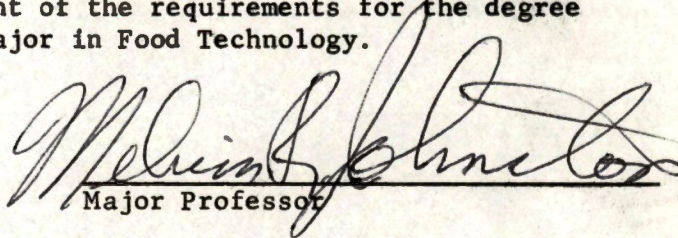


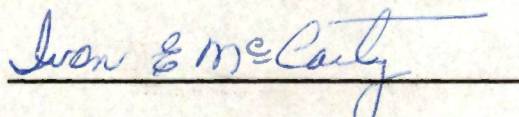
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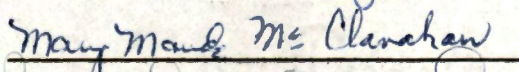
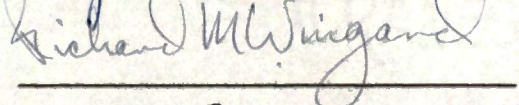
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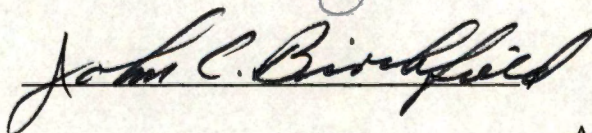
I am submitting herewith a thesis written by Raymond E. Dender entitled "The Development of a Central Food Service for the University of Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Food Technology.

  
Major Professor

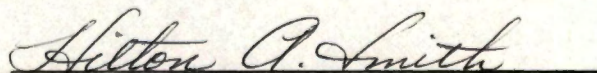
We have read this thesis  
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Vice President for  
Graduate Studies and Research



THE DEVELOPMENT OF A CENTRAL FOOD SERVICE  
FOR THE UNIVERSITY OF TENNESSEE

---

A Thesis  
Presented to  
the Graduate Council of  
The University of Tennessee

---

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

---

by  
Raymond E. Dender

June 1967



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## CHAPTER I

### INTRODUCTION

Feeding of university students has become a major problem of many large universities such as The University of Tennessee. In the Fall of 1966, 18,832 students were enrolled on the Knoxville campus, with an expected enrollment in 1970 of 31,155 students, according to Birchfield (3)\*. This large actual and projected enrollment has necessitated the establishment of a combined food services operation on The University of Tennessee campus.

The purpose of this study is to describe the Central Food Services of The University of Tennessee in an effort to assist other colleges and universities in their plans for a food service program. Also, the author wishes to show the savings that can be experienced by buying in quantity and by using centralized food service facilities.

The following problems were encountered in making this study: (1) limited amount of literature concerning the establishment and operation of Central Food Services, (2) lack of universities having a Central Food Service, and (3) relative newness in the field of Central Food Services. These problems placed strict limitations on the amount of research completed.

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\*The numbers in parentheses represent similarly numbered references in the Bibliography.



## CHAPTER II

### REVIEW OF THE LITERATURE

#### I. FOOD SERVICE INDUSTRY

The estimated sales of food services systems during 1965 were 26.4 billion dollars, according to Livingston (10). This places the food service industry as the fourth largest in the nation, but the largest in number of people employed. Approximately 3 million people are direct workers with food service. This tends to show that the food service industry is lagging behind the many other industries in productivity per person. This may be due to the limited amount of money spent for research in this field.

Livingston also reports that unlike other industries, research and development has not been widely accepted in the food service industry and consequently there has been very little change in the methods used in the food services through the years. This is a reflection of the low productivity of the food service workers. Certainly there have been some modest advances made in cooking equipment, in streamlining kitchens, in providing a measure of pre-portioned and portion controlled foods, but these are very small compared to what has been done in other industries.

There have been significant breakthroughs in the processing of foods, but little has extended to the food service industry. In the production of raw food products, there have been major changes in recent



years. Only recently have variety products been developed to facilitate the advent of mechanical harvesting.

Today, farmers are producing more and better raw products that yield higher quality to the food service industry, but the food service industry has not changed much with time. These are only a few examples of how other industries are changing compared to the small amount of progress in the food service industry.

## II. FIRST CENTRAL FOOD STORES OPERATIONS

According to Bloomfield (4), the first recognized central food stores operation was started at Miami University of Ohio during the school year 1913-14, with its primary purpose being to stretch the dollars that students were paying for board. Of the 638 students that year, about 500 were served in three dining rooms, stated in a recent survey (2).

In 1963, Miami University completed their newest facility with a cost of \$280,000. During the 1962-63 school year, over 8000 students were enrolled; and, \$1,195,143 was spent on the purchase of food used by their 13 units. Work was carried on by 27 full-time persons and 27 part-time students. The functions operating in the Central Food Service Building at this time are general offices, dietitians, food purchasing, bakery, central storage and meat processing.

Bloomfield also states that at the present time about a dozen institutions operate what can be classified as complete central food stores facility. Most of these have come into existence since 1949.



### III. MANAGEMENT OF A CENTRAL FOOD SERVICE FACILITY

Management plays a very important role in the success or failure of a central food services facility. West, et al. (21), lists six general actions that management must follow. These are: (1) planning, (2) forecasting, (3) organizing, (4) delegating, (5) actuating, and (6) controlling.

West also states that these six actions can be best executed by employing the five tools of management. These five tools are: (1) organization chart, (2) job analysis, (3) job description, (4) job specification, and (5) work sheet.

Organization Chart. An organization chart shows (a) the division and specialization of work, (b) the channels of formal communication, (c) responsibility and reporting relationships, (d) the pathway of authority transfer, (e) points of integration or coordination, and (f) personnel assignments.

Any type of organization is usually based on the functions of the various parts, including the relation of each contributing activity to those responsible for that activity, and for the whole enterprise. Figure 1 shows how these functions or activities are presented graphically by use of blocks. The lines connecting the various blocks indicate the channels of authority. Those persons with greatest authority are shown at the top of the chart and those with the least are shown at the bottom. Such graphic presentation shows the need to develop proper coordination among functions.



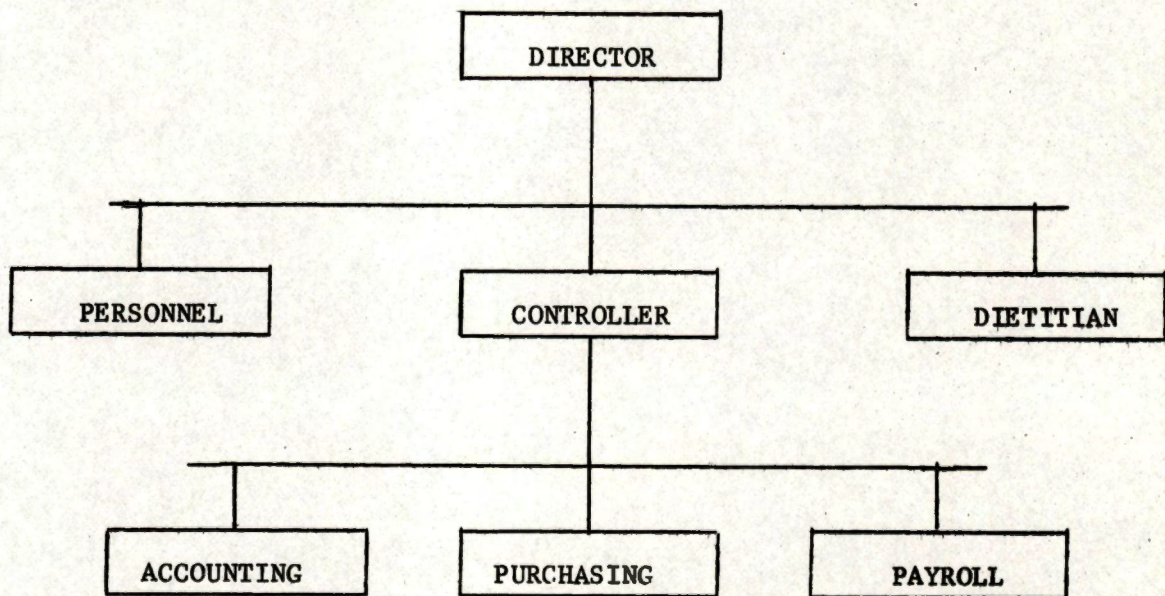


FIGURE 1

AN ORGANIZATION CHART



Job Analysis. Job analysis is a study of the position an employee holds. This includes specific tasks that are performed, the relation to other jobs, the conditions of work, and personnel requirements. A form is usually completed by the worker and then analyzed, giving such personal information pertaining to the worker as health, endurance, skills, abilities, emotional stability, integrity, general education, previous experience, and training on the job.

Job Description. This is a breakdown of the job analysis, in a descriptive form, received from the employee containing comments by the personnel manager. With this report, the supervisors and workers both are made aware of the requirements of the job.

Job Specification. This is a summary of the information received from the job analysis and the job description. This covers the duties involved, working conditions of the job, and personal qualifications required of the worker to successfully carry out the assigned responsibilities. Many people unconsciously employ this tool every time a person is interviewed.

Work Sheet. This describes the work to be done by a specific person which includes procedures and time required for each duty. Work sheets are especially helpful in training new employees. They can also be of help to present employees as a guide for their work.



#### IV. PERSONNEL IN A CENTRAL FOODS OPERATION

Personnel are a most important factor in any operation.

McMurray (14), gives four ways to insure good employees: (1) good employee selection, (2) competent training, (3) adequate compensation, and (4) qualified supervision.

In selecting good employees, the employer should first look for what the employee can do or what his abilities are. The interview is a very well-known method for discovering abilities of applicants. West, et al. (21), states that the interview serves a two-fold purpose. It helps determine if the applicant is qualified for the position and helps the applicant determine if he is interested in the position.

Employee turnover can be a very expensive action. West, et al. (21), reports on a study conducted by the University of Southern California in conjunction with 37 companies that the actual turnover cost of an employee is \$485.82. This figure is based on eight different costs involved when an employee is appointed, trained and dismissed.

#### V. PURCHASING FOR A CENTRAL FOOD STORES FACILITY

Purchasing, as defined by Fine (6), is the term that describes the business activity directed to securing materials, supplies, and equipment required for the proper and efficient functioning of the business. Fine also states that the objective of purchasing is to buy materials of the right quality, in the right quantity, at the right time, at the right price, from the right source, with delivery to the



right place. Therefore, the primary function of the purchasing department, is to negotiate with the vendors the needs of the department and to place orders with vendors for the goods desired by the units. The negotiation is to obtain the best value of the product to be purchased which includes quality, price and service. The quality desired should be determined by the intended use of the product.

Ritterskamp, et al. (18), lists several advantages of centralized purchasing summarized as follows:

1. Reduction in overhead cost through reduction in personnel.
2. Adequate supply of commonly used items on hand at all times.
3. Being able to secure items at prices which represent tangible savings over those obtainable by the issuance of individual purchase orders.
4. Reduction in the volume of "paperwork".
5. Standardization and the adoption of standard specifications.
6. Centralized supervision over inspection or deliveries, storage, distribution of stock, and interdepartmental transfers and sales of surplus stock.
7. Closer accounting control over expenditures.
8. Saving of discounts through prompt payment of invoices.
9. Employment of a full-time purchasing staff which will improve buying techniques and tend to eliminate unfair dealing and favoritism.
10. Simplification of the vendor's problem through solicitation of business from one purchasing office, reduction in the number of orders and deliveries, and reduction in accounting.



Fine (6), states that in recent years there has been an increasing trend toward the hiring of college graduates for positions in purchasing. He reports that in a recent study among members of the Milwaukee Association of Purchasing Agents, it was found that 45.5 per cent of the heads of purchasing departments had a college education. At the assistant purchasing agent level, the proportion of college graduates was 41.8 per cent, and for buyers, the proportion was 31.8 per cent. In the same study, the field of specialization for purchasing agents was a degree in Business Administration. This accounted for 44.7 per cent graduates in the study.

Fine also states that the most successful and efficient purchasing agent will probably be a college or university graduate who has had an education, purchasing or business management training, and experience. This will help them understand those with whom they will be working. Also, a degree in Business Administration is recommended.

The purchasing agent usually functions at two levels. He does some buying and, at the same time, he supervises the buying activities of subordinates. In his capacity as supervisor over buyers, and assistant purchasing agents, he is responsible for their training and development.

The responsibilities of a purchasing manager in the buying capacity, as reported by Fine (6), are:

1. Establishing purchasing policies in keeping with the policies of the company management.
2. Establishing organization within his department.



3. Developing adequate sources of supply to meet needs of the company.

4. Contacting purchasing executives of other companies.

5. Supervising operation of purchasing department and related areas under his authority.

6. Helping with budgets and expense control.

7. Supervising capital equipment purchasing.

8. Forecasting supply and price trends.

9. Signing of contracts.

Aljian (1) reports that the amount of product purchased is one way to estimate the number of buyers that are required to perform the purchasing function. Generally speaking, as the purchasing volume increases, the number of buyers employed should increase. Volume is not the sole measure, but can be an aid to determining the efficiency of the department.

The buyer's responsibilities in contrast to the manager's duties are:

1. Checking requisitions.
2. Placing orders.
3. Making adjustments.
4. Following up deliveries.
5. Filing reports and references.
6. Writing blanket orders.
7. Maintaining correspondence.



## CHAPTER III

### METHODS

Since there was very little material to be found on establishing a food services operation and upon which to base facts, the materials gathered for this study came from four sources: (1) the library, (2) discussion with salesmen and manufacturer's representatives, (3) correspondence with other university food services, and (4) personal experiences while working at Central Food Services of The University of Tennessee.

It should be emphasized that the materials obtained did not directly apply to centralized food services operations, but applied to different phases of industry. This information was used only as a guide for establishing a centralized food service.

The library. After extensive searching, there seemed to be only two main books of any importance that related directly to this study, and one research bulletin that was applicable. Several magazines were found that dealt with a centralized food services operation. These magazines proved to be the best source of information.

Salesmen and manufacturer's representatives. Salesmen and representatives of food manufacturers visiting The Central Food Services of The University of Tennessee helped the author by answering



questions concerning major functions dealt with in a centralized food services operation. They supplied some pamphlets and copies of specifications used in other colleges and universities.

Correspondence with other university food services. Correspondence with other food service directors included letters written to them asking for any information that they might have about their operation, or information they used in establishing their food service operation with emphasis on central food services.

Personal experiences. Since the author was a part-time employee of the Central Food Services of The University of Tennessee while working toward the Master of Science degree, he gained much knowledge of the operations and procedures while performing as an assistant buyer. This knowledge proved to be a great asset in completing this study.



## CHAPTER IV

### RESULTS

#### I. BUILDING

The building that is presently occupied by The Central Food Services was formerly the Tysaman Machine Shop. The building was purchased by The University of Tennessee and remodeled to the present configuration which was completed in June 1966, at a cost of approximately \$403,600. The total amount includes \$225,992 for construction, \$40,000 for consultant work, \$58,855 for major equipment and \$77,318 for various other equipment such as utensils, carts, and pallets.

Thirty-one full-time employees perform the functions within the building. These will later be broken down into their designated areas within the building.

Very little of the old building remains the same except some outer walls and the supporting structures for the roof. The building is constructed of massonary block and concrete with wood and steel posts being the supporting structures for the roof.

The portion of the building occupied by Central Food Services contains 28,458 square feet. The railroad dock, with an area of 1,000 square feet, is not included in this figure. Within the 28,458 square feet area, 6,791 square feet is utilized as hallways and docks. This accounts for 23.86 per cent of the floor space. The majority of this



space consists of the two halls that run parallel with the joining of the upper level and the lower level.

Figures 2 and 3 are the two separate levels of the Central Food Services building at The University of Tennessee. Figure 2 shows the upper level, and Figure 3 depicts the lower level. These two levels are joined by a ramp for use by the forklift and steps for use of pedestrians.

The upper level contains all of the offices with the exception of the purchasing office. In addition, two dry storerooms and a maintenance shop are located on this level. The lower level contains the railroad dock, shipping dock, coolers, freezers, butcher shop, bakery, and purchasing office.

Communication within the building is accomplished by both a telephone system with a local line and by an intercommunication address speaker system. The speaker system is located in every room of the building as well as the halls. There are four master control units--one in the purchasing office, one in the manager's office, one by the receptionist, and the other by the secretary.

The office area consists of a receptionist area, accounting office, conference room, director's office, secretarial pool, manager's office, personnel office, and an office for management trainees. The office area contains 2,642 square feet.

The storerooms are used for paper goods and canned items. The paper storage room contains 2,320 square feet. Some products are stored on pallets and stacked in shelves to prevent damage to certain items.



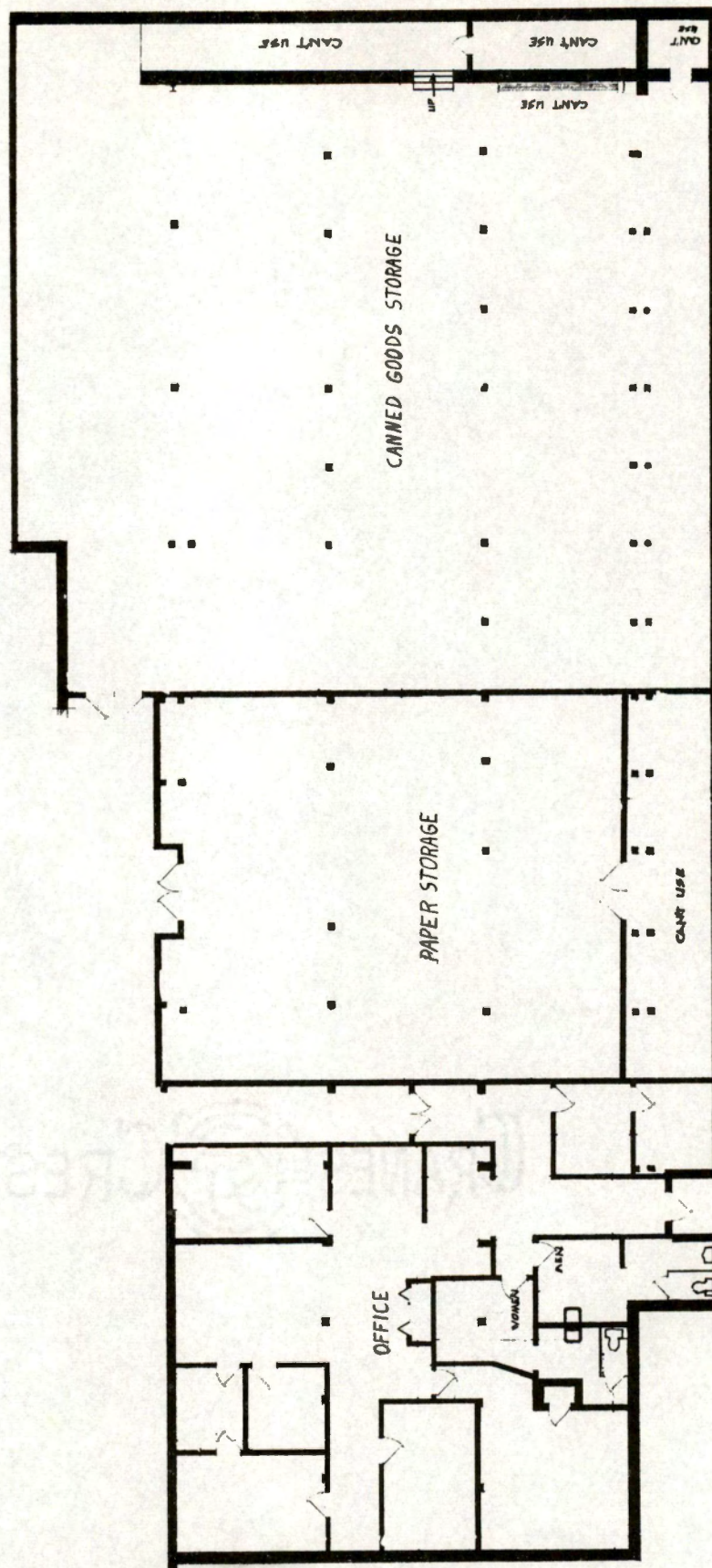


FIGURE 2

THE UPPER LEVEL OF THE CENTRAL FOOD SERVICES' BUILDING  
THE UNIVERSITY OF TENNESSEE



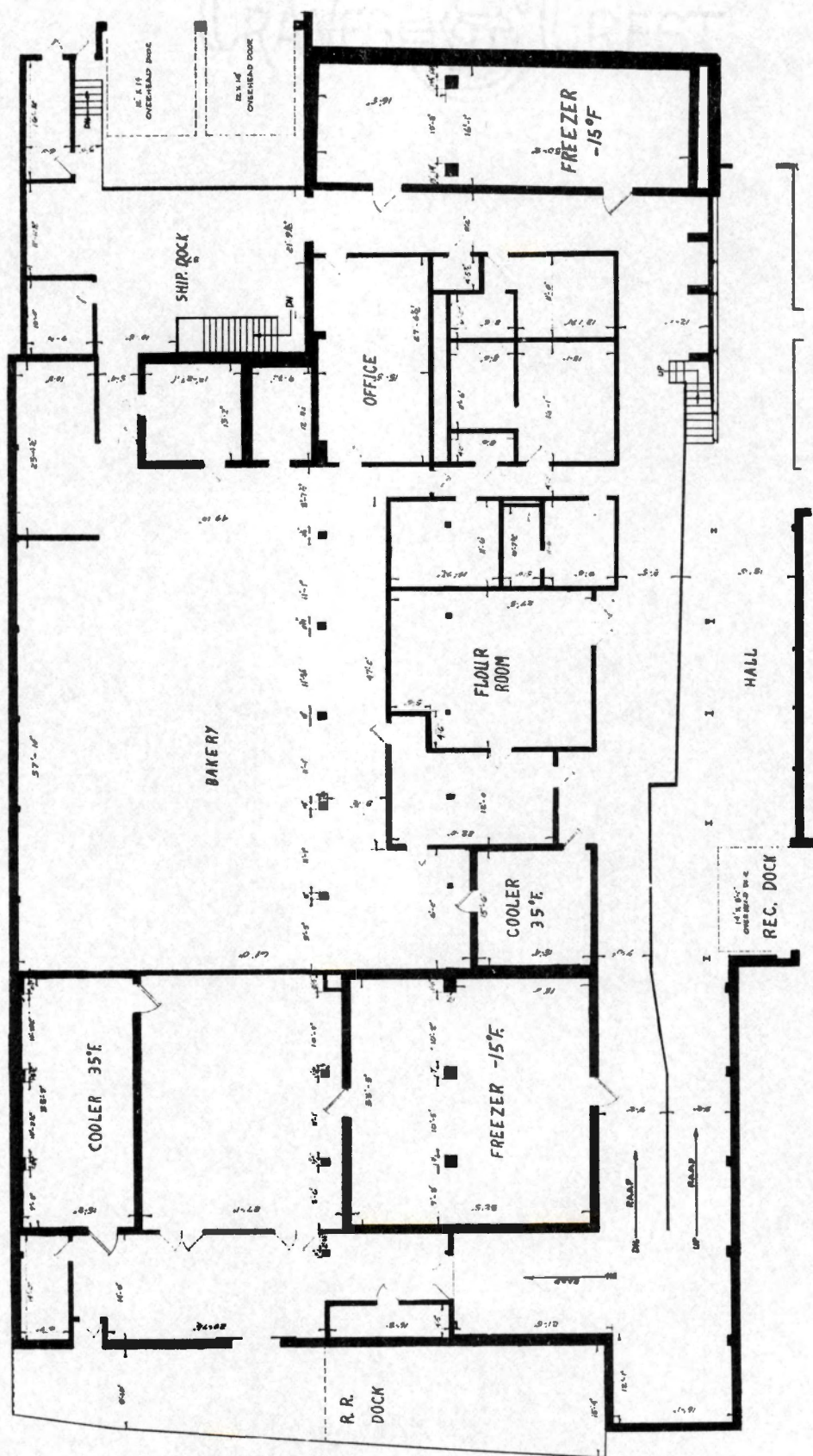


FIGURE 3

THE LOWER LEVEL OF THE CENTRAL FOOD SERVICES' BUILDING  
THE UNIVERSITY OF TENNESSEE



Joining the backside of the paper storage room is a maintenance shop occupying 356 square feet. This area is used by the man in charge of maintenance of all the building.

The large storeroom contains 4,412 square feet of usable space. Included in this room is a small area for electrical switch and fuse boxes, which is not included in the above figure. This room is used to store a limited number of canned good items that are to be used in large quantities. There are four rows of posts on this level that support the upstairs area. The posts are placed approximately eight feet apart.

The upper level contains a truck receiving dock to accommodate one truck. All features are shown in the building layout in Figure 2, page 15, except for the receiving dock which is shown in the layout of the lower level in Figure 3, page 16.

The upper level is connected to the lower level by a 14 per cent ramp. The ramp is used to move the forklift from one level to the other. Provisions were made in the hall area between the two levels to remove part of the guardrail to permit a pallet of goods to be moved from one level to the other by use of the forklift, if the forklift could not pull the 14 per cent ramp with a load.

A railroad dock is located on the East end of the lower level to receive goods shipped by rail. In the early planning stages of the building, provisions were made to have facilities for receiving carcass beef by rail; but, later the idea was discarded after the local market was examined and found to be adequate to supply, economically and in



sufficient quantity, portioned meats. There is a cooler containing 510 square feet that was to be used to store meat, but is now unused. The butcher shop, containing 945 square feet, is also available for other purposes.

Two freezers are used to store frozen meats and vegetables purchased in large quantities. The larger freezer contains 1,114 square feet and the smaller one has 803 square feet, with a combined area of 1,917 square feet. Both are operated at  $-15^{\circ}\text{F}$ . They are cooled with Freon gas compressors that are air cooled. Defrosting of each cooling unit within the freezer is automatic. There are four cooling units in each freezer with their defrost cycles alternated to have at least two units in operation at all times. If all four units should defrost at the same time and the temperature in the freezers should rise to  $0^{\circ}\text{F}$ , a solenoid will trigger an automatic alarm. The defrost cycle is staggered to prevent a rise in present temperature.

The bakery occupies a total area of 4,723 square feet. This includes 3,367 square feet in the main bakery work area, a flour storage room of 566 square feet, a scaling room of 284 square feet, two coolers of 410 square feet combined, and a freezer of 96 square feet. One cooler is designed for storage of raw products used in baking, and the other one is used for storage of baked goods.

The purchasing office is located on the lower level surrounded by the activities that are closely related to that office. This area occupies 426 square feet. The office was originally designed as a production office for the bakery and warehouse.



A truck dock is located at the West end of the building to accommodate two trucks for shipping. Also, on this end are facilities for trash removal.

Located underneath the bakery area is a partially developed basement. It contains the hot water heaters and the steam generator. The developed portion is used for storage of equipment not presently being used by the unit cafeterias. The total basement area is 5,200 square feet with only about one-third floored.

The floors in all production areas are covered with quarry tile. Other floors are finished concrete. One exception is the office which is covered with asphalt tile on concrete. The only original floors remaining are those in the two storage rooms on the upper level. These were cleaned and patched to smooth over some of the rough areas.

Security of the Central Food Services' building after working hours is handled by an automatic alarm system and the security officers of the University. The automatic alarm system is connected to each entrance and will alarm when the doors are opened after working hours.

The alarm is located on the switch board in the security office. If any employee needs to enter the building after working after working hours, he must call the security office and notify them of the time he will be entering and leaving the building.

## II. BAKERY

Eleven employees produce the products ordered by the unit cafeterias. The staff consists of a bakery supervisor, a head baker,



four bakers, two assistant bakers, and three utility workers for sanitation work. Production starts at 3:00 a.m. and continues until 4:00 p.m. Scheduling of two separate shifts is required to produce all products the same day that they are to be served. The bakery supervisor and the head baker work separate schedules so as to have supervision in the bakery at all times.

All floors in the baking area are constructed of quarry tile for easy cleaning and sanitary conditions. The floor has an infinite life and requires minimum repair. All walls are of massonary blocks, painted with a washable epoxy paint to aid in easy cleaning.

The bakery is ventilated by an air system that allows the air to enter in the center of the room and is exhausted around the outside walls. This system is equipped to handle 30 air changes per minute. Each exhaust vent is equipped with an air filter to filter the air before it is recirculated.

The bakery is designed to have a smooth flowing system from the ingredients room to the ovens. The scaling room is close to the storage area of the raw products and is designed to have all non-perishable products stored in it in small quantities for easy access of formula preparation. The perishable products can be obtained from the adjoining cooler when needed. In the scaling room, each ingredient of a formula is measured and sent to the designated mixing area.

All ingredients in the scaling room are stored in closed sanitary containers. These containers include the original shipping container,



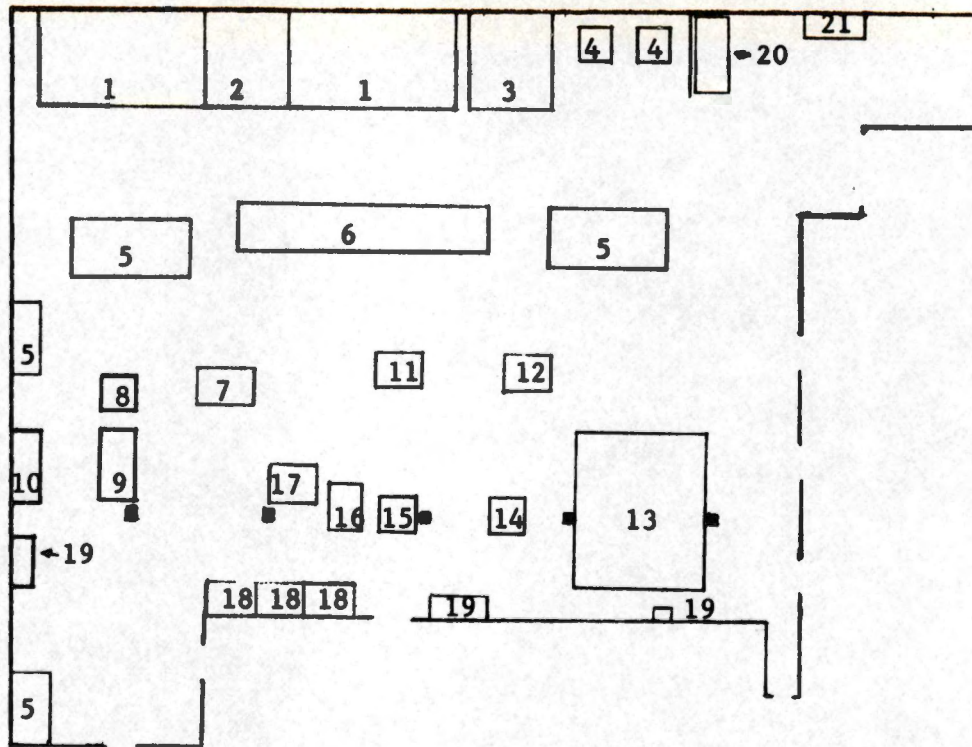
such as drums or barrels, stainless steel storage bins, and rubbermaid bins.

A diagram of the equipment layout and the name of each piece in the production area of the bakery can be found in Figure 4. In the Appendix can be found a list and description of all the equipment purchased for the bakery.

The mixing area is located directly outside the scaling room. In this area, there is a bread dough mixer which holds 200 pounds of raw ingredients and a water chiller and metering system. There is also a 140-quart Artofex pie dough mixer, a 20-quart table model Hobart mixer, a 60-quart Hobart mixer, and a 120-quart Hobart mixer with an 80-quart bowl. Also in this area are three steam jacket kettles used for the cooking preparation of pie fillings, icings, and various other items. These consist of a 20-gallon Groen kettle obtained from the renovated University Center Cafeteria, a 40-gallon Groen kettle, and an 80-gallon Groen kettle which has an automatic agitator with a counter balance for easy removal from the kettle. In addition, the kettle is designed for cold water injection into the jacket to facilitate quick cooling of ingredients after cooking.

In mixing of many products, cold water is required to offset the rise in temperature caused by friction and yeast action. Consequently, the water is cooled to 40°F. The water is metered and dispensed to either the large bread dough mixer or the two conventional vertical mixers, located adjacent to each other, by a valve system and movement of a long faucet.





- |                                   |                     |
|-----------------------------------|---------------------|
| 1. Middleby-Marshall Rotary Oven  | 12. Cookie Sheeter  |
| 2. Anetsberger Proof Box          | 13. Hood            |
| 3. Petersen Rotary Oven           | 14. Budgit Hoist    |
| 4. Doughnut Machine               | 15. Mixer           |
| 5. Worktable                      | 16. Mixer           |
| 6. Sheet Production Table         | 17. Pie-Dough Mixer |
| 7. Tart and Pie Press             | 18. Steam Kettle    |
| 8. Fortuna Automatic Roll Machine | 19. Sink            |
| 9. Dough Mixer                    | 20. Pot Washer      |
| 10. Water Cooler                  | 21. Soak Sink       |
| 11. Cake Depositor                |                     |

FIGURE 4

## BAKERY EQUIPMENT LAYOUT



From this area the product moves to an area where portioning is accomplished. Before portioning, the roll and bread dough is placed at room temperature in a proofing trough. The next step is scaling to the size of each loaf. The rolled dough is weighed in the amounts of three-dozen rolls. The dough is then placed on a special designed pan constructed with circular groves on one side. When the groves are turned up, the machine will roll the dough, but if the flat side is placed up, the dough will be cut and not rolled. The pan is then placed in the Fortuna Automatic Cutter where the mound of dough is pressed flat and cut into 36 equal pieces. The cutting and rolling operation takes less than 10 seconds.

The other mixed formulas are portioned in several different ways. There is a Kotten Dandy cake depositor that contains several different headers for depositing dough in different types of pans; for example, sheet and layer cakes. There is an adjustment on the machine to vary the volume of dough deposited.

The cookie sheeter, manufactured by Champion, uses different dies to make assorted shaped cookies. Cookie sheet pans pass underneath the depositor which equally spaces the cookies. The machine also has an adjustment to vary the size of the cookies.

A one-half ton Budgit Hoist was installed from the ceiling to lift and aid in the dumping of the larger mixing bowls. Each bowl is fitted with three rings for attaching the hoist. Lifting is accomplished by hoisting at two points apart. A stationary chain, attached to the third



point, provides the tilting action. This method was necessary because the full bowls weigh several hundred pounds.

Pie shells are formed by a Hydro-matic pie machine. A portioned amount of dough is placed in a disposable aluminum pan which in turn is placed in the press. Pressure is applied hydraulically to form the dough to the pan. A variable heating coil within the die prevents the dough from adhering to the surface. The length of time pressure is applied at a given temperature can be varied by manually adjusting the timer. Different sizes of pie shells can be made by changing the die and pans to the desired size. This may vary from a three-inch tart shell to a ten-inch pie shell.

A dough make-up table, manufactured by Anetesberger, receives the dough on a movable belt at one end, flours it by a sifting hopper, rolls out the dough lengthwise and then crosswise in separate operations. Work space is provided for hand application of fillings. After the filling area, there is an attachment that rolls the dough in a circular fashion for rolled products such as cinnamin rolls. The dough continues down the belt to an automatic knife which can be varied to cut different lengths. The dough is then removed by workers and placed on pans for proofing and baking.

The box used for proofing of dough is a walk-in type manufactured by Anetsberger. Heat for proofing of the dough is applied by steam. Proofing temperature and humidity can be varied according to different products.



The steam required by the bakery is produced by a steam generator located in the basement underneath the bakery. The original unit was inadequate, and a much larger generator was installed.

There are three gas heated rotary ovens used for baking. All three ovens are equipped for steam injection to be used in the baking of hearth bread. Two of the ovens hold 30 sheet pans each, have a heating capacity of 275,000 BTU per hour, and are manufactured by Middleby-Marshall. In addition to the normal venting of exhaust heat, the Middleby-Marshall ovens are designed with an outer shell that is vented separately from their interior. This allows heat to be expelled by fans without radiating into the work area.

The other oven has a 16 sheet pan capacity and is manufactured by Petersen. This oven was previously used by Strong Hall Cafeteria before its remodeling in 1965.

The two doughnut machines were manufactured by DCA Industries. These machines produce cake doughnuts at a rate of 80 dozen per hour each. The batter is automatically dispensed in the hot grease and revolved to cook one side, then they are turned over automatically and make another round. By adjusting the size of the doughnut and the temperature of the grease, the doughnuts are cooked until done. When the doughnuts have completed the second cycle they are flipped out of the vat onto a drip screen.

Equipment purchased for use in the bakery had to be made of a durable material that would not corrode easily and could be easily cleaned. The common types of materials of the equipment and utensils



are stainless steel, aluminum or aluminum alloy, and baked enamel. Some storage bins and trash receptacles are rubber or rubberized products manufactured by Rubbermaid. The major part of the equipment used in the bakery is NSF approved for sanitation. This includes tables, carts, storage bins, and various utensils.

The bakery has an air conditioned hood to remove the heat from freshly baked products. The products are placed on racks and rolled under the hood which has a forced air system through louvers which directs the air to allow adequate circulation within the layers of the products on each rack. The temperature of the air is cool when it is exhausted.

The freezer, with a temperature of -15°F, is used to hold frozen raw products and some prebaked products. The coolers are used to store both raw materials and baked goods. Both are maintained at 35°F. Some products, such as danish pastry and cinnamon rolls, are prepared and stored in the cooler overnight, or possibly longer, before baking. Many bakery products, such as layer cakes, can be baked in large quantities and stored in the cooler for several days without adverse dehydration or deterioration of quality.

The cart and pot washing operation is located in the area adjacent to the shipping dock. The location is convenient to the returning of equipment. Equipment that is soiled in the production of bakery products also flows to this area. Utensils are soaked in a large, two compartment sink then washed by a FMC utensil washer. In this area is a steam hose to aid in cleaning.



### III. MANAGEMENT

The management position of the Central Food Services is mainly concerned with coordination of functions. The manager is in charge of every operation in the building. He has under his direction three supervisors to aid in the supervisory activities of accounting, baking, and purchasing.

Figure 5 illustrates the organization chart of the Central Food Services. This chart clearly shows the different positions and their order of reporting.

The manager has two secretaries and a typist-receptionist to carry on the secretarial duties. Their duties include answering the telephone, greeting visitors and salesmen, printing departmental forms, and general secretarial work. One of the three is on duty at all times to provide continuous coverage of the telephone and the office functions. In addition, each office worker is required to work one half day each Saturday on a rotating basis.

The manager gives guidance in the supervision of accounting and its relationship to the purchasing function to keep these two divisions coordinated. An example is the proper handling of the purveyor and requisition forms and seeing that the original copy is received by the accounting office in correct form. The manager also works with each unit to make sure all accounting functions are performed to insure fast and accurate processing of the monthly statements. The data sent to and received from the units is also directed by the manager.



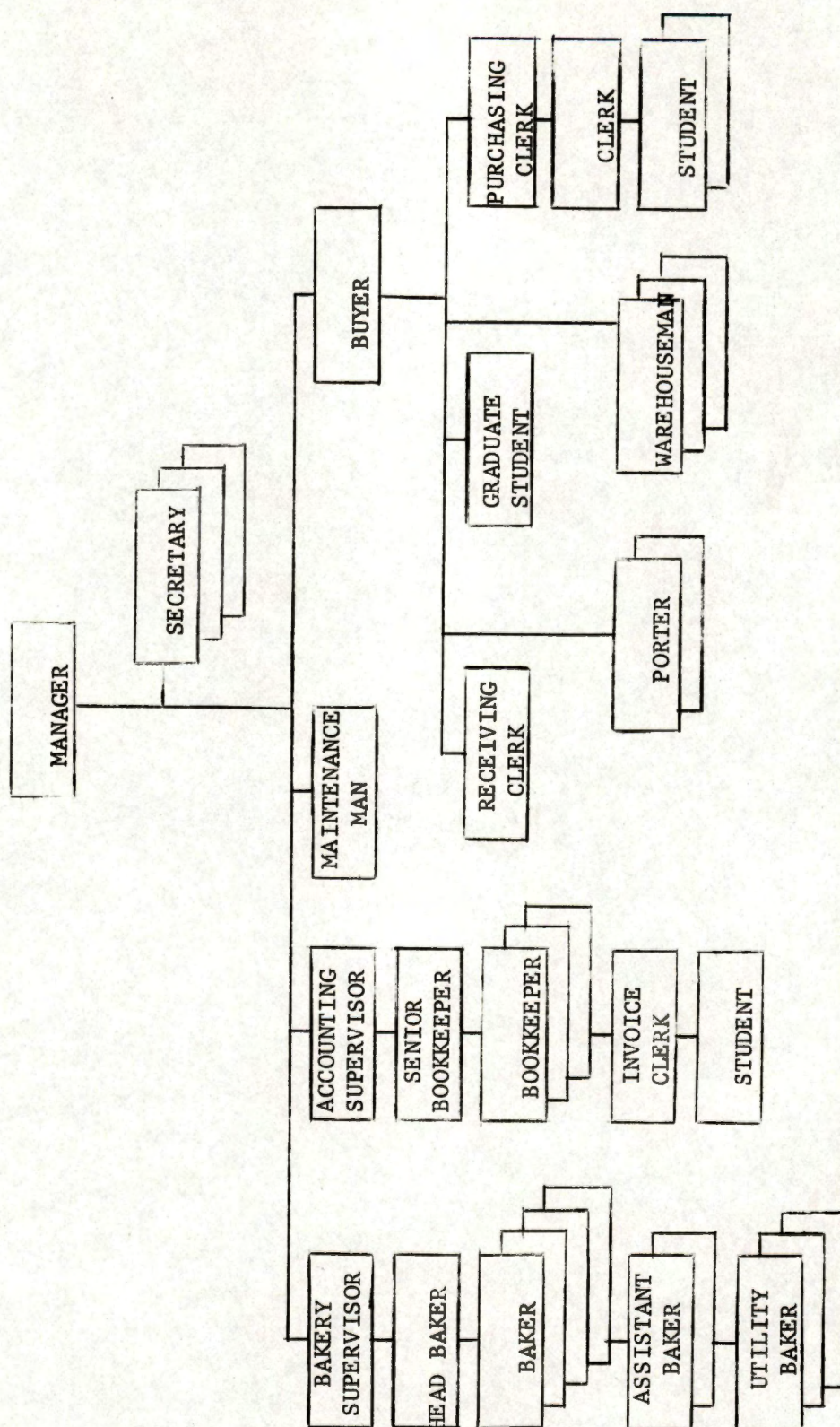


FIGURE 5

ORGANIZATION CHART OF THE CENTRAL FOOD SERVICES OF THE UNIVERSITY OF TENNESSEE



The manager spends considerable time each month in the signing of payrolls and invoices for authorization of payment. This includes signing of each month's invoices before they are sent to the Treasury Office for payment. Signing of payrolls is required three times each month, twice for the hourly wage employees and once each month for the salaried employees.

Other duties of the manager include assisting the unit managers in writing specifications for equipment they desire for their units. This requires a file of the manufacturers of food service equipment and supplies, and the catalogues they publish. Specifications may be needed for equipment to replace an existing piece, a new piece that was not needed before, or the complete line of equipment needed to open a new unit.

The manager of Central Food Services is responsible for the development of all procedures to be used at Central Food Services and those related to the separate units. After procedures have been developed and practiced, certain revisions are required in order to perform the functions for which it was intended. The manager is in charge of the evaluation of the needed revisions and making necessary changes.

Management of the purchasing, receiving, storage, and shipping requires considerable more time than does the accounting and bakery which are self sustaining. More direct supervision is required to give the workers the proper guidance.



#### IV. ACCOUNTING

Six full-time employees and one part-time student work in the accounting office. This includes an accounting supervisor, a senior bookkeeper, three bookkeepers, an invoicing clerk, and a student that works no more than 15 hours per week.

Budgeting is one of the essentials of the centralized accounting of the Food Services Department. The accounting supervisor is required to prepare the data for the preparation of the budget under the supervision of the manager. After each unit manager has prepared his budget in a similar manner, they are sent to the accounting office for assembly to prepare a departmental budget. This is under the supervision of the director and is subject to his approval.

After the budgets are prepared and approved by everyone concerned, the accounting office is required to exercise some control over the budget during the year. If the budget is not being followed, the accounting office notifies those concerned.

The supervisor of the accounting office is in charge of the general functioning of the central accounting office and all phases of accounting in the individual units. This includes the daily checking of receipts, invoices, purveyor and requisition forms, and the deposits.

Other duties under the direction of the supervisor are the maintenance of the cash receipts ledger and all statements from the units and Central Food Services, so that an operations statement can be prepared for the determination of their operation and food cost. Another duty is the computation of State sales tax.



The invoicing clerk prepares all accounts for payment by checking each invoice according to the correct price, quantity ordered, correct billing, and correct extension of price and discounts. The invoices are received daily from the units for processing. The University of Tennessee Treasury Office requires the original invoice before payment. The invoicing clerk checks to make sure the purveyors send an original and two copies when the merchandise is delivered. If this is not practiced, the invoicing clerk contacts the purveyors and requests the needed copy. If there are other corrections to be made, the invoicing clerk will make the necessary arrangements with the purveyors for correction.

The invoicing clerk checks the original copy of the purveyor forms with the invoices received from the suppliers to double check to see that the charges are for only those items received. When the statement from each supplier arrives, the invoice clerk checks for accuracy and makes the needed corrections, if any.

Copy number one of the requisition forms is used as an invoice by the accounting department. This is necessary to make the transfers from one account to the other.

#### V. PERSONNEL

Personnel functions are carried out by a member of the accounting office. The person devotes the major part of his time to personnel and the remainder to bookkeeping.



Applicants for employment in any phase of the Food Services Department are required to interview for the desired position. At this time the applicant fills out an application form and talks with the personnel manager. After interviewing, the personnel manager screens each applicant to obtain facts of the past record of the applicant.

The Food Services Department has a policy that a vacant position in the department is filled by a present employee if one qualifies and desires the appointment. If not, a person from outside the department is considered for the position.

All employees of the Food Services Department have a personal file at Central Food Services. This file contains all personal ratings given by the supervisors or managers, appointment papers, status changes, sick leave, vacation, leave of absence, time sheets, and other material concerning the employee. Files are kept on both wage employees and professional employees.

The personnel manager provides each employee with information concerning insurance policies available. These policies are generally obtained through the University at a discount on premiums.

## VI. PURCHASING

The purchasing office is centrally located between shipping and storage. The area of responsibility of the buyer includes these functions in addition to receiving. Nine full-time employees and three student clerks perform all functions associated with the procurement of goods



and their delivery to the unit cafeterias. The nine full-time employees include a buyer, a purchasing clerk, a statistical clerk, a receiving clerk, three warehouse men, and two porters. Student help is composed of one graduate student and two undergraduates working a maximum of 15 hours per week each.

The purchasing office has complete charge of purchasing all food items used by each unit. The office also assists in the writing of equipment specifications for requisitioning through the University Purchasing Department.

Items not stored are purchased by telephone on blanket purchase orders issued to approved purveyors. The prospective suppliers have supplied, by letter or salesmen, prices on frequently purchased items. Telephone bids are taken on those products not listed or that change price frequently. The telephone is used to contact purveyors and to request delivery of needed items. The bid purchase is used on large quantity products stored at Central Food Services and for other products such as bread, eggs, sugar, paper, and cleaning chemicals. The items to be bid upon are placed on the appropriate bid form by the University Purchasing Department and sent to interested suppliers. On a designated date and hour the sealed bids are opened, reviewed, and awarded to a purveyor on approval of all interested parties. All purchases are processed through the University Purchasing Department, but the determination of quality, price, service, and supplier is left to the discretion of the Central Food Services buyer.



The buyer is in charge of the functions of the purchasing office as well as receiving, storing, shipping, and cleaning of the building. The buyer establishes specifications for all products to be purchased regardless of the quantity. Revisions are made by the buyer when required. The buyer's responsibility in the purchasing office includes actual purchasing, follow up of orders, maintaining prices, foreseeing trends in the future, researching new products, pre-costing for contract units, interviewing salesmen, and keeping records.

The buyer's duties outside of the purchasing office include receiving of all products at Central Food Services, storage, shipping of all stored goods to each unit (including all bakery products), sanitation of the building except for the bakery which is under the direction of the bakery supervisor, and operation of the testing laboratory.

Centralized purchasing was established to relieve the unit managers and their staff of the details encountered in purchasing. It was also designed to reduce the cost of purchasing and at the same time maintain the same quality or to improve the quality at the same cost. Present procurement functions performed at the units include preparing a list from the various menus of the products needed and requesting delivery of those items. All other procurement functions are performed by the purchasing office at Central Food Services.

The purveyor forms used by the Food Services Department are a pre-printed form with a list of commonly used items divided into different categories, such as meats, canned vegetables, and frozen vegetables. An



example of a purveyor form can be found in Figure 6. Purveyor forms are used for ordering goods not in stock. These forms are printed in four copies and serve four purposes, which are: (1) ordering form for the unit, (2) receiving report for the unit, (3) purveyor form for the purchasing office, and (4) an accounts payable form for the accounting office.

All purveyor forms originate in the unit in which the products are to be received. The person in charge of ordering completes all four copies stating the desired delivery date, place of delivery, person ordering, and the quantity desired. If a desired product is not listed on a pre-printed purveyor form, space is provided at the bottom to add these items. Copy number three is retained at the originating unit. The other copies are sent to the purchasing office by noon on Wednesday of the week preceeding the week of delivery.

When the purveyor forms are received at the purchasing office, the purchasing clerk separates the forms according to the delivery dates. Processing of early deliveries are made before all others. Each purveyor order is completed with the appropriate price and name of the supplier. Copies one and four are returned to the originating unit at least one day before delivery. These copies are used to inform the receiving clerk of the agreed price and supplier. Copy number two is also priced with an indication of suppliers and is filed in the purchasing office as a record for future use.

Copy number four is used as a receiving report. On this copy, the receiving clerk places the quantity received in the appropriate



PURVEYOR ORDER AND RECEIVING REPORT  
FOOD SERVICES DEPARTMENT  
UNIVERSITY OF TENNESSEE

Date ordered by unit \_\_\_\_\_ By \_\_\_\_\_ Deliver to: \_\_\_\_\_  
Date order placed (CFS) \_\_\_\_\_ By \_\_\_\_\_

[illegible]

FIGURE 6

### PURVEYOR ORDER AND RECEIVING REPORT



column. If the supplier is unable to deliver the desired quantity, the receiving clerk accepts the amount delivered and makes a new purveyor form for the remaining amount. The purchasing office is then notified for a follow up on the balance. If problems arise concerning price, quality, or damage, the receiving clerk notifies the purchasing office for the appropriate steps to take. All inferior quality and damaged merchandise are returned by the driver and withdrawn from the invoice.

Copy number one is sent to the accounting office. It is used as a report for accounts payable, with shipping reports or invoices attached.

Requisition forms are used only for the transfer of goods from Central Food Services to one of the units or from one unit to another. These forms are pre-printed in four copies with a list of the products stored at Central Food Services. A copy of an unprinted requisition form can be found in Figure 7.

The unit prepares the requisition by stating the quantity of each product desired, date of delivery, name of unit, and signature of person placing the requisition. Copy number three is retained by the unit and the other three are sent to the purchasing office. A designated person in the purchasing office prices each item, extends it, and totals each sheet separately. Entries are made on inventory cards to reflect the decrease in Central Food Services stock. Copy number two is then filed in the purchasing office. Copy one and four are given to a warehouse worker for filling, then delivery to the unit. The warehouseman signs his name in the appropriate place after checking







and completing the order. Both copies are carried to the unit with the merchandise. All products are checked by the receiving clerk in the presence of the driver to double check the order. Both copies are then signed by the receiving clerk and copy one is returned by the driver to the accounting office as an invoice so proper transfer can be made of funds.

All requisitions and purveyor forms for one-week's delivery should be in the purchasing office on Wednesday noon of the preceeding week of delivery. This allows pricing and extension by the purchasing office and ample time for the warehouse workers to prepare the orders and make delivery.

Receiving at Central Food Services is handled by the receiving clerk or one of the warehouse workers. Shipments are received at either the truck receiving dock on the upper level or the railroad dock on the East end of the lower level. Sampling and code checking is done by the buyer at the time of receiving.

All products are placed on departmental standard pallets for storage in its designated place. Paper, cleaning supplies, canned goods, frozen goods, and bakery supplies are then stored in their assigned areas.

Products that do not conform to the specifications and terms of purchase are not accepted. This includes refusal of an "Extra Standard" product when "Fancy" was specified, return of damaged products, and similar discrepancies.



All products to be stored at Central Food Services are placed on standard pallets 32" x 40". This size pallet is designed to accommodate five cases of six number ten cans on each layer. This type pallet is easy to handle and allows for interlocking of different layers to prevent shifting while in transit. The pallets are designed for a four-way pick up. All boards of the pallet are of hardwood with special pre-coated pallet nails.

All canned goods stored in the large storage room are stacked on pallets then placed in the room in assigned areas. This large room holds 10-15 of the largest quantity items. There are seven or eight layers of canned goods to each pallet depending on the location in the room and stacked two pallets high. All goods are stacked to allow easy removal of the oldest stock first.

Paper products that crush easily are stacked on pallet racks in the paper goods storage room. Products that do not crush easily are stacked on pallets but not shelved. These products include napkins and cups.

The large freezer has pallet racks that hold full pallets of frozen products. One pallet can be stacked on the floor under the rack, then one pallet on each of two shelves enabling stacking of products three pallets high. There is one set of racks in this area that is two pallets deep. The forklift reaches out one full pallet, enabling the placing of pallets two deep and three high.



The smaller freezer has two sets of racks. There is a single and a double rack with space at both ends to allow stacking of full pallets that will not crush.

The forklift that is used in warehousing is manufactured by Raymond. It has a 2500 pound capacity. This forklift is battery powered enabling its use in the freezers. It is of sufficient size and power to pull the 14 per cent grade between the two levels.

The forklift will not pull an incline when loaded. One with sufficient power for this task was both too expensive and too large for the available aisle space.

Shipping of all products is performed by the warehouse workers. These men fill each order and deliver it to the unit. Truck driving is part of the job of a warehouse worker. They also deliver the bakery products to each unit at the designated time.

The delivery of all products and special catering functions require three trucks--two large vans and a small closed van. All deliveries are to be completed before three in the afternoon except for catering and some baked items.

The testing laboratory was originally designed to have sufficient equipment for the testing of each product purchased and stored at Central Food Services. Later it was found that the specifications include a provision that most products must be accompanied by a Federal Grading Certificate of the United States Department of Agriculture that states if the products meet our specifications. With this in the requirement for bid, there is less need for extensive testing. This requires that



the code number on the cans and those on the Federal grading certificate conform. By making this provision in the specifications, it was not necessary to complete the laboratory for this purpose.

When a shipment is received, the buyer takes a random sample from the shipment to spot check the quality of the merchandise. He also checks the condition of the containers, temperature of the product, and other factors to help assure that the product meets specifications.



## CHAPTER V

### DISCUSSION

#### I. BUILDING

The major problem encountered at Central Food Services is that the building is on two separate levels. The 14 per cent ramp joining the two levels created a problem in finding a forklift that would climb the steep grade. Of the five companies with whom inquiries were made pertaining to an electric forklift suitable for the purpose, not one had a forklift that would pull the incline when loaded. When this was discovered, a section of the guard rail was remodeled so that the section can be removed to transport full pallets from one level to the other. The forklift can lift the pallet from the lower level to the upper level, climb the grade, pick up the pallet again, and move it to the storage area. Frequently a hydraulic jack is used on the upper level to move the pallets, but it cannot be used in stacking. The incline creates considerable double handling which is time consuming.

The separation of the building requires two halls, parallel to each other at the joining of the two levels. Each hall is approximately ten feet wide and 245 feet long. If the building were to be on one level, with the same design, one full length of the hall could be



eliminated. The eliminated hall area of 2,450 square feet could be used for another purpose. This would greatly reduce the area of halls now accounting for 23.86 per cent of the total floor space of the building. The hall and dock area, with exception of the railroad dock, accounts for nearly one-fourth of the floor space.

Figure 8 is a diagram of the Central Food Facilities of the Texas Technological College. The total area in this building is approximately 30,377 square feet with only 2,996 square feet utilized as halls and docks. This represents only 9.86 per cent of total available space which is considerably less than the Central Food Services building of the University of Tennessee.

Figure 9 is a diagram of the Michigan State University Food Stores Building showing the design of its facilities. This facility (4) was used as a guide in designing the Central Food Services building at the University of Tennessee, according to Birchfield (3). The new Michigan facility is designed for maximum operation based on fifteen years of successful operation of the Food Services Department. The building has a total of 78,000 square feet with little area utilized as hallways and docks. The exact hall and dock area is not given, but can be visualized from the diagram as being very small.

Another trouble area and safety hazard in the building construction is in the freezer area. The forklift is used in both freezers to load and unload pallets of food. The doors are only a few inches wider than the forklift, causing the driver to take extra precautions to prevent damage to the door facings. The sides are constructed of wood and plaster



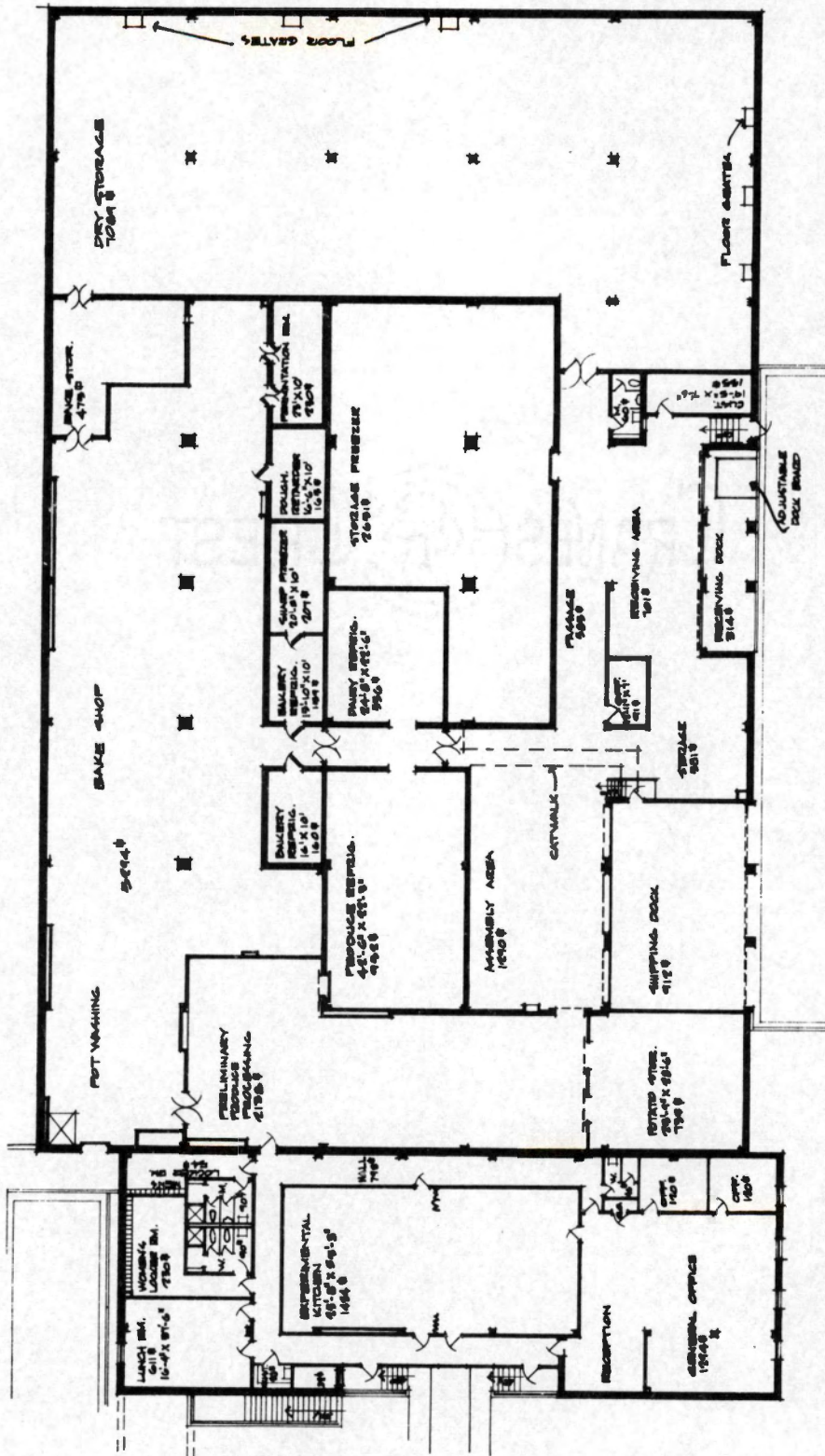


FIGURE 8

CENTRAL FOOD FACILITIES OF THE TEXAS TECHNOLOGICAL COLLEGE



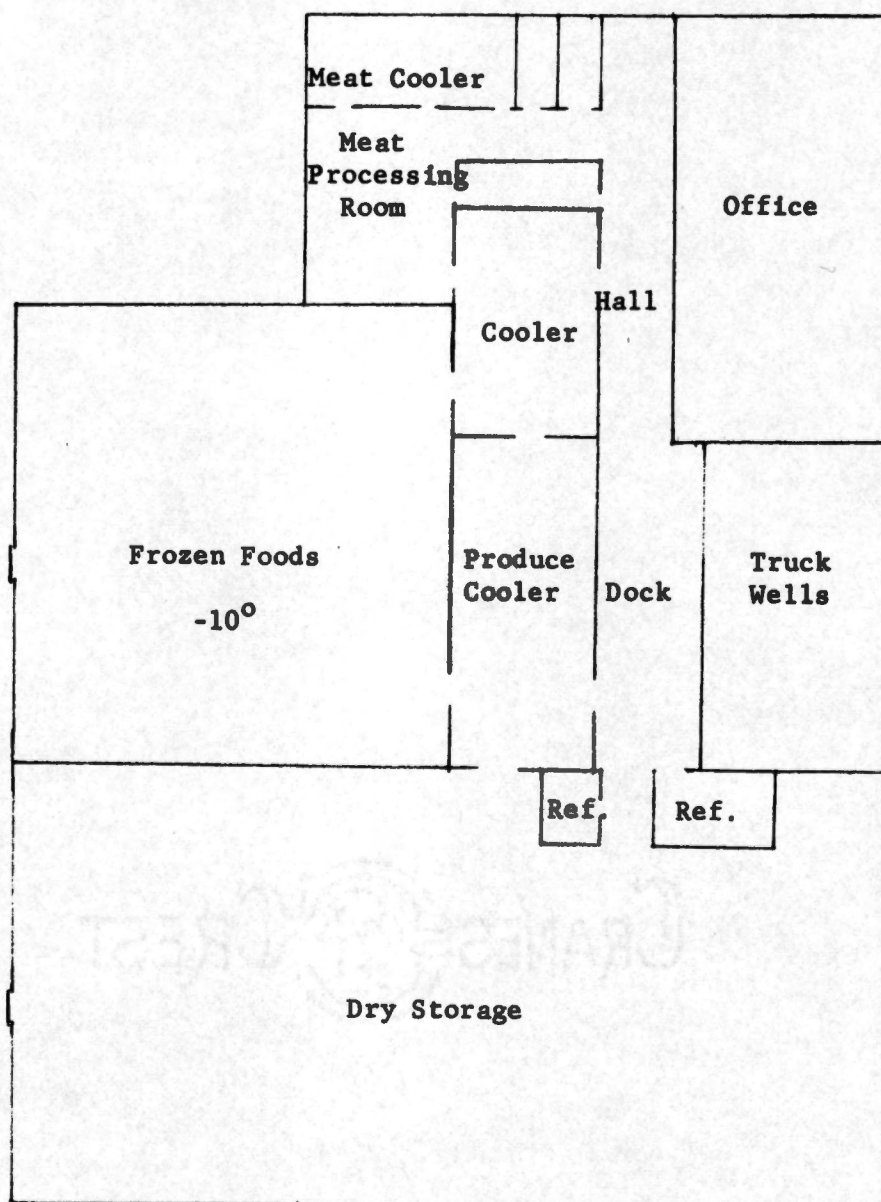


FIGURE 9

MICHIGAN STATE UNIVERSITY FOOD STORES



which is easily damaged. The doors should be wider and provided with a protective metal guard to prevent damage. Also, the doors are too short which results in removal of the guard from the forklift before entering the freezer.

The lights inside the freezers are hanging; therefore, when a light is near the shelving, only one-half a pallet can be stored on the top shelf, thereby reducing the capacity of the freezer. If the lights were considerably closer to the ceiling and suspended by different fixtures, the problem would not be as acute.

During early planning of the building, the amount of insulation needed in the floors of the coolers and freezers was not calculated. As a result of this error, the floors inside the coolers and freezers are on a higher level than the hallway. The difference in height of the cooler and freezer floors compared to the outside floors ranges from two to twelve inches. The steep incline into one freezer creates difficulty in entering with the forklift. If frost or ice forms on the incline, it is impossible for the forklift to enter.

The freezer doors do not have a mechanism to prevent freezing of moisture around the outside facings. This causes difficulty in opening the doors. A heating coil, such as ceil heat wiring, would prevent freezing in this area and would permit easy opening of the door.

The freezer doors are not equipped with Air Curtains or mechanical mechanisms for opening. Later, these may need to be installed if the doors are used frequently enough to offset the cost of equipment.



The original paint used on the plaster walls of the freezers was not adequate for that purpose. After a short time, the paint on the ceiling began flaking off. This was greatest in the areas where the cool air from the units was directly on the paint. In this area, there was a slight formation of ice. The freezers were repainted with a paint that is more suitable for use in freezer areas.

The number of supporting posts in the two dry storage rooms decreases the usable storage area. There are four rows of posts placed approximately eight feet apart. The pallets to be stacked in the rooms must be placed around each post. The posts also create problems in placing aisles so that each product can be removed without double handling. The aisles had to be selected in the area between the posts and had to be wide enough for use by the forklift.

The boiler originally installed was not of sufficient capacity to produce the steam required by the bakery. Later, a larger boiler was installed and has proved to be of sufficient capacity.

Water in the Knoxville, Tennessee area is very hard, and large amounts of mineral deposits build up in certain equipment. The new boiler has an attachment supplied by a chemical company for the adding of a chemical compound to prevent deposits of lime.

The Central Food Services building is not equipped with a stand-by generator in case of a power failure. The Tennessee Valley Authority and the Knoxville Utilities Board are equipped to handle power failures by rerouting the power supply. If this University were to be in a



remote area where the electrical supply was not so pronounced, an auxiliary power supply would seem appropriate. One power failure in an area where no other electricity could be supplied might result in the loss of thousand dollars of frozen food. This loss would greatly exceed the cost of a stand-by unit.

Each time a new unit is constructed or an existing unit is renovated, savings in construction costs are realized by the reduction in size of storage area required. With the use of a central food services facility, only storage space for a week's supply is needed at the units. This considerably reduces the storage area and thus reduces cost of construction. The greatest savings encountered with a central food services is not only realized through quantity purchasing of food, but in the lower construction cost for newly built facilities.

The present Central Food Services building is adequate for storage of certain food items used in quantity. The Food Services Department is presently feeding approximately 6000 meals per day. With the opening of two new units in the Fall of 1967, the number of meals being served will more than double. In each additional year until 1970, there will be an increase of one new unit each year if future plans are completed. With the high projected enrollment of students, the Central Food Services building will not be adequate in future years. Future planning for additional central stores facilities should include all problems encountered with the present building.



## II. BAKERY

Very few problems have arisen in the design of the bakery production area or the equipment chosen. Most equipment was purchased new with the exception of various pieces used when baking was performed in the individual units. All used equipment was in excellent condition.

One problem discovered during the testing of the equipment was with the Middleby-Marshall ovens. When steam was required in the baking of hearth bread, water condensed in the steam lines and was injected into the ovens. This was corrected by installing a water trap in the steam line to extract the condensed water in the line and to divert it back to the boiler.

The air-conditioned hood used in the bakery was installed to facilitate the removal of heat from the bakery products. The cooling unit is an air-conditioned unit which exhausts the air in different directions to circulate within the racks. Many bakeries do not have this facility and require large floor space to cool their products. With this unit, the cooling time is decreased which allows more products to be cooled in the same amount of time.

The present design and layout of the bakery appears to be satisfactory. All pieces of equipment and floors are easily cleaned. The cake depositor, cookie sheeter, pie press, and dough make-up table are on wheels with locks and can be moved for easy cleaning and flexibility with the design of the production area. When a piece of equipment is not in use, it is removed to give a larger work area



around the other equipment. The cookie sheeter and cake depositor are moved under the hoist so dough can be dumped into their hoppers. In the area where the portable equipment is used, there are several electrical outlets strategically located for use of the equipment in nearly any area of the production floor.

### III. PERSONNEL

In the past, each manager was responsible for the interviewing, checking of references, appointment of personnel, promotions, and discharges. With the increase in student enrollment and the need for more employees, one person is needed to execute personnel functions. The University of Tennessee Central Food Services was organized with a person in charge of interviewing, screening applicants, and handling problems arising with personnel.

The personnel office should have the organizational chart of the Food Services Department as a guide in order to be familiar with each position within the department. Each different position should have a job analysis and job specification to be used as a guide for employment. The job analysis and job specification should include the conditions under which each employee will work, the requirements of that job, the training, and other personal qualifications that are desired. Such information will give the personnel manager an inventory of the employment needs.



Maintaining a source of labor supply and determining which one or ones shall be used to bring the best qualified prospective employees to his attention, is a very important task of a personnel manager. Labor sources in the Knoxville area are many and varied. These include the University Alumni Placement Office, University Non-Academic Placement Office, the local Trade Schools, Tennessee Employment Office, Youth Opportunity Center, Newspapers, Distributive Education, and private employment offices.

One of the best sources to fill a vacant position is promotion from within the department. This is usually the promotion of an employee to a higher position and hiring another employee to fill the lower position, but it can be the transfer of equal positions or the lowering of an employee if he feels he would rather have the lower position. The present policy of the Food Services Department of promotion from within serves as an inducement for the employees to qualify for higher positions. After the personnel manager has reviewed all applicants from within, he recommends a choice if one qualifies; but if one does not qualify, outside applicants are considered. It is the duty of the personnel manager to then recommend to the unit manager and his supervisor the best qualified applicant. The final decision of hiring each employee is the responsibility of the unit manager or the supervisor that is to be in charge of the employee.

The direct personal interview is of great importance in the food service industry. The majority of people employed are classed as



unskilled workers or relatively untrained. Direct contact with the applicant is advantageous in that the interviewer has an opportunity to become acquainted with the applicant and to observe personal characteristics and reactions that would be impossible to learn from an application form or letter. It also enables the applicant to decide whether or not he would like to become an employee of the institution.

#### IV. ACCOUNTING

Centralized accounting was established to relieve the managers of their workload and to keep the accounting cost at a minimum. Few people realize that excessive paper work means excessive accounting cost. This cost can be demonstrated by following the steps of issuing and processing a purchase order. Some of these costs are in the purchasing office and are absorbed there. The costs include cost of the paper for the requisition and other forms, envelopes, postage, typing, checking, sorting, filing, and distributing. The cost of processing the invoice must be included which consists of checking and comparison with the order, follow up, correspondence, filing, checking receipt of goods, and approval for payment.

Another accounting cost is inventory. Niswonger and Fess (15) list two basic types of inventorying of which the second is used at Central Food Services. The two are periodic and perpetual inventorying. Periodic inventorying is determining the count of products in stock by a physical measurement at specified intervals. Perpetual inventory is maintained on each purchase or sale with a resulting balance.



A perpetual inventory is kept at Central Food Services with a card file on each product. Each time goods are delivered or a shipment is made, the quantity is placed on the card and the balance is extended. This balance is readily accessible from the cards rather than taking a physical inventory. A physical inventory should be taken at least four times per year to check accuracy of the perpetual inventory method.

The perpetual inventory is more costly because of the greater requirement of labor in keeping a resulting balance. A balance is desirable but a greater cost may be offset by the convenience of having an inventory at all times rather than having to physically count a product to obtain the amount in stock.

#### V. MANAGEMENT ,

Management of a central food services facility is very similar to that of a wholesale jobber. The functions of management, personnel, accounting, purchasing, receiving, storing, and shipping are incurred by the manager of a central food services.

The manager must be highly qualified to give proper guidance to supervisors of the various areas within the building. He must use his best judgment in solving all problems. With his leadership, the central food services can operate in an efficient manner and help stretch the student's food dollar.

The organizational chart is very helpful to the manager. He knows each position and the channel through which each employee reports.



The manager and supervisors are located on top of a graphic portrayal of an organizational chart with the chain of command being lower as the chart descends.

The accounting office and bakery do not require as much of the manager's time as do the activities centered around storage. Both the accounting and bakery supervisors are skilled in management of that area and require less man-hours of supervision from the manager of Central Food Services. The other offices of the building, under the direction of the buyer, require more management control for an efficient operation. Employees in the warehousing area are unskilled workers and thus require more supervision.

With the opening of approximately one new unit each year, the manager of Central Food Services spends considerable time with the development of each unit. The manager and his staff help with the designing of the building and purchasing of needed equipment. This is an added duty which requires considerable time to properly perform.

## VI. PURCHASING

The purchasing function plays a vital role in today's business world, and its importance is steadily increasing as the number of supplying firms increases and as new products are developed. Here is an area of business which offers able men opportunities for advancement and a challenging career. The purchasing agent must know the institution's complete operation and be familiar with the many sources of supply for all items to be purchased.

Probably no administrator in an institution has a wider or more varied range of personal contact with others than does the purchasing agent. To many vendors, he is the voice of the institution. Their attitude toward the institution is influenced by their contacts with the purchasing office. The purchasing agent should properly conduct the business of his office while maintaining friendly relations with all.

Salesmen and representatives that make contacts with the purchasing agents form certain opinions as to whether the agents are honest, likeable, warm, and admirable. Purchasing personnel must make good impressions with whom they do business in order to present a good image for the institution.

With the use of quantity buying, storage, consolidated purchasing, use of specifications, and standardization of products, the purchasing office demands an equal quality, or higher, product at the same cost or less. Centralized purchasing for the Food Services Department began in September 1966, and no apparent savings were realized except for the purchase of large quantity items.

Better organization of small purchases can sometimes result in a savings. Canned Fancy Whole Kernel Yellow Corn is purchased in 100 case lots on a trial basis to orientate the warehouse procedures before large quantity buying starts. The price of this product in case lots delivered to each unit weekly was \$6.90 per case, but when purchased in 100 case lots and delivered to Central Food Services for



storage and distribution the price was lowered to \$5.79. This resulted in a savings of \$1.11 which was 16 per cent of the original cost. Fruit Cocktail is another item presently stored. The original cost was \$7.96 but was decreased to \$6.89, representing a 13.4 per cent savings. Frozen French Fries are presently stored at a savings of only 5.4 per cent. These items are presently stored in 100 case lots, but in the future the items stored will be in considerably larger quantities. All items presently purchased for storage are from local jobbers, but in the future some items will be purchased directly from manufacturers. It may be possible that direct purchasing will result in further savings.

The unit cafeterias try to maintain a 42 per cent food cost. This means that 42 cents of every sales dollar is spent for the purchase of food. A savings in the purchasing of food results in a lower food cost and a lower selling price. This savings may be small, but it stretches the student's food dollar.

The cost of purchasing within a department is difficult to evaluate. One can see that the cost of issuing an order and purchasing cost are relatively the same for a quantity order as it is for a small one. If the same quantity is to be purchased during a specific time, one large order may be sufficient while it takes several small orders to purchase the same amount of product. The cost of ordering several small orders is far greater than that for one large order. In this way, additional savings can be realized.

Kotschevar (9) states that the methods of purchasing and distributing food in the food service industry is too costly. Experts have estimated that we are spending six per cent more than we should be. A six per cent decrease in food cost would be a significant savings.

Kotschevar also reports in a recent survey that delivery of food to food service units costs the purveyors from \$2.50 to \$8.00 per stop. He says that many purveyors need a \$100 delivery to cover the cost of shipping. In the same study the average food service operation purchased from 19 different suppliers with an average delivery order of \$25.00. The University of Tennessee Food Service Department is presently purchasing food from 39 different suppliers.

Kotschevar (9) reports from another survey, concerning marketing costs to supermarkets versus food services, that during a period in which marketing costs to supermarkets rose eight per cent, the costs of food services rose 26 per cent. This may be because of the forming of supermarket chains which buy many items direct and do their own warehousing. The food service operators are purchasing today as they did years ago. Kotschevar also states that direct buying with drop-shipment or central warehousing can save as much as 15 per cent of the food cost.

At the present time, the facilities of the Central Food Services are not adequate to operate a central stores that stocks all items used in the units. Central Food Services is dependent upon the local jobbers to supply the infrequently used items. In this way, they



perform a great service to the institution. The jobbers perform other services to the Food Services Department in helping with specifications, immediate delivery, introduction of new products, literature information, and obtaining specialty items.

There are seven major factors of how cost can be reduced by central purchasing and storage. Some of these have already been discussed in this chapter. The seven include: (1) larger quantities of fewer items by use of standardization, (2) more economical buying quantities, (3) reduction in procurement time, (4) savings of the unit manager's time in purchasing, (5) receiving of desired quality by use of specifications and inspection, (6) delivery in large quantity rather than many small quantities, and (7) less paper work resulting from fewer number of purchases.

Several factors should be included in determining the proper quantity to purchase. These are listed by Ritterskamp, et al. (18), and include: (1) the rate of use in the past, (2) anticipated future rate of use, (3) cost of carrying an inventory, (4) cost of placing an order, (5) amount of storage space available and proper storage facilities, (6) potential deterioration during storage, (7) quantity price differential, (8) economical packaging quantity, (9) amount of lead time for delivery, and (10) market conditions.

Proffitt (16) states that food purchasing specifications should be prepared to adequately describe the food products desired and should include such details as are essential to be a complete and accurate

description. Factors should not be included in the specification that cannot be checked when the product is received. If each factor described in the specifications cannot be analyzed by the personnel responsible for procurement, little purpose is served by including such details in the specifications.

All factors that are included in the specifications of the Food Services Department can be analyzed by the United States Department of Agriculture, Federal Grading Service or the staff of Central Food services purchasing. The Federal Grading Service will grade all desired products according to the specifications of this department.

James Lytton (12) of the Tennessee area of the Federal Grading Service suggested that specifications be developed according to the standards established by the United States Department of Agriculture and select the grade that fulfills our requirements. Drained weight is an essential in canned products, but no set requirements are made in the Federal Standards, only a recommended drained weight. The State of Tennessee Purchasing Department has recently revised their specifications to include drained weight for canned goods and net weight when applicable.

Specifications being placed for bid should always include the name of the product, quantity desired, quality desired, the unit on which price should be quoted, drained or net weight, and size or type of unit or container. Other information that can be included for a specific product is count, sieve size, syrup density, geographic area of production, variety, style of pack, and medium packing.



Mr. Lytton (12) advised the purchasing of Fancy (Grade A) frozen vegetables and fruits. The lower grades are inferior and do not satisfy the quality demanded by the Food Services Department.

This study is not a controlled experiment. Savings are not realized only in dollars and cents, but in the careful checking of each shipment of goods, seeing if the specifications are being met. This prevents the acceptance of spoiled or low quality products.

Quality in food service activity is the most desired and widely sought element in institutions. As this ideal becomes a reality, quality in action portrays management and personnel awareness of obligations to students. Also, it is a sign of meal service attainments. Quality standards can be required by use of specifications. Quality of a product should be selected according to the intended use of the product. Tomatoes for cooking purposes do not need to be of a Fancy grade which is of very high quality, but can be of a lower quality with a drained weight requirement.

The use of pre-printed purveyor and requisition forms saves time in the preparation of each order. Each frequently used item is listed on a purveyor form and all items stored at Central Food Services is listed on a requisition form. Considerable labor is saved by reducing the amount of writing or typing required in ordering. Before the forms were pre-printed, a rough list was made in the stock room and transferred to another copy, but the person taking inventory can fill in the quantity requested and need not transfer it to another sheet.

Researching of new and improved products is an essential function of the purchasing office if new products are to be introduced or if a higher quality is desired. Many new labor saving products are constantly being introduced. One line of these foods is known as convenience foods. The term convenience foods refers to those foods which have services "built-in" to the basic ingredients to reduce the amount of preparation required in the institution kitchen. The "built-in" feature is usually considered to be labor. Today's list of convenience foods is endless, but includes cake mixes, frozen products, pre-portioned meats, fully cooked and frozen entrees, and others.

The advantages to the user are obvious. Some reduce preparation time, need less storage space, and they are of consistent quality. There are few disadvantages of convenience foods if quality is demanded and if the products are handled properly.

Increased production with less human effort has been an objective in food services for many years. Interest in the designing of work systems to convert human work practices to machines was a contributing factor to the Industrial Revolution. The introduction of convenience foods in food services may be a revolutionary factor. Current high food and labor costs make it imperative that every effort be made to study the work design and perfect efficient operation if high standards of production and quality of products are to be attained at a reasonable cost in food services.



There are two main factors to consider when convenience foods are to be used. One is to present the food in a pleasing manner by use of garnish and seasoning. Generally, convenience foods are slightly seasoned to allow further seasoning so each user can be satisfied. The second is not to tell the students that convenience foods are being used so that they will believe the food was prepared on the premises.

Wade (19) states that the preparation of entrees in a conventional kitchen accounts for 75 per cent of the time required to prepare a meal. The entree items are only 25 per cent of the meal. The use of fully prepared and frozen entrees can reduce labor needed and thus reduce labor cost. He states that the cost of the frozen entrees is higher per serving than the conventional item, but labor is built-in the convenience food.

The frozen entree items have all necessary products incorporated which reduced storage space of each item. The only production required is removal from the box and heating to bring the product to serving temperature. These products can be purchased in a disposable steam table pan which eliminates washing and storage of the pans.

Robert Spence (17), Food Service Director at the University of Maryland, says it cost 26 cents everytime a steam table pan is removed from a table insert, washed, stored, and used again on the line. Also, Williams (22), reports that Ekco Aluminum Company estimates that it takes 26 cents to wash and clean a steam table pan. This includes soap, labor, and machinery.

There are several advantages of convenience foods stored in aluminum containers. These are: (1) less labor expense due to less set-up time, (2) increased convenience when stored in a disposable pan, (3) better portion control, (4) less leftovers, (5) easier food storage, (6) elimination of triple handling, (7) less money tied up in steam table pans, (8) reduction in weight with aluminum, (9) improves kitchen sanitation due to simplification in clean up, (10) reduces labor cost, (11) lowers initial cost of washing equipment, and (12) better control over quality.

Principia College, near St. Louis, Missouri, was the first college to completely change to convenience foods, Wade (20) reports. The food items used are frozen prepared entrees, fresh mixed salad, purchased from a local produce dealer, canned soup, canned and frozen fruits and vegetables, frozen pies, and portion controlled meats. All items have a certain amount of labor built in to save preparation time in the kitchen.

The kitchen at Principia College was built to feed 250 students, reports Keller (8). Today it is feeding 650 students with the aid of convenience foods. The facility was changed to convenience foods during the Spring of 1964. Since then, the food service staff has been reduced from 46 to 26 employees which is a savings of 44 per cent in labor cost.

Keller's (7) report on "The Lankenau Study", which compares three weeks of convenience food menus to three weeks of conventional



menus, a decrease of 4.4 cents per meal in food cost resulted when convenience foods were used. The labor cost was also reduced 7.9 cents per meal and the materials cost of paper and others increased 3.5 cents per meal. There was a 34 per cent decrease in man hours required to prepare the meals when convenience foods were used which was a considerable saving.

Livingston (11) reports that the New York Board of Education has introduced convenience foods in their system to aid in reducing labor cost. In an experimental study sponsored by the Ford Foundation, the cost of convenience foods was compared to conventionally prepared foods. This was based on the cost of a fully prepared meal, and it was found that convenience food meals cost 6.5 cents less than conventionally prepared meals. There was a slight decrease in food cost, but the largest reduction was the labor cost. Most products were purchased in disposable pans.

Martin (13) reports on a study of prepared items during 1964 which was a record year for the sale of prepared items. The frozen prepared items accounted for \$1,198 million which was a 35.6 per cent increase over the previous year. This includes both retail and institutional prepared items.

Convenience foods are only one item that requires research by the purchasing office. Convenience items, especially frozen prepared entrees, have great potentials for future use and should be researched carefully before being placed on the menu. Convenience foods can be the long-awaited break through in the food service industry.

Purchasing in the future at the University of Tennessee may be assisted by the use of electronic data processing equipment. Machines are available that can aid in inventory control, ordering time, quantity to order, accounting procedures, and other functions related to purchasing and accounting. Many of these functions are time consuming and would relieve the accounting and purchasing staff of many hours presently required to perform these functions.

Principia College, operated by Lee Wade (19), made provisions to change their receiving from each of two units to one central receiving point. In doing this the purveyors reduced their prices and a 7.5 per cent reduction resulted in food cost. This adequately paid for a highly qualified receiving clerk, the cost of labor, and a truck to distribute the food. Principia College had one unit that was 50 miles from the receiving point, which could account for the 7.5 per cent reduction in food cost. Mr. Wade states that even if the units were close together he would still have a central receiving point because he can receive the quality he specifies by use of a skilled receiving clerk.

High quality products must be purchased if the unit cafeterias are to produce high quality food. Quality cannot be increased in food, but must be there from the beginning.

Before the pallets were purchased for warehousing at Central Food Services, several people were contacted to determine if there is a standard pallet used in industry and if there is a durability test to check the strength of the pallet. After extensive research, it was



found that no standard pallet or standard test was known to exist. The pallets purchased by Central Food Services are constructed of hardwood because of the durability of the wood. Small pallets were chosen for easy movement in narrow aisles.

D'Anna (5) reports on a study about palletized versus deadpile unloading in the food industry. Results favored palletized movement of food, and can be found in Table I.



TABLE I

PALLETIZED VERSUS DEADPILED UNLOADING IN THE FOOD INDUSTRY  
FOUR-WEEK PERIOD PROJECTED TO ONE YEAR

| Number<br>Working<br>Days | Tonnage of<br>Product for<br>Unloading | Man-Hours Required<br>To Unload |           | Man-Hours Saved<br>Unloading<br>Palletized | Equivalent Saving<br>In Manpower<br>(8 Hour Days) |
|---------------------------|----------------------------------------|---------------------------------|-----------|--------------------------------------------|---------------------------------------------------|
|                           |                                        | Pallet                          | Deadpiled |                                            |                                                   |
| 1                         | 250,000#                               | 10                              | 50        | 40                                         | 5                                                 |
| 2                         | 150,000#                               | 6                               | 30        | 24                                         | 3                                                 |
| 3                         | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 4                         | 200,000#                               | 8                               | 40        | 32                                         | 4                                                 |
| 5                         | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 6                         | 400,000#                               | 16                              | 80        | 64                                         | 8                                                 |
| 7                         | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 8                         | 200,000#                               | 8                               | 40        | 32                                         | 4                                                 |
| 9                         | 500,000#                               | 20                              | 100       | 80                                         | 10                                                |
| 10                        | 750,000#                               | 30                              | 150       | 120                                        | 15                                                |
| 11                        | 250,000#                               | 10                              | 50        | 40                                         | 5                                                 |
| 12                        | 150,000#                               | 6                               | 30        | 24                                         | 3                                                 |
| 13                        | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 14                        | 200,000#                               | 8                               | 40        | 32                                         | 4                                                 |
| 15                        | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 16                        | 400,000#                               | 16                              | 80        | 64                                         | 8                                                 |
| 17                        | 300,000#                               | 12                              | 60        | 48                                         | 6                                                 |
| 18                        | 200,000#                               | 8                               | 40        | 32                                         | 4                                                 |
| 19                        | 500,000#                               | 20                              | 100       | 80                                         | 10                                                |
| 20                        | 750,000#                               | 30                              | 150       | 120                                        | 15                                                |
| Four<br>Weeks             | 6,700,000#                             | 268                             | 1340      | 1072*                                      | 6.7                                               |

\*Equivalent to 13,936 hours saved per year @ \$3/hr. pay ratio = \$41,808 annual savings versus deadpile unloading.



## CHAPTER VI

### SUMMARY

An evaluation and description of the Central Food Services of the University of Tennessee was developed in an effort to assist other colleges and universities in establishing a food service program, to illustrate the savings that can be experienced through quantity buying and storing of products, and to serve as a basis of analysis.

Under conditions of the study reported in this paper, it was found that:

(1) The construction of Central Food Services facilities reduce floor space requirements for office, storage, bakery, and meat cutting, in supporting units, resulting in lower construction costs in those units.

(2) The building presently occupied by the Central Food Services is not adequately designed for maximum efficiency. With the projected increased enrollment at the University of Tennessee, the building will need added facilities for storage and office space.

(3) The present design and layout of the bakery at Central Food Services is well designed with efficient and modern equipment.

(4) The present personnel of the Central Food Services are all well qualified. The best method of filling vacancies is through

promotion from within the facility, if a present employee is qualified. Outside applicants are also used to fill positions.

(5) Centralized accounting reduces the workload of management and helps keep accounting costs at a minimum. Perpetual inventorying as used at Central Food Services is a convenient means of having a continuous inventory and for projection of supplies.

(6) Management activities of Central Food Services are mostly centered around the storage operation. Accounting and bakery functions are self sustaining, since the accounting and bakery supervisors are skilled in management of their employees.

(7) By use of specifications, grading, standardization of products, quantity purchasing and storing, the Food Services Department has experienced substantial savings on some products, while maintaining the same high standard of quality. Savings are not always measured in dollars, but in the prevention of low quality or damaged products by use of specifications and checking when the merchandise is received.





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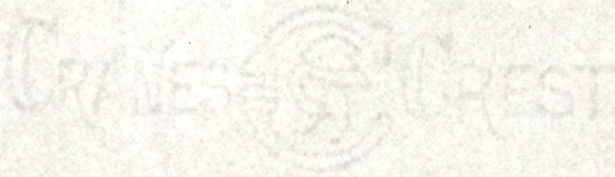
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**APPENDIX**





THE UNIVERSITY OF TENNESSEE  
CENTRAL FOOD SERVICES  
BAKERY EQUIPMENT

| <u>QUANTITY</u> | <u>DESCRIPTION</u>                                                                                                                                                                               |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 each          | Doughnut Machines, Model "Standard Model A" as manufactured by DCA Food Industries, Inc.                                                                                                         |
| 1 each          | Continuous Feed Cookie Machine, Model #65 as manufactured by Champion Machinery Co.                                                                                                              |
| 1 each          | Sifter, Model #SB-375 as manufactured by Union Steel Products Company.                                                                                                                           |
| 1 each          | Sheeter Production Table, Model #ST-5-DC-16 as manufactured by Anetsberger Brothers.                                                                                                             |
| 1 each          | Tart and Pie Press, Hydro-matic, Model H-200 as manufactured by A.M. Manufacturing Co.                                                                                                           |
| 3 each          | Dough Troughs, Model DT-404 as manufactured by U.S.P.                                                                                                                                            |
| 1 each          | Dough Cutting and Moulding Machine, Model "Size 4" (36 pieces) as manufactured by Fortuna, distributed by Bakery Machinery Import Corp.                                                          |
| 1 each          | High Speed Dough Mixer, Model "Thoro-Mix" as manufactured by Champion Machinery Co.                                                                                                              |
| 1 each          | (Automatic Water Meter) with Water Cooler, Class II, size 500 water meter and one (1) Model CPB-200W Water Cooler with Model #10TM Taste Master filter as manufactured by Champion Machinery Co. |
| 1 each          | Mixer, Model #15 as manufactured by the Artoflex Division, Exdelsior Industrial Corp.                                                                                                            |
| 1 each          | Cake Depositor, Model "Sanitary Dandy" as manufactured by the Kotten Machine Co.                                                                                                                 |
| 1 each          | Scaling Bench, Model 141S scaling bench, as manufactured by Wilder Manufacturing Co.                                                                                                             |



|          |                                                                                                                                        |
|----------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1 each   | Two Compartment Sink with Drain Board, Model SS-224-RB sink with lever handle waste and connected overflow as manufactured by Seco Co. |
| 1 each   | Scale, Bench, Model 5600-1, 22" x 22" with portable stand as manufactured by Howe Richardson Scale Co.                                 |
| 20 each  | Delivery Storage Cabinets, Bucksco Model C4 as manufactured by Bucks County Enterprises.                                               |
| 170 each | Pie Handling Trays, Bucksco Model P-24 as manufactured by Bucks County Enterprises.                                                    |
| 4 each   | Pan Dollies, Bucksco Model DD-52 with A75 handle to accommodate 18" x 26" pans as manufactured by Bucks County Enterprises.            |
| 6 each   | Bucksco Racks, Model T36 as manufactured by Bucks County Enterprises.                                                                  |
| 6 each   | Shelf Carts, Bucksco Model T35 as manufactured by Bucks County Enterprises.                                                            |
| 4 each   | Scrap Baskets, Bucksco Model S-831 with casters as manufactured by Bucks County Enterprises.                                           |
| 1 each   | Worktable with Overshelf, Model 15-7230 as manufactured by Southern Equipment Co.                                                      |
| 1 each   | Worktable, Model #21-6030 with back turned up 1½" as manufactured by Southern Equipment Co.                                            |
| 1 each   | Scale, Model 5600-1 bench scale as manufactured by Howe Richardson Scale Co.                                                           |
| 1 each   | Wrap Up Table, Model #21-4830 as manufactured by Southern Equipment Co.                                                                |
| 1 each   | Two Compartment Sink with Double Drainboard Model SS-224-DB with lever handle waste and connected overflow as manufactured by Seco Co. |



|        |                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 each | Ice Machine, Scotsman Super-Flaker ice machine Model SF-3WSFB as manufactured by Queen Products.                                                                                                                                                                                                                                                                                              |
| 1 each | Scale, portable, Model 5800-2 as manufactured by Howe Richardson Scale Company.                                                                                                                                                                                                                                                                                                               |
| 3 each | Emergency Lights, 2 heads, 7½ Volt., #75 as manufactured by Big Beam, Crystal Lake, Illinois.                                                                                                                                                                                                                                                                                                 |
| 2 each | Emergency Lights, 2 heads, 1½ Volt., #800 as manufactured by Big Beam, Crystal Lake, Illinois.                                                                                                                                                                                                                                                                                                |
| 2 each | Flashlights, 2 cell, #FS1X as manufactured by Permissable.                                                                                                                                                                                                                                                                                                                                    |
| 2 each | Rotary ovens, Model 783 as manufactured by Middleby-Marshall.                                                                                                                                                                                                                                                                                                                                 |
| 1 each | Racks Steam box, 2 racks Add-A-Unit size 7½ x 8'0" as manufactured by Anetsberger.                                                                                                                                                                                                                                                                                                            |
| 1 each | Ladder, Safety-Step, Cat. P4 S30 four-step with casters height 38", depth 31", 30" wide at bottom, 25½" at top as manufactured by Ballymore.                                                                                                                                                                                                                                                  |
| 1 each | Wet and Dry Vacuum with transporter adaptor, Model JB 365 CV as manufactured by Pullman Vacuum Cleaner Corp.                                                                                                                                                                                                                                                                                  |
| 6 each | Cabinets, Heavy Duty hand carrying, Model CD 50 as manufactured by Bucksco.                                                                                                                                                                                                                                                                                                                   |
| 4 each | Cabinets, Standard hand carry, with 5, 12 x 20 x 2½ steam table pans on 3½ spacing, Model CD 52 as manufactured by Bucksco.                                                                                                                                                                                                                                                                   |
| 1 each | Pot sink with double drainboard, two compartment type, one compartment 24" deep, 48" long, and 33" from front edge to back. Second compartment is 36" long, 33" wide, and 16" deep inside. Smaller sink is located on left-hand side. Drainboards are 36" long and 33" wide with top edge 1½" diameter rolled at 180°. Table is mounted on four 1 5/8" diameter stainless steel tubular legs. |



1 each

Steam jacketed kettle w/ power mixer, 80 gallon capacity, trunion type, 2/3 jacketed entirely constructed from Type 304, 18-8 stainless steel. The jacket designed for both steam heating and water cooling. Kettle top fitted with pouring lip to be "V" shape design, with 2" close coupled sanitary kettle drain valve Model #FD20 as manufactured by Groen Mfg. Co., Elk Grove Village, Illinois. Etched on the inside of the kettle - graduation marks from 10 to 70 gallon at 10 gallon increments. Kettle suspended on extra heavy stainless steel trunion arms supported in aluminum alloy bearings with internal bronze bushings. Gear drive mechanism is machine cut and fully self-locking type fully concealed in a polished aluminum housing. The gear drive allows the kettle to be tilted not less than 180°. Vessel is mounted on all stainless steel tubular stand complete with flanged feet. Stand is of such a height to allow kettle to empty into a 14" high container when in the down position (approximately 110°). Power mixer, agitator hinge mechanism is provided with enclosed spring assist so designed that agitator can be hinged in and out with ease by one person. Model #DTA/3 manufactured by Groen Mfg. Co., Elk Grove, Illinois.

1 each

Bench Mixer, 20 quart Model #AS200-DT mixer as manufactured by Hobart Mfg. Co., Troy, Ohio.

1 each

Vertical Mixer w/ Power Lift, 140 quart mixer as manufactured by Hobart Mfg. Co., Troy, Ohio.

1 each

Steam Jacketed Kettle, 40 gallon capacity, trunion type. Model #D2 as manufactured by Groen Mfg. Co., Elk Grove Village, Illinois.

1 each

Pot and Kettle Filler, Model #B610 as manufactured by T & S Brass and Bronze Works, Inc., 128 Magnolia Avenue, Westberry, Long Island, New York.

1 each

Steam Boiler with accessories, Model #WTHP-7A-1000-150 as manufactured by Cleaver Brooks.



|                 |                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 each          | Electric Bowl Hoist, Model #C305-3, "Budgit" type as manufactured by Manning, Maxwell, and Moore Co., Muskegon, Michigan. Hoist is lug suspension, coil load chain, 16 feet per minute lifting speed with $\frac{1}{2}$ horsepower. Model #905431 chain container, chain sling and dumping chain to be used for 120 quart and 80 quart Hobart mixing bowl. |
| 1 each          | Fry-Saver, capacity 120 lbs. (16 $\frac{1}{2}$ gal.) Model 5100 as manufactured by Blickman.                                                                                                                                                                                                                                                               |
| 1 each          | Scale, "Micro-weigh", Type H, Model 1259-01, 3 revolution 24 lbs. x $\frac{1}{2}$ oz. dial chart. Scale to be tapered for s/s scoop. Scoop should have capacity to hold 24# flour, stainless steel platform, dust and moisture scale in column, as manufactured by Howe Richardson.                                                                        |
| 6 each          | Elevated Trucks, Model 3622 as manufactured by Rubbermaid.                                                                                                                                                                                                                                                                                                 |
| 6 each          | Heavy duty trucks, Model 3685 as manufactured by Rubbermaid.                                                                                                                                                                                                                                                                                               |
| 134 each (Sets) | Layer Cake Pans, Cat. #681 as manufactured by Ekco (Strapped in sets of three).                                                                                                                                                                                                                                                                            |
| 2 each          | Portable tables w/wooden tops and s/s tube under shelf, Food Equipment Corporation.                                                                                                                                                                                                                                                                        |
| 24 each         | Cookie sheets, #800-18 as manufactured by Crescent Metal.                                                                                                                                                                                                                                                                                                  |
| 6 each          | Utility racks, Cat. #OUR-1824-2-S as manufactured by Precision Metal.                                                                                                                                                                                                                                                                                      |
| 1 each          | Desk, Standing type, Model 2250 as manufactured by Lyon Metal Products.                                                                                                                                                                                                                                                                                    |
| 1 each          | Set, oil Stone Knife sharpening heavy cast iron base container with 4 rubber suction feet, Model 1K6000. Size 11" long, 4" high. Have 2 stones (1 course and 1 fine) Size 7" long, 2" wide, 1" thick. Has automatic locking device to snap stone in place as listed by Edward Don.                                                                         |



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| 1 each   | Curling chain, 16" x 17" for H.K. Vanity Bread Molder.                                                                                                                                                                                                                                                                                                                                                                                      |
| 17 doz.  | Cake pans, Model #5212 as manufactured by Wearever Aluminum.                                                                                                                                                                                                                                                                                                                                                                                |
| 3 each   | Measuring Cup, #3150 as manufactured by Wearever Aluminum.                                                                                                                                                                                                                                                                                                                                                                                  |
| 1 each   | Measuring Scoop, #4752, 2 quart capacity as manufactured by Wearever Aluminum.                                                                                                                                                                                                                                                                                                                                                              |
| 1 each   | Scoop, #5320, 20 oz. and #5330 scoop, 30 oz. as manufactured by Wearever Aluminum.                                                                                                                                                                                                                                                                                                                                                          |
| 1 each   | Mixing Bowl, #7980, 80 quart with stand stainless steel as manufactured by Vollrath.                                                                                                                                                                                                                                                                                                                                                        |
| 6 each   | Utility Pans, #4540 as manufactured by Wearever Aluminum.                                                                                                                                                                                                                                                                                                                                                                                   |
| 4 doz.   | Seamless perforated roll pans, EKCO #7404, 18" x 26" perforated tin 3/32 square holes per lineal inch, as manufactured by EKCO-GLACO Co. Pans to be Bake-Prep and glazed.                                                                                                                                                                                                                                                                   |
| 1 each   | Multi-Flavor Doughnut Filler as manufactured by Homegenette Division of RPI, Porefe Avenue, North Arlington, New Jersey. Consists of: <ul style="list-style-type: none"> <li>a. Insta-charge filler unit, cap. 20 lbs.</li> <li>b. Power Base, deluxe with pressure control.</li> <li>c. Sani-Seal lids (to fit (a) above).</li> <li>d. Filler Cart, Model A.</li> <li>e. Spouts regular (set).</li> <li>f. Spouts Eclair (set).</li> </ul> |
| 400 each | Loaf Pans, as manufactured by EKCO Products Company, strapped in sets of four. Pan size topped in 8" x 4", bottom 7½" x 3½" x 2½" deep on slant. Overall size of set is 8½" x 19 7/8". Pans are strapped in sets of four. Pans are Kolor pre-glazed prior to delivery.                                                                                                                                                                      |



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| 4 each   | Mobile Hot-Cold Food Conveyor, Model RS-200 as manufactured by Precision Metal Products, Inc. Unit is furnished with perimeter bumpers and locking brakes on two of the four wheels.                                                                                                                |
| 30 each  | Upright, erector shelf, chrome 18" wide x 63½" long as manufactured by Metropolitan Wire Goods, Cat. #1862.                                                                                                                                                                                         |
| 60 each  | Shelves for erector shelf uprights, width 18", length 60", Cat. #1860 as manufactured by Metropolitan Wire Goods.                                                                                                                                                                                   |
| 10 each  | Utility cabinets, #UC1836, aluminum, height 63½", width 22", depth 27 7/8" caster size 5". Capacity 18" x 26" pans 1½" spacing 36. Precision Metal Products.                                                                                                                                        |
| 2 each   | Racks, aluminum, overall size, length 72", width 32", height 71". Shelves 10, style DS-328, width 28", length 66" shelves spacing 5 3/4", casters texite or rubber. Shelves are fabricated from 1/8 aluminum wire clinched on 1" center USP, Model R1230 A as manufactured by Union Steel Products. |
| 3 each   | Utility trucks with handles, #5465 as manufactured by Wearever Aluminum.                                                                                                                                                                                                                            |
| 3 each   | Sets of Panels (2 sides and 1 end) #5467 for item #5465 as manufactured by Wearever Aluminum.                                                                                                                                                                                                       |
| 3 doz.   | Multi-purpose Camboxes, code #1826-CB, size 18" x 26" x 6" as manufactured by Cambro, Inc., Huntingbeach, California.                                                                                                                                                                               |
| 1 doz.   | Shelve, Multi-purpose Camboxes, code #1826-CB-S, size 18" x 26" as manufactured by Cambro, Inc., Huntingbeach, California.                                                                                                                                                                          |
| 1 doz.   | Cover, Multi-purpose Camboxes, code #1826-CB-C, size 18" x 26" as manufactured by Cambro, Inc., Huntingbeach, California.                                                                                                                                                                           |
| 400 each | Sheet pans, Cat. #K2581 as manufactured by Meilink Steel Safe Company.                                                                                                                                                                                                                              |



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| 56 sets  | Loaf Pans, Cat. #406, strapped in set of four as manufactured by EKCO.                                              |
| 500 each | Muffin tins, Cat. #042 as manufactured by EKCO.                                                                     |
| 5 each   | Platform trucks, #1826 as manufactured by Wearever.                                                                 |
| 16 each  | Tote Boxes with handles, Cat. #4502, s/s as manufactured by Wearever.                                               |
| 1 each   | Dolly, Cat. #4498 as manufactured by Wear-ever for the above.                                                       |
| 100 doz. | Pans, Tin Tart, #1103 as manufactured by James M. Decker Co., Inc.                                                  |
| 1 each   | Sieve, #5272 2/0, aluminum 14 mesh as manufactured by Wearever.                                                     |
| 1 each   | Sieve, #5272 aluminum 20 mesh as manufactured by Wearever.                                                          |
| 1 each   | Bowl, legion S-15349, mixing stainless steel, 15 guage, rolled edge, 30" dia., 24 gal. as manufactured by Wearever. |
| 12 each  | Scoop, hand, cast aluminum, heavy duty, #3, 5# capacity, sugar, as manufactured by Wearever.                        |
| 2 each   | Rolling Pin, wood 15" L. x 3½" D. as manufactured by Wearever.                                                      |
| 1 each   | Mixing Bowl, #5253, 27 9/16" wide x 11 9/16" long as manufactured by Wearever.                                      |
| 1 each   | Can Opener, extra heavy duty (Model 1) "Edlund" Height 26" with handle raised, base size 8½" x 3½", weight 6 lbs.   |
| 2 each   | Pail, K7177, 13 quart capacity stainless steel bail handle, seamless construction as manufactured by Vollrath.      |



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| 6 each   | Brush, K5266, bench, white Russian bristles, vulcanized in rubber directly in hardwood handle, length of bristles 2 3/4", over length 9" x 1 3/4" as manufactured by Edward Don. |
| 4 each   | Brush, K5265, bakers, white Russian bristles, vulcanized in rubber directly in the hardwood handle, length with handle 10 1/2" as manufactured by Edward Don.                    |
| 2 each   | Bakers Peel, K4432, one piece poplar, overall length 33 1/2", width 8", 5/16" thick, w/6" handle as manufactured by Edward Don.                                                  |
| 2 each   | Paddles, Model S55, K7286, stainless steel construction, 55" overall length as manufactured by Edward Don.                                                                       |
| 1 each   | Electric Can Opener, Model 101, automatically punctures and opens cans as manufactured by Edlund.                                                                                |
| 12 pairs | Bakers Hot Pads, J724, asbestos, 6 1/2" x 8", Panhandler Inc. (1 doz. per box).                                                                                                  |
| 2 each   | Bread Knife, #6481 S, 9" as manufactured by Wearever.                                                                                                                            |
| 3 each   | Spatula, 10", #6490 S, as manufactured by Wearever.                                                                                                                              |
| 6 each   | Dough Cutter, #6214 SR, 6" x 3" as manufactured by Wearever.                                                                                                                     |
| 7 each   | Measure, #5261, 1 quart as manufactured by Wearever.                                                                                                                             |
| 7 each   | Measure, #5264, 4 quart as manufactured by Wearever.                                                                                                                             |
| 2 each   | Thermometer, Sugar, Dial 200°-400°, 2° Divisions.                                                                                                                                |
| 1 each   | Decorating Stand, Aluminum, 8" dia.                                                                                                                                              |
| 12 each  | Pastry Bag, canvas, 24" x 14".                                                                                                                                                   |



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| 3 sets  | Cake ornamentor, plain tubes, stainless or nickel steel, #1 to #9 (9 each per set).                                            |
| 12 each | Pastry bag, canvas, 12" x 8½".                                                                                                 |
| 2 sets  | Cake ornamentor, star tubes, stainless or nickel steel #0 to #9 (10 each per set).                                             |
| 3 sets  | Cake ornamentor, french tubes, stainless or nickel steel, #0 to #9 (10 each per set).                                          |
| 24 each | Cake ornamentor, rose tubes, stainless or nickel steel, assorted sizes.                                                        |
| 24 each | Cake ornamentor, leaf tubes, stainless or nickel steel, assorted sizes.                                                        |
| 4 each  | Whips, soft wire, 18" stainless steel, handle, sealed for sanitation.                                                          |
| 7 each  | Ingredient bins, Model 3626, 21½" wide x 23½" long x 29 3/8" high with sliding lid, color white as manufactured by Rubbermaid. |



## VITA

The author was born January 16, 1942, in Lenoir City, Tennessee. He was graduated from Farragut High School, Concord, Tennessee, in 1960. He was enrolled at Hiwassee Junior College from September 1961 to July 1963. In September 1963, he transferred to The University of Tennessee where he received his B. S. degree in Agriculture, with a major in Poultry, in June 1965. Since that time he has been working toward the Master of Science degree in Agriculture, with a major in Food Technology. While working toward the M. S. degree, he was employed part time with the Food Services Department of The University of Tennessee.

He was married to Miss Glenda Mason on December 27, 1964.