile or masonry carried up to a height of five to eight feet are commonly recommended. The remainder of the wall may be of a hard, smooth-finished plaster of Keene's cement. Tile, white or colored, may be used for the entire

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<sup>8</sup>Ibid.

<sup>9</sup>Bryan, op. cit., p. 253.

<sup>10</sup>West and Wood, loc. cit.

<sup>11</sup>Ibid. pp. 464-467.

wall if the budget permits. Regardless of the materials used, walls in all preparation units should be washable and impervious to moisture.<sup>12</sup>

The ceiling should be light in color, smooth, impervious to moisture, easy to wash and keep in good repair. A non-absorbent, rodent-proof, fire-resistant acoustical type of ceiling is desirable. Painted water-proof, mildew-resistant plaster or cement may be used if financing does not permit other types.<sup>13</sup>

Outside door should have self-closing devices and locks; metal frames are desirable and should harmonize with walls and other casings in type, color, and finish.<sup>14</sup>

#### Lighting.

The estimate of the amount of light needed is too often based on watt-hour readings rather than on a comparison of efficient work units with adequate and inadequate lighting facilities as determined by foot-candle measurements. A light intensity of 20 to 30 foot-candles is considered adequate for general lighting in food preparation and display units with an increase up to 50 foot-candles in intensity on working surfaces. This increase is obtained by means of the installation of supplementary lights above or near the working areas.<sup>15</sup>

The desired twenty to thirty foot-candles intensity can usually be supplied if light colors are used on walls and ceilings and if three watts are allowed per square foot of floor space.

Rooms finished in white paints or paper are easy to light as approximately eighty to ninety percent of the light striking the wall

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<sup>12</sup>Ibid., p. 467.

<sup>13</sup>United States Department of Agriculture, loc. cit.

<sup>14</sup>West and Wood, op. cit., p. 468.

<sup>15</sup>Ibid., p. 470.

is reflected. The use of such whiteness, however, is not advisable for many rooms because of the cold and unpleasant effect produced. Slightly darker shades such as ivories, buff, cream, pearl grey, yellow, or green have only slightly lower reflective properties and are more acceptable as a wall finish because of their pleasing and restful effect. Hues of as low a reflective factor as fifty percent should be avoided for interior finishes in school lunch kitchens.<sup>16</sup>

Plumbing and heating. The kitchen must be supplied with ample cold and hot water connections. The drainage and waste lines should have accessible cleanouts, and grease traps provided where needed. Wherever possible the piping should come out of the walls instead of the floor with at least an eight inch clearance for cleaning the floor.<sup>17</sup>

The heating system in the school lunch kitchen should be the same as the rest of the school; however, there should be a separate temperature control.<sup>18</sup>

Ventilation. The ventilation of the lunch kitchen is one of the most important factors in determining the attractiveness of the room, yet the location and arrangement of many lunch rooms indicate that insufficient consideration is given to this factor.

If artificially ventilated, the same standards should be maintained as for other classrooms. This is sometimes difficult in

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<sup>16</sup>Ibid., pp. 467-468.

<sup>17</sup>United States Department of Agriculture, op. cit., p. 17.

<sup>18</sup>Ibid.



basement lunchrooms, but may be secured with proper arrangement of adequate intake and exhaust fans.

"If natural ventilation is to be successful a cross draft must be provided."<sup>19</sup> Only locations above the basement floor permit satisfactory natural ventilation.

A built-in vent or vented hood over the range and other cooking equipment is recommended. A two-speed fan is desirable with a filter intake in the hood.<sup>20</sup>

Equipment. It is obvious that no standard list of equipment could be prepared which would be suited to all school kitchens. Table I, page 12, however, may serve as a guide for items of large kitchen equipment for lunch rooms of various sizes.

Certain points to be observed in the layout of equipment are found to be expedient in most kitchens. They are adaptable to any good architectural plan. Mary Bryan<sup>21</sup> suggests that:

1. Processes of receiving and preparing food must move in orderly sequence around or through the room, either from left to right or from right to left.
2. The direction of the routing is in turn determined by the location of the cafeteria and the point nearest the exit which is most convenient for the collection of dishes. The line bringing its trays to a dish window or truck must not cross the service line. If this point locates the dishwashing section of the cafeteria on the right-hand side of the kitchen, preparation should move toward the left. Routing in the opposite direction is usually most convenient, if dishwashing is done on the left.

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<sup>19</sup>Bryan, op. cit., p. 251.

<sup>20</sup>United States Department of Agriculture, loc. cit.

<sup>21</sup>Bryan, op. cit., pp. 273-74.

TABLE I

SUGGESTED ITEMS OF LARGE KITCHEN EQUIPMENT FOR THE SCHOOL LUNCHROOM<sup>1</sup>

ARTICLE	MEALS SERVED PER DAY					
	100-200	200-500	500-1000	1000-1500	1500-2000	2000 up
Shelving with soiled and dish tables	1 basket 10 lb.	1 basket 10 lb.	1 basket 10 lb.	1 basket 15 lb.	1 basket 20 lb.	2 baskets 25 lb.
with attachments	15 qt.	20 qt.	30-20 qts..	30-20 qts..	60-30 qts.	30-30 qts.
Meat slicer		small	medium	medium	medium	medium
Pan rack	3 shelf	3 shelf	3 shelf	4 shelf	4 shelf	4 shelf
Range and hood	large hslid. or 1 sec. heavy duty	heavy duty	heavy duty	heavy duty	heavy duty	heavy duty
Dish truck			one	one	one	one*
Bakers plate					one	one
Rack, cooling		4 shelf	6 shelf	8 shelf	9 shelf	9 shelf
Bake oven		2 deck	2 deck	4 deck	4 deck	4 deck
Steamer					2 compart- ment	2 compart- ment
Steam jacketed kettle				30 gal.	30 gal.	30 gal. 10 gal. trunnion
Food cutter						small
Refrigerator	15 cu.ft.	30 cu.ft.	75 cu.ft.	125 cu.ft.	160 cu.ft.	225 cu.ft. 2 boxes
Tables	one	two	two	two	three	four
Sinks	one	one	two	two	two	three
Slop sink	one	one	one	one	one	one
Hand basin	one	one	one	one	one	

\*Additional trucks will be required unless soiled dishes are delivered to the dishwashing unit by the students.

<sup>1</sup>Taken from The School Cafeteria (New York: F. S. Crofts and Company, 1946), p. 275.

3. The sink and peeler for vegetable preparation should be located near the delivery entrance.
4. Salad, fruit, dessert and sandwich preparation should adjoin the vegetable preparation. Utility table or tables, the small mixer (if required), toaster, and refrigerator are usually placed between the vegetable unit and the entrance to the lunch room.
5. Cooking equipment should be convenient to the vegetable preparation unit. Ranges, bake oven, steam kettle and steamer should be grouped under the same hood. The baker's and cook's tables will adjoin the cooking unit.
6. In small kitchens the cooking unit is usually placed against the wall opposite the entrance to the service counter. In large ones, it is frequently preferable to place this unit in the center of the room, grouping other preparation units around it. Hot food may be carried quickly to the service counter from this location.
7. The mixer should be placed so as to be used by both cook and baker.
8. If the pot sink is placed under the vegetable sink the cost of plumbing is lessened.
9. The dish storage cabinet should be accessible to salad, baking, and cooking units. If there is no dish storage in the cafeteria service counter, this dish cabinet must be near the entrance to the dining room.
10. Space must be allowed between pieces of stationary equipment for the passage of dish or service trucks, if these are used, and for employees to stand or sit while working, or to pass each other.
11. Food preparation and service are frequently carried out in the same room. An effect of partitioning off the preparation is gained by placing dish storage fixtures and refrigerators back of the counter and in front of the preparation equipment.

Work tables should be substantially constructed with non-absorbent smoothly finished tops. Linoleum, stainless steel, and hardwood with water resistant finish make satisfactory working surfaces.<sup>22</sup>

Work tables should be thirty-four inches to thirty-six inches in height, twenty-four inches to thirty inches wide if used on one side only, and forty-two inches to forty-eight inches if used on both sides.

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<sup>22</sup> Irene Burba, "Essential Equipment for the School Kitchen," Nations Schools, 44:64, September, 1949.

All work tables, the serving counter and the dishwashing table should be made of stainless steel metal since it is easy to clean and does not stain.<sup>23</sup>

The refrigeration needs of the school lunch kitchen will depend upon the number of meals served, the location of the school, food purchasing practices, frequency of delivery, and use of central storage. One cubic foot stores approximately thirty to thirty five pounds of food.<sup>24</sup>

Several types of dishes are considered acceptable for the school lunch program. Points to consider in selecting dishes are their stacking, breaking, and chipping qualities, and if they stain or wash well. Stainless steel, china, and the newer plastic dishes are all acceptable; however, the china dishes do chip and break while the other two types do not.<sup>25</sup> Open stock patterns should be selected for china and glassware so that only small surplus supplies of these items will be necessary.<sup>26</sup>

Storeroom. The storeroom should be adjacent to the kitchen area and convenient to the receiving area.<sup>27</sup> The size of the storeroom should be determined by (1) the distance and the frequency of deliveries from wholesale suppliers; (2) amount of money available for investment in

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<sup>23</sup>David Page, Grace Parle, "Model Lunchrooms as Seen by Pupils, Mother and Health Inspector," Nations Schools, 53:94, April, 1955.

<sup>24</sup>United States Department of Agriculture, op. cit., p. 21.

<sup>25</sup>Ibid.

<sup>26</sup>Bryan, op. cit., p. 287.

<sup>27</sup>United States Department of Agriculture, op. cit., p. 10.

supplies, and (3) quantity of donated commodities. The room should be cool (not over 70° F.) and dry. Minimum space should be approximately one-fifth the kitchen area.<sup>28</sup> It is important to guard against vermin and to insure cleanliness. Floors are therefore of concrete, walls of plaster or glazed hollow tile, and shelves and bins of metal. The room should be free of pipes and contain no machinery.<sup>29</sup> It is advisable for the storeroom to have one door to the kitchen and one to the receiving area. These doors should be at least forty inches wide to simplify the receiving of supplies.<sup>30</sup> Windows in the storeroom should be screened with a fine mesh screen wire to prevent entrance of insects and rodents.<sup>31</sup>

Only the kitchen supervisor or an employee designated by her should have access to the storeroom.<sup>32</sup>

Lavatories and dressing rooms. The purpose of providing separate locker and toilet facilities for lunchroom employees is to promote more rigid enforcement of state and local health regulations. The location of these facilities should be near the employees' entrance to the kitchen area. Separate facilities for men and women should be provided if both sexes are employed. For dressing room space approximately three and one-half square feet of floor area per lunch room

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<sup>28</sup> Henry H. Rathman, "Basic Guide of School Lunchroom Planning," American School Board Journal, 134:107-8, February, 1957.

<sup>29</sup> Bryan, loc. cit.

<sup>30</sup> United States Department of Agriculture, loc. cit.

<sup>31</sup> Montana State Department of Public Instruction, "Handbook for the Proper Handling and Storing of Commodities," (Lineographed).

<sup>32</sup> Bryan, loc. cit.

employee is sufficient. If a cot is provided in the dressing room, an additional twenty square feet of floor space must be allowed. A minimum of ten foot-candles of light must be provided in the toilet and dressing room facilities. This can be achieved by about one watt per square foot of floor area. If natural ventilation is used the outside window or air vent should be screened with fine wire mesh screen. If a window is not provided for ventilation, an exhaust fan is desirable. If the toilet and dressing room facilities open into a corridor, one door is sufficient; however, if they open into the kitchen two doors with a vestibule between kitchen and toilet must be provided. Doors should be equipped with automatic closers. The floors of the dressing rooms and toilet facilities should be covered with quarry tile, terrazzo, or resilient tile with coved bases. Walls and ceilings should be light in color, smooth, impervious to moisture, easy to wash and keep in good repair. Glazed tile is most desirable but painted plaster or masonry is acceptable. Lavatories should be equipped with cold and hot water with a mixing faucet provided. There should be no uncleanable space beneath or behind lockers, under plumbing or plumbing fixtures or any piece of furniture.<sup>33</sup>

#### RECEIVING AREA

Outside. The outside receiving area should be located near the service driveway, adjacent to the storeroom and kitchen. It should be away from the playgrounds and student traffic.<sup>34</sup> The outside receiving

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<sup>33</sup>United States Department of Agriculture, op. cit., p. 55.

<sup>34</sup>Ibid., p. 7.

area should have a loading platform the height of a truck bed for ease of unloading. It is preferable for the outside receiving area to be covered.<sup>35</sup> The size of the outside receiving area will depend upon the number of meals served and volume of deliveries. However, it should be at least six feet wide. A concrete floor is adequate for the outside receiving area. It should be artificially lighted, and if a roof is not provided, it must be a weather-proof type.<sup>36</sup>

Inside. The inside receiving area should be adjoining the loading platform and separate from the kitchen and storeroom. The size of the inside receiving area will depend upon the number of meals served and the frequency and volume of deliveries. A minimum of fifteen foot-candles of light is sufficient. This can normally be achieved by about two watts per square foot of floor area. To facilitate the checking and moving of supplies it is advisable to provide a clip board and a hand truck. The walls should be light in color, smooth and impervious to moisture. Glazed tile is the most desirable but painted plaster or masonry is acceptable. Quarry tile is the most desirable flooring. However, terrazzo or concrete with a hardener is acceptable.<sup>37</sup>

#### FOOD PREPARATION

It is the responsibility of the kitchen supervisor to prepare

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<sup>35</sup>Rathman, loc. cit.

<sup>36</sup>United States Department of Agriculture, op. cit., p. 7.

<sup>37</sup>Ibid., p. 8.

palatable, nutritious, safe meals.<sup>38</sup> Periodic checks should be made of the water supply to insure its sanitary qualities. Samples of the water can be sent to the Public Health Service for a check. This service requires very little time and most schools in Montana could expect the results in a week.

Only pasteurized milk should be served. If unpasteurized, it should be boiled on the premises. If powdered milk is used, it must be mixed with safe water within an hour or two of the time it is to be used.<sup>39</sup> Milk should be purchased from a reputable dealer and straws purchased in sanitary boxes or individually wrapped should be furnished for drinking from bottles or cartons.

All meats used in the school lunch program should be inspected and approved by a government inspector. Day-old products are not to be used if there is any ingredient which is capable of spoilage or fermentation. This precaution is particularly needed with products containing chicken, fish, ham or other ground and left over meat dishes, excepting smoked or cured meats.<sup>40</sup>

Food, utensils, and containers must not be handled carelessly by kitchen workers. The personal hygiene and food handling practices of all employees should be checked closely by the kitchen supervisor.

Insects and rodents play an important role in food contamination and some outbreaks of food-borne disease have been traced to

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<sup>38</sup>West and Wood, op. cit., p. 62.

<sup>39</sup>Joint Committee on Health Problems in Education, The National Elementary Principal, 27:22, December, 1947.

<sup>40</sup>Ibid.



them.<sup>41</sup> Food must be kept in closed, dust-proof and vermin-proof containers. The housekeeping of the kitchen must be above criticism.<sup>42</sup>

#### FOOD SERVING

Plate style is the most common way of serving lunch meals. It insures each student a well balanced meal. However, there is more waste in that the pupils have a tendency not to eat things they do not like.

Cafeteria style of serving requires more equipment and does offer the pupils a greater variety of food. However, the pupils will eat only things they like and a well balanced meal is not always selected. There is probably less waste in serving cafeteria style in that the pupils select only food they like.

The family style of serving is best suited to the feeding of small groups. It requires less personnel to operate. However, it does not give the pupil the variety of food the cafeteria style serving permits.

Regardless of the method of serving used, it is important that the pupils get nutritious food, the right kind, and plenty of it.<sup>43</sup>

#### SANITATION

Cleaning equipment. A good food operation depends upon the

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<sup>41</sup>Charles C. Wilson, Eric W. Wood, "Survey of School Lunch Practices," American Journal of Public Health, 45:163-7, February, 1955.

<sup>42</sup>Joint Committee on Health Problems in Education, op. cit., p. 22.

<sup>43</sup>Montana State Department of Public Instruction, "A Brief Outline of the Montana School Lunch Program," p. 5. ( mimeographed.)

proper cleaning of its equipment. It is essential to maintain the quality of the product; and it is necessary for high standards of sanitation in food production. "Employees who work with clean equipment, and who are trained to keep that equipment clean, take pride in their work and the products they produce."<sup>44</sup> "A neatly typed cleaning instruction sheet in a plastic holder hanging on the wall near each piece of equipment is recommended."<sup>45</sup>

The kitchen supervisor should specify, by name, the person responsible for each cleaning job. A time schedule should be followed for cleaning equipment and a list of the required cleaning materials should be provided.<sup>46</sup> A separate locker or storeroom should be provided for the storage of cleaning materials. This should be adjacent to the receiving area and convenient to the kitchen, dishwashing, and maintenance areas.<sup>47</sup>

The dishwashing area should be located near the exit from the dining room and adjacent to the serving area where dishes will be used next. A dishwashing machine should be provided where one hundred or more meals are served. The machine should be complete with pre-washing facilities. An exhaust unit should also be provided for the excessive humid air. A minimum of eighty square feet of floor space

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<sup>44</sup>Lendal H. Kotschevar, "Establish a Maintenance Program," Institutional Feeding and Housing, 7:62, August, 1956.

<sup>45</sup>"Today's Food Soil Complicate Cleaning," Implant Food Management, January, 1956, p. 44.

<sup>46</sup>Kotschevar, loc. cit.

<sup>47</sup>United States Department of Agriculture, op. cit., p. 14.

should be allowed for small schools and up to two hundred fifty square feet of floor space for large schools for the dishwashing area.<sup>48</sup> A separate dishwashing room is recommended for those school kitchens feeding over five hundred pupils per day.

Maintaining adequate hot water for washing and rinsing dishes and utensils is a big problem. It is recommended the water for washing be one hundred forty degrees Fahrenheit; that for rinsing, one hundred eighty degrees.<sup>49</sup> After rinsing, draining the dishes is considered more sanitary than the drying with dish drying cloths.

Cloths used for cleaning should be used for no other purpose and when soiled should be placed in the laundry. Cleaning agents used should be non-poisonous and stored in their separate locker when not in use.

Cleaning floors and walls. The daily upkeep costs on floors in kitchens are relatively high, and for this reason easily cleaned floors are desirable for all work units. Good sanitary standards in upkeep include a daily, thorough cleaning of the kitchen floor with soap and water. A mild soap or detergent solution is preferable to an alkali or strong soap.<sup>50</sup>

The walls of the kitchen should be cleaned thoroughly each year. The walls of the food preparation units will require more attention than the kitchen walls proper and should be cleaned after the unit is used.

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<sup>48</sup>Rathman, op. cit., p. 108.

<sup>49</sup>Marguerite Moore, Emma Lee Hutchinson, "Cafeterias Built to a Standard Design," Nations Schools, 58:94, September, 1956.

<sup>50</sup>West and Wood, op. cit., p. 467.

Types of cleaners used. Kitchen floors should be mopped with a mild neutral soap suds solution. Spots can be removed with a damp cloth.<sup>51</sup>

When cleaning walls it is important to remember that the main cleaning agent is water. "The purpose of detergent is to loosen the soil. There must be friction to remove it."<sup>52</sup>

One cleaning agent "that will do everything" is not presently available. The complexity of modern food soil and other kinds of soil require that both alkaline and acid cleaners be used.<sup>53</sup>

Method of garbage disposal. It is desirable to have a separate room for garbage storage. It should be located near the service entrance or loading platform.<sup>54</sup> Garbage should be separated as to liquid and food particles, cans, and burnable materials. With the use of a garbage disposal unit in the kitchen and an incinerator for burning paper and cartons the area required for garbage storage can be greatly reduced. Garbage cans should be provided with vermin and insect-proof covers. A hose big or can washing unit should be provided for daily washing of garbage cans.<sup>55</sup> Live steam is the surest means of sterilizing the garbage cans. All garbage cans should be kept covered and garbage should be wrapped if local ordinances so provide.<sup>56</sup>

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<sup>51</sup>Ibid. p. 466.

<sup>52</sup>Today's Food Soils Complicate Cleaning, op. cit. p. 44.

<sup>53</sup>Ibid., p. 42.

<sup>54</sup>United States Department of Agriculture, op. cit. p. 49.

<sup>55</sup>Rathman, op. cit., p. 108.

<sup>56</sup>Joint Committee on Health Problems in Education, op. cit., p. 22.

Personnel. "All persons employed in the school lunch kitchen must be scrupulously clean in person and attire."<sup>57</sup> Medical care for accidents and minor illnesses is usually given by the school nurse or school physician free of charge to the employee. Physical examinations should be given to all employees at least twice during the school year. If there is no school physician, these examinations by outside physicians should usually be paid for from cafeteria funds.<sup>58</sup>

The furnishing and laundering of uniforms may also be regarded as compensation but this service is desirable from the point of view of good sanitation, immaculate cleanliness, and appearance as well. The uniform service includes student workers as well as regular employees.<sup>59</sup>

All employees should have their hair covered by an appropriate hair net or cap. Employees must keep their hands clean and nails well trimmed and clean. It is important that employees wash their hands immediately before handling food and after use of the toilet.

If there is suspicion that a worker is suffering from some communicable disease, skin disease or discharging wound, he should be examined by a physician or health officer. He should not be permitted to return to work after sickness or absence of undetermined cause until checked by a physician.<sup>60</sup>

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<sup>57</sup>Ibid., p. 21.

<sup>58</sup>Bryan, op. cit., p. 72.

<sup>59</sup>Ibid., p. 70.

<sup>60</sup>Joint Committee on Health Problems in Education, op. cit., p. 22.

## CHAPTER III

### THE CONDITIONS FOUND IN THE SCHOOL LUNCH PROGRAMS STUDIED IN FLATHEAD COUNTY WITH REGARD TO FACILITIES, SANITATION, SERVICES, AND PERSONNEL

Authoritative literature of recommended conditions for school lunch programs provided material for the check list;<sup>1</sup> check lists available were examined; from these sources a check list was compiled for checking the facilities, sanitation, services and personnel of the school lunch programs of five selected schools in Flathead County.

Written requests were mailed to the school administrators asking permission to conduct this survey of their school lunch kitchen and facilities. Such requests were granted in all cases with the provision that the name of the school be withheld and not subjected to competitive rating with other schools being surveyed. Therefore, the letters A, B, C, D, and E have been assigned to the schools studied and will be used in the remainder of this study.

The data for this study was collected in the five schools in Flathead County by means of a personal inspection of their school lunch kitchens and facilities. The check list was filled out in the presence of the school lunch supervisor to insure coverage of the operation and to record the findings. Of the schools studied, one

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<sup>1</sup>See Appendix p.62.

served only grade school students, and one served only high school students. The other schools studied served both grade and high school students. Table II, page 26, lists certain items of general interest regarding each lunch program.

#### KITCHEN

By action of the school boards of these schools, the kitchen facilities of Schools A and E were not used for any purpose other than school feeding. In Schools B, C, and D, the kitchen facilities were used for activities other than school feeding. Among the out-of-school groups using the kitchen facilities were the P. T. A., the Saddle Club and the Lions Club.

Floors. The surface of the floors in the kitchens of Schools A, D, and E was inlaid linoleum of harmonizing color with walls and ceilings. In Schools B and C the surface of the floors in the kitchens was concrete painted to blend with the rest of the background.

Walls and ceilings. The walls in the kitchens studied were light in color. Walls of a smooth plaster finish impervious to moisture were found in all kitchens studied. The ceiling of School B was painted Cellotex. In Schools A, C, D, and E the ceilings were made of smooth finished plaster. In Schools A, B, D, and E the kitchen walls were also the walls for the preparation units. In School C the walls of the food preparation units were covered with inlaid linoleum. The walls and ceilings of the kitchens of all schools studied appeared clean.

Lighting. The artificial lighting in the school lunch kitchens studied was in all cases equal to or greater than twenty foot-candles.

TABLE II

## GENERAL INFORMATION ON THE SCHOOL LUNCH KITCHENS OF SCHOOLS STUDIED IN FLATHEAD COUNTY

1957-58

SCHOOL	Average number of pupils served per day	Average number of adults served per day	Cost of meals to pupils	Cost of meals to adults	Percent of U. S. D. A. commodities used	Type meal served
A	192*	12	.25	.25	20	A**
B	350	12	.25	.25	20	A
C	1248	55	.25	.25	15	A
D	98	8	.25	no charge	15	A
E	140	10	.25	.25	20	A

\*Figures in this column include underprivileged students who do not pay for their meals.

\*\*The type A lunch consists of the following foods:

1. One-half pint of whole milk as a beverage.
2. Two ounces of lean meat, poultry, fish, or cheese, or one egg, or one-half cup of dry beans or peas, or four tablespoons of peanut butter.
3. Three-fourths cup of vegetables or fruit.
4. Bread made from enriched flour, and butter or fortified margarine.



Schools A, C, D, and E were equipped with additional fixtures over work surfaces which increased considerably the light in these areas. Additional lighting for work areas was not provided in School B.

All of the school kitchens studied had windows on one side but only Schools B and C had the kitchen windows screened. School A had purchased metal framed screens for their kitchen windows but these had not been installed at the time of this study. Schools D and E did not plan to screen the kitchen windows.

Plumbing and heating. Plumbing facilities in the kitchens of the five schools studied provided adequate hot and cold running water. Plumbing did not hamper cleaning in any of the schools studied.

The kitchens of Schools B, C, D, and E were located in main buildings of the school and therefore connected with the main heating system. The heat could be separately controlled in these kitchens. The kitchen of School A was heated by a propane heater mounted from the ceiling at the back of the kitchen.

Ventilation. Natural ventilation was used in all of the kitchens studied. In Schools A, B, C, and E exhaust fans were used to aid in ventilation as well as to remove cooking odors. Schools C and E for their kitchens provided cross draft, natural ventilation, and, as a result, had the best ventilated kitchens of those studied.

Equipment. In Schools C, D, and E the food receiving, preparing and serving moved in an orderly fashion from one side of the kitchen to the other; in School A the vegetable peeler was inconveniently located and in School B the vegetable preparation unit was in a room adjacent to the dining room.

The line of students who were bringing soiled dishes to the dish window or truck crossed the serving line in Schools A, B, and C; in Schools D and E the line returning soiled dishes did not cross the serving line.

The peeler and sink for vegetable preparation was near the delivery entrance in Schools D and C; in School A they were at the opposite side of the kitchen; in School E they were located in another building; in School B they were located in the inside receiving area which was adjacent to the kitchen.

The salad, fruit, dessert and sandwich preparation table was located adjacent to the vegetable preparation unit in Schools A, C, and D; in Schools B and E this area was in the kitchen proper while the vegetable preparation was in a room adjacent to the dining room.

Utility tables and small mixers were properly placed for efficient use in all five schools studied. The refrigerators were not as well located. In School A the refrigerator was placed adjacent to the salad and vegetable preparation unit; in School B the refrigerator was located in the store room. The refrigerator in School C was placed adjacent to the food serving counter. In Schools D and E the refrigerator was located at the back of the kitchen away from the salad and dessert preparation area.

The cooking equipment was convenient to the vegetable preparation unit in Schools A, C, and D. The cooking equipment was not convenient to the vegetable preparation unit in School B (the vegetables were prepared in a room adjacent to the kitchen) or in School E (the vegetables were prepared in another building).

The grouping of ranges, bake ovens and steam kettles under one hood was not present in any of the schools under study. Only Schools B and C were equipped with bake ovens. School E was the only school equipped with a fume hood. Exhaust fans for the removal of cooking odors were installed in the kitchens of Schools A, B, C, and E. The exhaust fan in School E was installed in the fume hood. The kitchen of School D was not equipped with an exhaust fan.

The mixers in School C were of the stationary type and in three sizes: small, medium, and large. The small mixer was located between the vegetable unit and the entrance to the lunch room; the medium sized mixer was in the baking area; the large mixer was in the cooking area. School A was equipped with a small portable mixer and a medium sized stationary mixer. Schools B, D, and E were each equipped with small portable mixers which could be moved to where they were needed.

The dish storage cabinet was located near the entrance to the dining room in all of the five schools studied. However, in Schools B and C the dish storage cabinet was not easily accessible to the salad and baking units; in School B it was located on the opposite wall from the salad and baking area; in School C the dish storage cabinets were in the serving area which was located in a room adjacent to the kitchen.

The composition of the counter and table tops in the kitchens of Schools A, D, and E was formica. In the kitchens of Schools B and C the table tops were covered with inlaid linoleum. In School C the serving counter was made of stainless steel. The serving counter of School B was covered with inlaid linoleum.

In the schools studied refrigeration and deep freeze space varied

from a walk-in freezer to a single unit, chest-type freezer. Supervisors in Schools A, B, C, and E reported adequate refrigeration and deep freeze facilities. In School D the deep freeze space was not adequate. This school was equipped with a twenty-two cubic foot, upright type deep freeze but was unable to get deliveries as frequently as the other schools studied.

The cooking dishes and utensils in use in all the kitchens were in good condition and clean. Heavy gauge aluminum, cast iron, and stainless steel were the most commonly used cooking utensils.

All schools used plastic dishes in which to serve meals.

#### STOREROOM

In Schools A, C, D, and E the storeroom was adjacent to the kitchen and receiving area. In School B the storeroom was located some distance from the kitchen and this necessitated passing through the dining area to get supplies. In Schools A, B, C, and E the size of the storeroom was more than one-fifth the kitchen area. In School D the storeroom was less than one-fifth the kitchen area, and, as a result, supplies could not be stored as desired. Only one storeroom, (School E) could be considered rodent, insect, and vermin-proof. The only storeroom with windows was in School E. This storeroom had two windows which were thirty six inches in width and forty eight inches in height. These windows were covered with a wire screen of such coarse mesh that it would not keep out insects and flies.

Adequate ventilation of the storeroom was lacking in Schools A, B, D, and E. The storeroom of School C was equipped with an exhaust fan. In School B natural ventilation by use of two screened windows was used,

but a cross draft was lacking. Storerooms in all the schools studied were dry. Storerooms in Schools B and C were cool because they were located below ground level. In Schools A, D, and E, the storeroom was the same temperature as the kitchen.

Adequate shelving was provided in the storeroom of Schools A and B. In Schools C, D, and E supplies were piled upon the floor for lack of shelving. The storerooms of all the schools studied were equipped with but one door and only in Schools A and C were the doors to the storeroom at least forty inches in width. Only Schools A and C provided a hand truck for moving supplies to and from the storeroom. All regular employees had access to the storerooms in the schools studied. In Schools A, C, D, and E student employees also had access to the storeroom.

The storeroom floors were unpainted concrete in Schools A, B, and C. In Schools D and E, the floor was covered with inlaid linoleum. A floor drain was present in the storerooms of Schools A, B, C, and E.

The walls and ceilings of the storerooms were smooth plaster, and therefore washable; in Schools A, C, D, and E; in School B, the ceiling of the storeroom was unpainted Cellotex which could not be washed.

#### LAVATORIES AND DRESSING ROOMS

Separate toilet facilities were provided for employees in Schools A and C. In these two schools the toilet facilities were located near the employees' entrance to the kitchen, and two doors with a vestibule between them separated the toilet facilities from the kitchen. In School E the employees used the toilet facilities in the

school gymnasium. In Schools B and D the employees used the toilet facilities in the school building. Schools A and C, the only schools where both sexes were employed in the lunchroom, did not provide separate toilet facilities for men and women.

The floor of the toilet in School A's lunch room was covered with inlaid linoleum; in School C the toilet floor was painted concrete.

In Schools A and C the walls and ceilings of the employees' toilet facilities were of plaster, painted a light color and washable.

Dressing room and locker facilities were not provided in any of the schools studied.

In Schools A and C the employees' toilet facilities were installed in such a way as to make it difficult to clean behind the stool.

The lunch room toilet facilities of School A were ventilated by one screened window thirty inches in width and eighteen inches in height. In School C no ventilation was provided.

School A and School C provided more than a minimum of ten foot-candles of light in the employees' toilet facilities.

#### FOOD RECEIVING

Outside. The outside receiving area was located away from the playground and student traffic in all of the schools studied. In Schools A, C, D, and E the outside receiving area was adjacent to the kitchen and storeroom. In School B the outside receiving area was located some distance from the kitchen and storeroom and it was necessary to travel through the dining area to reach either.

The composition of the outside receiving area was concrete in all the schools studied. Only School A provided a receiving area at

least six feet from front to back. In all five schools studied the outside receiving area was artificially lighted and none of the schools provided a roof for the receiving area.

Inside. The inside receiving area was adjoining the loading and unloading area in Schools A, D, and E. In School C the inside receiving area was located at the end of a ramp adjacent to the kitchen. In School B it was necessary to move the supplies down a flight of stairs to reach the inside receiving area. The inside receiving area was separate from the kitchen in Schools B, C, D, and E. In School A the inside receiving area was part of the kitchen.

None of the schools studied provided a table or a clipboard for use in the checking of supplies in the inside receiving area.

The composition of the floor in the inside receiving area of Schools B, C, and E was concrete; in Schools A and D the floor was covered with inlaid linoleum.

The composition of the walls and ceilings of the inside receiving area was smooth finished painted plaster in all the schools studied.

#### FOOD PREPARATION

The food was prepared in such a manner as to make it safe for human consumption in all schools studied. Since each of the schools was connected to the town's water supply, the sanitary qualities of the water were checked each month by the county officials.

In each town the water supply was chlorinated.

Pasteurized milk was served in individual one-half pint cartons in all five schools. Sanitary drinking straws were provided for drinking milk in Schools C, D, and E. The pupils in Schools A and B drank their

milk directly from the paper milk carton.

The kitchen supervisors from all five schools stated that all meats used were government inspected and approved.

Hot foods served were taken directly from the stove and served from the same utensil in which they were cooked. School C was equipped with a dry heat, stainless steel serving counter which kept the hot food at a constant temperature between feeding shifts.

Kitchen employees in all schools exercised care in handling food, food utensils, and containers. Foods which could be saved were kept in closed dustproof and vermin-proof containers or were refrigerated.

#### FOOD SERVING

The meals were served plate style in the five schools studied. In four of the schools, A, B, C, and E, the students' plates were filled by the kitchen employees as the students passed by the serving counter. In School D the students seated themselves at the dining tables and were served plate style by student waiters.

Students were permitted second helpings in all the schools studied. Plastic dishes were used by all five schools. Schools B, C, D, and E used sectionized plates, while School A used sectionized trays.

#### SANITATION

Cleaning equipment. Time schedules for cleaning equipment were not used in any of the schools studied. In no school was a cleaning instruction sheet found on the wall near each piece of equipment, nor was there a list of materials needed for cleaning the equipment in any of the school kitchens. Each employee had a specific area or piece of equipment for which she was responsible in Schools B, C, D, and E.



In School A the employees worked together at the cleaning, and areas or equipment were not assigned to individual employees.

Automatic dishwashing machines were used in Schools A, C, and E. Each machine was equipped with a temperature gauge which showed the washing temperature to be one hundred forty degrees Fahrenheit in Schools C and E. The hot water rinse in the schools having dishwashers was one hundred eighty degrees. Soiled dishes in Schools B and D were washed by hand in dishwashing sinks. The water for washing and rinsing was not as hot as that used by the automatic dishwasher. In all five schools the soiled dishes were pre-rinsed before washing. In Schools A, C, and E the pre-rinse unit was a spray type and adjacent to the dishwashing machine. Schools B and D used one section of their divided dishwashing sink for pre-rinsing. Dishes were drained after rinsing in Schools A, B, C, and E. Kitchen employees wiped the dishes dry with dish wiping cloths in School D. Separate dishwashing rooms were not provided in any of the schools studied.

Cleaning and dust cloths were used only for cleaning purposes, and were placed in the laundry after use in all schools studied. Cleaning materials were kept in separate lockers in Schools A, B, C, and E. In School D the cleaning materials were kept with the school janitor's supplies.

The equipment in Schools B, C, D, and E appeared to be clean to sight and touch; however, in School A the large items of equipment such as the refrigerator, the shelving, and the mixer were covered with a fine lint produced by an automatic dryer which had been installed in the kitchen. In all schools space was left between pieces of stationary

equipment so they could be cleaned easily.

Cleaning floors and walls. Floors were wet mopped each day in all of the school lunch kitchens. Walls were washed in food preparation units only when the kitchen supervisor thought they needed to be cleaned. The walls of all the kitchens were cleaned thoroughly at the close of each school year.

Types of cleaners used. Mild detergent and water was used in all schools as the cleansing agent for floors, walls, and equipment. There were no special cleaning agents used on table tops, counters or food preparation units in any of the schools. Detergents used were non-poisonous in all schools.

Methods of garbage disposal. The garbage in all schools was separated as to liquids, cans, paper and cartons and placed in covered garbage cans. Garbage was collected each day at Schools C, D, and E. At Schools A and B garbage was collected every other day. Only School C provided a separate storage room for garbage storage and garbage can washing. In all schools garbage cans were scrubbed with detergent and hot water, drained, and aired. Paper milk cartons, boxes, and other burnable materials were burned in the school incinerator in all schools.

Garbage disposal units were found in the school lunch kitchens of Schools C and E. In School C the vegetable preparation sink was equipped with a garbage disposal unit and a second disposal unit was installed in the pre-rinse sink.

Personnel. The kitchen supervisor in each of the five schools studied was a woman of middle age. Only Schools A and C used male kitchen help. School A used male students to serve, clean dining tables,

and scrape plates. School C employed a male cook on a full time basis. The majority of the full time kitchen employees were women of middle age. Schools A, C, D, and E all used student help in the kitchen. School B did not use any student help. In all cases where student help was used, the students received only their meals as payment. In all schools adult employees were required to have one medical examination a year. This examination in all cases was required at the start of the school year. Student helpers were not required to have medical examinations before working in the kitchen or serving food. Medical examinations were paid for by the employee in Schools B, C, D, and E. In School A the medical examination was paid for by the school district. Health records were not kept on employees in any of the schools. All schools used a written form in reporting accidents. Accidents were reported promptly to the school administrator.

Uniforms were worn by all adult employees. The uniforms were furnished by the employees, and they were responsible for keeping them clean. Adult employees in all schools wore appropriate hair covers. Student help in Schools A, D, and E were not required to wear hair covers; however, all student employees in School C were given a hair net and required by the kitchen supervisor to wear it. The employees of all schools appeared to be clean, and were neat in appearance. Only Schools A and C allowed kitchen employees to smoke while on duty. The kitchen supervisor of School C required those who did smoke to leave the kitchen while they were doing so. In School A employees were not required to leave the kitchen while smoking.

## CHAPTER IV

### A COMPARISON OF THE RECOMMENDED STANDARDS FOR THE SCHOOL LUNCH PROGRAM WITH THOSE FOUND IN THE SCHOOLS STUDIED IN FLATHEAD COUNTY

The purpose of comparing the conditions found in the five school lunch kitchens of Flathead County with the standards developed in Chapter II determine to what extent these schools were meeting the need for a nutritious meal served in a sanitary manner.

All five schools served type A meals<sup>1</sup> which were planned to provide each student with at least one third of the total nutrients required per day.

In each of the schools studied one menu was available to all students. Menus were not published each week because to do so would restrict the use of leftover foods and cause fluctuations in the numbers eating from day to day. The hot noon meal appeared to be liked by the majority of those participating in the lunch program. Lack of food in the garbage cans after the noon feeding period was completed, further substantiated the belief that the students liked the food served. Dislikes of certain foods by some students, however, were present in all schools.

Floors. The flooring of the kitchens of the schools studied was

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<sup>1</sup>Refer to Table II, p. 26, definitions of type A meal.

in good condition. The kitchen floors in Schools A, D, and E were covered with inlaid linoleum. This type of flooring is easy to clean, but it is slippery when wet. In Schools B and C the kitchen floors were painted concrete. The type of flooring most desirable for a school lunch kitchen floor is quarry tile. However, additional cost of this more expensive flooring is sometimes difficult to finance.

Walls and ceilings. In all the schools studied the walls and ceilings appeared clean and were light in color. The walls of all school kitchens studied were smooth plaster and the ceilings of Schools A, C, D, and E were also plaster. The ceiling of School B was Cellotex painted white. The color of the walls in Schools D and E was light green. In School A the color of the kitchen walls was light yellow; in School C the kitchen walls were a light orchid color. The kitchen walls of School B were white and a green linoleum wainscot extending to a height of six feet was provided on one side of the kitchen. The modern trend for paint in the kitchens is light, pastel shades.

Lighting. The importance of good lighting in school lunch kitchens cannot be overlooked. Employees must have ample light to read recipes, sales and written instructions. Industrial studies by the United States Public Health Service have shown that forty-eight percent of workers between thirty and forty years of age, and seventy-one percent between forty and fifty have defective vision.<sup>2</sup>

A minimum of twenty foot-candles for general kitchen lighting and at least thirty foot-candles for working surfaces are recommended.

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<sup>2</sup>Margaret Dreisback, "Good Light for School Lunch," Practical Home Economics, March, 1952, p. 127.

The placing of lights should be such that employees do not work in their own shadows. White fluorescent tubes give off less heat and use less electricity than incandescent bulbs.

In figuring the artificial lighting of the schools studied, the standard followed was that one watt per square foot of floor space equaled ten foot-candles. On this basis the kitchens in Schools A, C, D, and E were well lighted. In these schools the foot-candles of artificial light was greater than the minimum of thirty for working areas. The kitchen of School B received about twenty-five foot-candles of artificial light which is adequate for general kitchen lighting but less than that desired for working surfaces.

Plumbing and heating. In Schools B, C, D, and E the school lunch kitchen was connected with the school plant's hot water supply. This is an ideal situation as it insures an adequate supply of hot water. The kitchen of School A was equipped with an eighty gallon electric hot water tank equipped with a booster to decrease the recovery period. This tank did provide enough hot water and at the proper degrees for dishwashing.

For an economy measure it is advisable to heat the school lunch kitchen with the heating system of the school plant. Separate temperature controls should be provided. The kitchens in Schools B, C, D, and E were so heated. School A was heated by a propane heating unit mounted from the ceiling at the back of the kitchen. This unit was equipped with a fan and was thermostatically controlled.

Ventilation. The kitchens in Schools A, B, C, and E were equipped with exhaust fans. The exhaust fan in School E was installed in a large

fume hood. In Schools A, B, and C the exhaust fan was located near the cooking area. The kitchen of School D was ventilated by windows. Schools B, C, and E used natural ventilation in addition to the exhaust fan.

In all the schools studied the ventilation of the kitchen was below the desired standards. Schools C and E were the better ventilated of the schools studied.

Equipment. In a school lunch kitchen the process of receiving, preparing and serving should move in an orderly sequence. In Schools C, D, and E this process did move through the kitchen in an orderly manner. In School A this process would have moved in a more orderly manner had the kitchen equipment been better located. In School B the process of receiving, preparing and serving food did not move through the kitchen in the desired manner because the vegetable preparation unit was located in the inside receiving room adjacent to the dining room. The salad green storage space was located in a room adjacent. This caused the flow to be from both sides toward the middle of the kitchen instead of from one side to the other.

It is undesirable to have the line of students returning soiled dishes crossing the serving line. In Schools A, B, and C the line returning soiled dishes did cross the serving line; however, in School C this occurred only when there was a delay in serving the students; the student body was divided into three groups and each could finish and return its soiled dishes before the next group was served. In School E the soiled dish line did not cross the serving line; in School D dishes were delivered and returned by the student waiters.

Near the delivery entrance should be the sink and peeler for vegetable preparation. In Schools B, C, and D the sink and peeler for vegetable preparation were placed near the delivery entrance. In School A the sink and peeler for vegetable preparation were placed on the opposite side of the kitchen from the delivery entrance. In School E vegetables were prepared in another building.

It is desirable for cooking equipment to be convenient to the vegetable preparation unit. Ranges, bake ovens, and steam kettles should be grouped under one hood. In Schools A, C, and D the cooking equipment was adjacent to the vegetable preparation unit. This required transporting the vegetables through the dining room to the kitchen in School B; in School E all vegetables were prepared in another building. Only School E was equipped with a fume hood.

The baker's and cook's tables should adjoin the cooking unit. Only Schools B and C were equipped with bake ovens. School C baked eighty loaves of bread a day for its lunch program. In all schools the cook's tables adjoined the cooking unit.

All schools under study were equipped with enough mixers to meet their needs. Their locations were in accordance with recommended standards: School A had a stationary mixer between the vegetable preparation unit and the entrance to the lunch room; School C had stationary mixers in cooking, vegetable preparation, and baking units. Schools B, D, and E were each equipped with a small portable mixer.

The dish storage cabinet should be accessible to the baking, cooking and salad units and the dish storage cabinet should be located near the entrance to the dining room.



In all schools the dish storage cabinet was located near the dining room. However, only in Schools A, D, and E was the dish storage cabinet accessible to the salad, cooking, and baking units.

The amount of refrigeration and deep freeze space needed depends on local needs such as location of school, food purchasing practices, frequency of delivery, and use of central storage. Only School D was unable to receive daily deliveries and as a result it needed more refrigeration for storage of supplies for two and three-day periods. School D was equipped with a twenty-two cubic foot deep freeze and a fifteen cubic foot refrigerator.

Most of the space in the refrigerator at School D was used for the storage of the school's milk supply. Refrigeration and deep freeze facilities were reported adequate by the kitchen supervisor in the other schools studied.

Stainless steel is recognized as one of the best and most desirable table and counter material. However, there are other less expensive materials which will give a durable, smooth, and easily cleaned surface. Such materials are formica, inlaid linoleum and water-proofed hardwood.

The counter and table tops in the kitchens of Schools A, D, and E were formica. In School C the table tops were covered with inlaid linoleum and the serving counter was made of stainless steel. In School B the table tops and counters were covered with inlaid linoleum.

#### STOREROOM

The purpose of the storeroom is to provide a cool, dry place to store food supplies until needed. The desired location of the storeroom

is adjacent to the kitchen. The storeroom of School B was the only one which did not conform to this standard. Shelf space in the storeroom should be sufficient to accommodate the maximum quantity of supplies on hand at any time. Only Schools A and B provided adequate shelving. The storeroom should be well ventilated and should not be kept warmer than seventy degrees Fahrenheit. To insure proper sanitation it is recommended that the storeroom be insect-vermin- and rodent-proof.

The storerooms in Schools B and C were below ground level and therefore the cooler of those studied. Storerooms in all five schools studied were dry. However, the temperature of the storeroom in Schools A, D, and E was greater than seventy degrees Fahrenheit. The exhaust fan in the storeroom of School C created a change of air for the needed ventilation. Only the storerooms in Schools C and E could be considered insect, vermin and rodent-proof.

Ideally, the doors to the storeroom should be forty inches in width to facilitate the moving of supplies. There was only one door to each of the storerooms studied in the five schools of Flathead County. The doors to the storerooms in Schools A and C were forty inches in width. The doors to the storerooms in Schools B, D, and E were thirty-six inches wide.

It is desirable for the interior surfaces of the storeroom to be washable and a floor drain should be provided to facilitate cleaning. In all schools the walls of the storerooms were washable. However, the ceiling of the storeroom in School B was unpainted Cellotex which could not be washed. The storerooms of Schools A, B, C, and E were equipped with a floor drain.

Any window in the storeroom should be screened with a fine wire screen and windows should not interfere with shelving. The storeroom of School B was the only storeroom that contained windows which were screened with a coarse wire screen.

#### LAVATORIES AND DRESSING ROOMS

It is desirable for the kitchen employees to have separate lavatory and dressing room facilities. Of the five schools studied in Flathead County, only Schools A and C provided separate lavatory and dressing facilities for each. Schools A and C employed both sexes but did not provide separate facilities.

If lavatory and dressing facilities are adjacent to the kitchen, they should be separated by two doors with a vestibule between them. Lavatories in Schools A and C were installed in this manner.

Hot and cold running water, soap and sanitary towels should be provided for the lavatories. The lavatory and dressing facilities should be located near the employees' entrance to the kitchen. Only School A provided hot and cold running water with soap and sanitary towels. Schools A and C had lavatory facilities installed near the employees' entrance.

There were not dressing room facilities provided in any of the schools studied, so employees came each day dressed for work.

If windows are not provided for natural ventilation, an exhaust fan should be installed. In School A a screened window was provided for ventilation. School C did not provide any ventilation for its lavatory facilities. In Schools B, D, and E the kitchen employees were not furnished lavatory facilities and were required to use those in the school.

Walls and ceiling should be washable and plumbing should not be placed so as to impair cleaning. Floors should be constructed of durable material which is easy to clean. The walls and ceilings of the lavatory facilities of both Schools A and C were washable. The floor of the lavatory of School A was covered with inlaid linoleum while the floor of School C was painted concrete.

The plumbing in Schools A and C was in such a position as to make cleaning difficult behind the stool. However, the lavatory in the kitchen of School C was also used for storage of scrub pails.

#### RECEIVING AREA

Outside. The outside receiving area if desirably located, should be near the service driveway, adjacent to the storeroom and kitchen and away from the playground and student traffic. It is desirable for the outside receiving area to be at least six feet from front to back; however, size will be determined by the extent of the feeding operation and the frequency of delivery. For the protection of supplies during inclement weather a roof should cover the area.

Concrete makes one of the most durable and satisfactory outside receiving areas. It is permanent and easy to keep clean.

In all five schools studied the outside receiving area was located near the service driveway and away from the playground and student traffic. Only in School A was the outside receiving area six feet from front to back. In all schools studied the outside receiving area was constructed of concrete and in no case was it covered.

Inside. The inside receiving area should adjoin the outside receiving area and loading platform. The inside receiving area should

be separate but adjacent to the kitchen and storeroom. To facilitate checking and sorting of supplies it is desirable for a table, preferably mounted on casters, and a clipboard to be provided.

All surfaces should be washable to insure proper sanitation and the floor should consist of a material which is durable and easy to keep clean.

In Schools A, C, D, and E the inside receiving area was located adjoining the outside receiving area and adjacent to the storeroom but it was necessary to travel through the dining room to reach the kitchen.

A table and clipboard were not provided for the inside receiving area in any of the schools studied.

The walls and ceilings of the inside receiving area were washable in Schools A, C, D, and E. In School B the walls were washable, but the ceiling which was covered with unpainted Cellotex was not.

The floors in the inside receiving area of Schools A, D, and E were inlaid linoleum. The floors in the inside receiving area of Schools B and C were unpainted concrete.

#### FOOD PREPARATION

It is the responsibility of the school lunch employees to safeguard the health of the school children. Food served by the school kitchen must not be contaminated by poor food handling practices during preparation. In the absence of refrigeration, leftovers which are capable of fermenting or spoiling should not be carried over to the next day. Only pasteurized milk shall be served, and all meats used in the lunch programs must be officially inspected.

Handling and preparing food so as to be safe for human consumption

was above reproach in the schools studied. Food which was kept over was refrigerated or placed in dust-proof, vermin-proof containers. All meats served were government inspected. Milk served in all schools was pasteurized. Only Schools C, D, and E provided drinking straws. In Schools A and B the students drank from their individual milk cartons.

All schools studied reported that monthly checks of the purity of the water supply were made by county officials.

#### FOOD SERVING

The meals served by the school kitchens studied in Flathead County were all plate style. Serving meals cafeteria style is preferred by authorities but the size of the feeding programs in the Flathead County Schools studied prohibited this type of service because of the cost and additional foods required. One of the objectives of the school lunch program is to provide wholesome nutritious food for the students' noon meals. All of the schools studied were meeting this objective by serving type A meals and by permitting the students to have second helpings.

Acceptable dishware is china, plastic and stainless steel. Dishes in all schools were of the plastic variety and were in good condition.

#### SANITATION

Cleaning equipment. It is desirable for a list of required cleaning materials with cleaning instructions to be placed by each piece of equipment to be cleaned. Assigning each employee a piece of equipment or area to clean and be responsible for is desirable.

Lunch kitchen supervisors in Schools B, C, D, and E assigned employees pieces of equipment or areas to clean. Only School A did not follow this practice. The employees there worked cooperatively in cleaning the equipment and area. A list of required cleaning materials and instructions for cleaning was not found in any of the school kitchens studied.

An automatic dishwashing machine is desirable in any school lunch program feeding over one hundred meals per day. Only School lunch kitchens A, C, and E were equipped with automatic dishwashing machines.

It is desirable after washing to rinse dishes in water one hundred eighty degrees Fahrenheit and drip-dried. Only schools providing automatic dishwashers were able to rinse dishes in water of this temperature. Schools A, B, C and E drain-dried dishes, while School D dried its dishes with wiping cloths. Dishes in all the schools studied were pre-rinsed before washing which meets the desired standard.

Cleaning cloths were used only for cleaning and when soiled, were placed in the laundry in all five schools studied. This precaution insured proper sanitary practices.

Cleaning floors and walls. Ideally, floors in kitchens of school lunch rooms should be wet mopped each day. If floors are not wet mopped each day, they should be swept with sweeping compound.

The floors in the school lunch kitchens studied were all wet mopped each day. In School D the employees hand scrubbed and wiped the floors.

Walls of food preparation units should be washed and wiped clean each day after the unit has been used. In Schools A, C, and E the food

preparation unit walls were cleaned each day after use. Walls of the food preparation unit in Schools B and D were cleaned only when the supervisor thought they should be.

Walls and ceilings of school lunch kitchens should be clean at all times. Any spattering, smudging, or marking should be removed immediately if the desired standards are to be achieved.

In all the schools studied the walls of the school lunch kitchens appeared clean to sight and touch. Kitchen supervisors in all schools stated that walls and ceilings were cleaned when they needed it.

Types of cleaners used. The recommended cleaner for floors is a mild soap or detergent and water solution. Spots should be removed with an abrasive.

Walls may also be washed with a mild soap or detergent and water solution. Walls of food preparation units, table tops, counter tops and equipment which are in direct contact with food may require more than one cleaning agent.

Detergent and water were the main cleaning agents used in all five school kitchens studied. Detergent and water solution was used for cleaning floors, walls, tables, counters and all equipment of the schools studied.

Cleaners used in the schools studied were all non-poisonous which meets the desired standard.

Methods of garbage disposal. It is desirable to separate liquids, cans, papers and cartons of garbage in the lunch kitchens each day. Refuse should be placed in tightly covered garbage cans and stored in a separate room until removed. The burnable materials should



be burned in the school incinerator. The garbage cans should be scrubbed with hot water and soap or detergent, sterilized with live steam and aired to dry.

School lunch kitchens C. and E were equipped with automatic garbage disposal units which disposed of materials that could be ground. In all schools garbage cans with tightly fitting lids were used and garbage was sorted to some degree. In all schools burnable materials were sorted from non-burnable. Only School C provided a separate room for garbage storage.

Garbage was collected each day from the kitchens in Schools C, D, and E; garbage from kitchens A and B was collected every other day and remained in the kitchen until it was collected. Garbage cans were scrubbed with a detergent and water solution in all the schools studied. The school kitchens studied were not equipped to use live steam to sterilize their garbage cans.

#### PERSONNEL

If the sanitary qualities of the school lunch program are to be insured, kitchen employees must be scrupulously clean in appearance and person. Health examinations twice a year are recommended for all employees. If the desired standards are to be attained, employees should wear clean uniforms and appropriate hair covers.

The permanent kitchen employees of the five schools studied all wore clean uniforms and appropriate hair coverings. They were clean and well groomed in appearance. Medical examinations were required of the permanent kitchen employees once a year in all five of the schools studied.

Kitchen employees of Schools A and C were allowed to smoke while on duty although no smoking was witnessed. The kitchen supervisor in School C required employees while smoking to leave the kitchen proper.

Student employees were not required to have medical examinations. Student employees did not wear uniforms and only in School C were they required to wear proper hair covers.

With the exception of the student employees not being required to have medical examinations and the lack of hair coverings for student employees in Schools A, D, and E the personnel in these five lunch kitchens could probably meet the most rigid tests for employees in a school lunch kitchen.

#### SUMMARY OF DATA BY SCHOOLS

Equipment and facilities in the school lunch programs of the schools studied were adequate and in good condition with a few exceptions. Exceptions were as follows:

School A. By rearrangement of some of the kitchen equipment in School A time and effort could have been saved in meal preparation. A fume hood with an exhaust fan installed over the cooking unit would have improved ventilation.

Addition of a garbage storage room would have improved the sanitary condition inasmuch as School A did not have daily garbage collections.

The assignment by the kitchen supervisor of special areas or pieces of equipment to be cleaned would have complied with recommendations. Cleaning would have been facilitated if an electric drier in

the kitchen had been vented outside.

Sanitary straws for drinking milk were not provided. Student employees were not required to meet the same standards as permanent kitchen employees with regard to medical examinations, appropriate hair coverings and clothing.

School B. The layout in the lunch facilities of School B did not allow an orderly sequence in the preparation of meals.

Ventilation was insufficient and could have been improved by the addition of a fume hood with an installed exhaust fan. A fine wire screen should replace the coarse screening now on the kitchen windows.

No separate lavatory facilities for lunch room employees were provided. A provision was not made for the storage of garbage in a separate room nor were sanitary drinking straws provided.

The addition of an automatic dishwasher would have been an improvement from a sanitary aspect.

Additional lighting fixtures were needed over the working areas in School B.

School C. This school was the best equipped school kitchen studied. However, ventilation was a recognized problem. The grouping of cooking and baking equipment under a large fume hood equipped with an exhaust fan might improve the ventilation.

The lavatory facilities were not adequate and could have been improved with additional plumbing fixtures. Scrub pails should not have been stored in the lavatory facilities of School C.

School C was in need of additional shelving in its store room. Proper cleaning without the moving of supplies was impossible in this

store room because of the quantity of supplies piled on the floor.

Student employees in School C did wear appropriate hair coverings but were not required to have medical examinations or wear uniforms.

School D. The storeroom of School D was inadequate in size and in provided shelving. Most of the supplies for the kitchens of School D were stored in the inside receiving area.

The ventilation of the kitchen in School D could have been improved with the installation of a fume hood and exhaust fan.

An automatic dishwasher would have been desirable for the kitchen of School D. In the absence of an automatic dishwasher, the practice of hand drying dishes was used.

Separate lavatory facilities were not provided for the kitchen employees in School D.

Students employed as waiters in School D were not required to have medical examinations, wear hair coverings, or uniforms.

Additional refrigeration in the kitchen of School D was needed for the storage of fresh vegetables and leftover foods.

School E. The kitchen windows in School E were opened for ventilation but these windows were not screened.

Additional shelving should have been provided in the storeroom of School E.

Separate toilet facilities for kitchen employees were lacking in this school.

School E did not provide a separate storeroom or locker for kitchen cleaning materials and equipment.

Student employees in the kitchen of School E were not required to have medical examinations, wear appropriate hair coverings or uniforms.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### SUMMARY

The purpose of this study was to ascertain the sanitary qualities of the facilities, services and personnel in the school lunch kitchens of five selected schools in Flathead County.

The results of this study were expected to yield recommendations for the improvement of the sanitary conditions and to facilitate kitchen efficiency through rearrangement of equipment.

Standards for school lunch programs were established through reading authoritative literature on institutional feeding and housing. From these standards and from available check lists, a check list for this study was constructed. Through the use of this check list data were collected by a personal examination of existing conditions in the school lunch programs studied. By comparing existing conditions with the established standards the research was carried out.

#### CONCLUSIONS

The school lunch programs studied in Flathead County were as a group equal to or better than the standards established with regard to facilities, sanitation, services and personnel. Two of the school lunch programs studied were housed in relatively new buildings while a third was just remodeled. This no doubt had some influence on the sanitary conditions of school lunch kitchens as a group.

In all the school lunch kitchens studied the personnel were well groomed and neat in appearance. Permanent kitchen employees were required to have one medical examination a year. Meals were nutritious and appeared to be prepared in a sanitary manner. In the five schools studied the fresh meats served were officially inspected, and pasteurized milk was served. All schools reported monthly testing of the water supply.

The physical facilities in the lunch programs of the schools studied were clean. Floors were wet mopped each day and all cleaning agents used were non-poisonous.

Dressing room facilities for kitchen personnel were not provided in any of the schools studied.

School administrators and kitchen supervisors were constantly endeavoring to improve the lunch programs.

#### RECOMMENDATIONS

As a result of this study it appears desirable (1) to require student employees to meet the same standards as regular employees, (2) an effort be made to improve ventilation in the school lunch kitchens, and (3) for kitchen supervisors and administrators to realize the importance of sanitation in the school lunch program.

In conducting the research for this study it was difficult to find information on the subject of student employment in the school lunch program. Since student employees in the schools which used them did not have to meet the same standard as permanent kitchen employees with regard to medical examinations, appropriate hair coverings and wearing of uniforms, it appeared that there was need for further investigation on this subject.

## BIBLIOGRAPHY



BIBLIOGRAPHY

- Bryan, Mary De Garmo. The School Cafeteria. New York: F. S. Crofts and Company, 1946. 730 pp.
- Burba, Irene. "Essential Equipment for the School Kitchen," Nations Schools, 44:64, September, 1949.
- Dreisbach, Margaret. "Good Light for the School Lunch," Practical Home Economics, p. 127, March, 1952.
- "Fifty-Seven Thousand Schools in National School Lunch Program," Locomotive Engineers Journal, 88:247, April, 1953.
- Giesy, Russell D. "A Study of the Sanitary Conditions in The School Lunch Programs of Six Ravalli County Town Schools for the 1950-51 School Year." Unpublished Master's professional paper, Montana State University, Missoula, 1953.
- Kotschevar, Lendal H. "Establish a Maintenance Program," Institutional Feeding and Housing, 7:62, August, 1956.
- Moore, Marguerite, Emma Lee Hutchinson. "Cafeterias Built to a Standard Design," Nations Schools, 58:94, September, 1956.
- Page, David, Grace Parle. "Model Lunchrooms as Seen by Pupils, Mother, and Health Inspector," Nations Schools, 53:94, April, 1955.
- Rathman, Henry H. "Basic Guide of School Lunchroom Planning," American School Board Journal, 134:107-8, February, 1957.
- State Department of Public Instruction. "A Brief Outline of the Montana School Lunch Program." Montana: Distributed by the Office of the State Superintendent of Public Instruction. (Mimeographed.)
- \_\_\_\_\_. "Handbook for the Proper Handling and Storing of Commodities." Montana: Distributed by the Office of the State Superintendent of Public Instruction. (Mimeographed.)
- \_\_\_\_\_. Your Schools Today and Goals for Tomorrow. Biennial Report of the Superintendent of Public Instruction. Montana: State Department of Public Instruction, 1954.
- \_\_\_\_\_. Your Schools Today and Their Achievements. Biennial Report of the Superintendent of Public Instruction. Montana: State Department of Public Instruction, 1956.
- Stewart, Harry E. "Our Experience with Plastic Dishes in Institutional Feeding," Nations Schools, 43:65, April, 1949.

The Joint Committee on Health Problems in Education. "Sanitary Requirements for School Lunches," The National Elementary Principal, 27:21-22, December, 1947.

"Today's Food Soil Complicates Cleaning," Implant Food Management, p. 44, January, 1956.

United States Department of Agriculture. A Guide for Planning and Equipping School Lunchrooms. Agricultural Marketing Service PA 292. Washington, D. C.: United States Department of Agriculture, 1956.

West, Bessie Brooks, Levelle Wood. Food Service in Institutions. New York: John Wiley and Sons, Inc., 1950. 589 pp.

Wilson, Charles, Eric W. Wood. "Survey of School Lunch Practices," American Journal of Public Health, 45:163-7, February, 1955.

APPENDIX

CHECK LIST

Name of School \_\_\_\_\_

Location \_\_\_\_\_

GENERAL INFORMATION

1. Average number of pupils served per day \_\_\_\_\_.
2. High school \_\_\_\_\_ Grade school \_\_\_\_\_ Total \_\_\_\_\_
3. How many non-pupils (faculty, custodians, etc.) are served per day? \_\_\_\_\_
4. What is the charge per meal? Pupil \_\_\_\_\_ Adult \_\_\_\_\_
5. Are U. S. D.A. commodities used? \_\_\_\_\_
6. What percent of food served is U. S. D.A. commodities? \_\_\_\_\_
7. How much federal government reimbursement is received per pupil for the school lunch program? \_\_\_\_\_
8. Are meals served in shifts? \_\_\_\_\_ Explain \_\_\_\_\_  
\_\_\_\_\_
9. Is the kitchen used by organizations for purposes other than school feeding? \_\_\_\_\_ Explain \_\_\_\_\_  
\_\_\_\_\_

KITCHEN FACILITIES

- |   | Yes   | No    |
|---|-------|-------|
| 1. Does the process of receiving and preparing food move in orderly sequence around or through the room, either from left to right or from right to left? Diagram on last page. | _____ | _____ |
| 2. Does the line bringing its trays to the dish window or truck cross the service line?   | _____ | _____ |

3. Is the sink and peeler for vegetable preparation near the delivery entrance? \_\_\_\_\_
4. Is salad, fruit, dessert, and sandwich preparation adjacent to the vegetable preparation? \_\_\_\_\_
5. Are utility tables or table, small mixer, toaster, and refrigerator placed between vegetable unit and the entrance to the lunch room? \_\_\_\_\_
6. Is cooking equipment convenient to the vegetable preparation unit? \_\_\_\_\_
7. Are ranges, bake oven, steam kettle and steamer grouped under the same hood? \_\_\_\_\_
8. Are the baker's and cook's tables adjoining the cooking unit? \_\_\_\_\_
9. Is the mixer placed in a position favorable for maximum use? \_\_\_\_\_
10. Is the dish storage cabinet accessible to salad, baking, and cooking units? \_\_\_\_\_
11. Is the dish cabinet near the entrance to the dining room? \_\_\_\_\_
12. Is space allowed between pieces of stationary equipment? \_\_\_\_\_
13. Size of refrigerator \_\_\_\_\_
14. Size of deep freeze \_\_\_\_\_
15. Is there an adequate supply of hot water? \_\_\_\_\_
16. Is there an auxiliary heater for water? \_\_\_\_\_
17. Is the fume hood equipped with an exhaust fan for removal of odors? \_\_\_\_\_

	Yes	No
18. Are cooking dishes and utensils in good condition?	_____	_____
19. Are utensils used made of approved materials?	_____	_____
20. Are utensils clean to touch and sight?	_____	_____
21. Do walls and ceiling appear clean?	_____	_____
22. Are walls and ceiling light in color?	_____	_____
23. Are walls and ceiling impervious to moisture?	_____	_____
24. Are walls a smooth hard finish?	_____	_____
25. Is the artificial lighting adequate?	_____	_____
26. Are there windows in the kitchen?	_____	_____
27. Are windows screened?	_____	_____
28. What is the composition of the floor?	_____	
29. What is the composition of the walls?	_____	
30. What is the composition of the ceiling?	_____	
31. What is the composition of table tops?	_____	
32. What is the composition of the counter tops?	_____	
33. What kind of heating system is used? _____ explain	_____	
_____		
34. Is the kitchen ventilated artificially?	_____	_____
35. If the kitchen is ventilated artificially, how? _____	_____	
_____		
36. Is natural ventilation used?	_____	_____
37. If natural ventilation is used is a cross draft provided?	_____	_____
38. Is air conditioning used?	_____	_____
39. Is kitchen adequately ventilated?	_____	_____

	STORAGE	Yes	No
1.	Is the storeroom adjacent to the kitchen?	_____	_____
2.	Is the space in the storeroom sufficient for storage of kitchen supplies?	_____	_____
3.	Is the storeroom rodent, vermin and insect-proof?	_____	_____
4.	Is ventilation adequate?	_____	_____
5.	Is the storeroom cool and dry?	_____	_____
6.	Does the storeroom have adequate shelving?	_____	_____
7.	Is there more than one door to the storeroom?	_____	_____
8.	Are doors to storeroom at least forty inches wide?	_____	_____
9.	Does more than one employee other than manager have access to the storeroom?	_____	_____
10.	Is storeroom equipped with hand truck?	_____	_____
11.	What is the composition of the floor? _____		
12.	What is the composition of the walls and ceiling? _____		
<hr/>			
13.	Are walls and ceiling washable?	_____	_____
14.	Does the storeroom have windows?	_____	_____
15.	Are the windows screened?	_____	_____
16.	Do windows interfere with shelving?	_____	_____
17.	Does the storeroom have a floor drain?	_____	_____
18.	What is the size of the storeroom windows? _____		

LAVATORIES AND DRESSING ROOMS

1.	Are separate toilet facilities available to employees?	_____	_____
2.	Are facilities located near employees' entrance to kitchen?	_____	_____

Yes No

- 3. Are toilet and locker room facilities adequate?
- 4. Are separate facilities provided for men and women if both sexes are employed?
- 5. Is lighting adequate?
- 6. Are there any windows in toilet or locker facilities?
- 7. Are plumbing facilities adequate?
- 8. Is the ventilation adequate?
- 9. Are there any uncleanable spaces behind lockers or under fixtures?
- 10. Are there two doors between kitchen, toilet, and locker facilities?
- 11. What is the composition of the floor? \_\_\_\_\_
- 12. What is the composition of the walls and ceiling? \_\_\_\_\_

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- 13. Is there any rest room furniture such as easy chairs or couches in locker rooms?

FOOD RECEIVING OUTSIDE

- 1. Is the outside receiving area located near service driveway, adjacent to storeroom and kitchen?
- 2. Is the outside receiving area located away from playground and student traffic?
- 3. Is the outside receiving area at least six feet from front to back?
- 4. Does the outside receiving area have a roof over it?
- 5. Is the roof high enough to permit loading and unloading?
- 6. Is the outside receiving area artificially lighted?



7. What is the floor composition of the outside receiving area? \_\_\_\_\_

FOOD RECEIVING INSIDE

- 1. Is the inside receiving area adjoining the loading platform? \_\_\_\_\_
- 2. Is it separate from the kitchen? \_\_\_\_\_
- 3. Does it appear to have ample space for size of operation? \_\_\_\_\_
- 4. Does the inside receiving area appear to have ample lighting? \_\_\_\_\_
- 5. Is a table provided? \_\_\_\_\_
- 6. Is a hand truck provided? \_\_\_\_\_
- 7. Is a clip board provided for checking supplies? \_\_\_\_\_
- 8. What is the composition of the floor? \_\_\_\_\_
- 9. What is the composition of the walls and ceiling? \_\_\_\_\_

FOOD PREPARATION

- 1. Is food prepared so it is safe for human consumption? \_\_\_\_\_
- 2. Has the state health department approved the sanitary qualities of the water supply? \_\_\_\_\_
- 3. How often is the water tested for purity? \_\_\_\_\_
- 4. Is the water supply chlorinated? \_\_\_\_\_
- 5. Is pasteurized milk served? \_\_\_\_\_
- 6. Are sanitary straws used for drinking from bottles or cartons? \_\_\_\_\_
- 7. Is all meat government inspected? \_\_\_\_\_

- 8. Do workers exercise care in handling food, food utensils, and containers? \_\_\_\_\_
- 9. Is food kept in closed, dustproof, and vermin-proof containers? \_\_\_\_\_

FOOD SERVING

- 1. Are meals served family, plate or cafeteria style? \_\_\_\_\_
- 2. Does the lunch program include the special milk program? \_\_\_\_\_
- 3. Are pupils permitted second helpings? \_\_\_\_\_
- 4. Is the milk for the special milk program served with the meals? \_\_\_\_\_
- 5. If special milk is not served with meals, how is it served? \_\_\_\_\_

CLEANING EQUIPMENT

- 1. Is there a list of required cleaning materials? \_\_\_\_\_
- 2. Is a locker or storeroom provided for cleaning materials? \_\_\_\_\_
- 3. Is there a time schedule for cleaning equipment? \_\_\_\_\_
- 4. Is there a cleaning instruction sheet on the wall or near each piece of equipment? \_\_\_\_\_
- 5. Does each worker have a specific area or piece of equipment for which he is responsible? \_\_\_\_\_
- 6. Is an automatic dishwasher used? \_\_\_\_\_
- 7. Is a hot water rinse used? \_\_\_\_\_
- 8. Is a separate room furnished for dishwashing? \_\_\_\_\_
- 9. If an automatic dishwasher is not used, how are dishes washed? \_\_\_\_\_

- 10. Is more than one cleaning agent used? \_\_\_\_\_
- 11. Are all eating and drinking utensils pre-rinsed before washing? \_\_\_\_\_
- 12. How are dishes and utensils dried? \_\_\_\_\_
- 13. Are cleaning cloths kept clean? \_\_\_\_\_
- 14. Are cleaning cloths used for anything other than cleaning? \_\_\_\_\_
- 15. Does all equipment, including stoves, refrigerators, counters, shelves, hoods, counters, sinks, and tables appear clean to touch and sight? \_\_\_\_\_
- 16. Are the cleaning agents used non-poisonous? \_\_\_\_\_

CLEANING--FLOORS AND WALLS

- 1. Are the floors mopped each day? \_\_\_\_\_
- 2. Are the floors swept each day? \_\_\_\_\_
- 3. Is sweeping compound used? \_\_\_\_\_
- 4. Can walls be washed? \_\_\_\_\_
- 5. Are the cleaners used on floors and walls non-poisonous? \_\_\_\_\_
- 6. How often are kitchen walls cleaned? \_\_\_\_\_
- 7. Is more than one cleaning agent used on floors? \_\_\_\_\_
- 8. Is the same cleaning agent used on floors and walls? \_\_\_\_\_

TYPES OF CLEANERS USED

1. What type of cleaning agent is used on floors?

\_\_\_\_\_

2. What type of cleaning agent is used on walls?

\_\_\_\_\_

- 3. Is the same cleaning agent used on all equipment? \_\_\_\_\_
- 4. What type or types of cleaning agents are used on the equipment? \_\_\_\_\_
- 5. Are the cleaning agents used non-poisonous? \_\_\_\_\_

METHODS OF GARBAGE DISPOSAL

- 1. Are liquids, cans, papers and cartons separated? \_\_\_\_\_
- 2. Are garbage cans covered? \_\_\_\_\_
- 3. Are garbage cans collected each day? \_\_\_\_\_
- 4. What is the means of garbage disposal? \_\_\_\_\_
- 5. Are garbage cans scrubbed each day with hot water and soap, sterilized with live steam, drained and aired? \_\_\_\_\_
- 6. What method is used in cleaning garbage storage cans? \_\_\_\_\_

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- 7. Is there a separate room for garbage storage? \_\_\_\_\_

PERSONNEL

- 1. Is student help used in the kitchen? \_\_\_\_\_
- 2. Are medical examinations required at least twice a year of all employees? \_\_\_\_\_
- 3. Are students required to have medical examinations before working in the kitchen? \_\_\_\_\_
- 4. Are health records kept on employees? \_\_\_\_\_
- 5. Are accidents reported promptly? \_\_\_\_\_
- 6. Do employees pay for their own physical examinations? \_\_\_\_\_
- 7. Are employees permitted to smoke while working? \_\_\_\_\_
- 8. Do employees wear uniforms? \_\_\_\_\_
- 9. Do employees furnish their own uniforms? \_\_\_\_\_

10. Do employees wear hair nets or other appropriate hair covers?

\_\_\_\_\_

11. Do employees appear clean in person and clothing?

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DIAGRAM OF KITCHEN LAYOUT