THE FEASIBILITY OF PRODUCING AND MARKETING A PRECOOKED, FROZEN, PACKAGED MEAL

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This is to certify that the

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THE FEASIBILITY OF PRODUCING AND MARKETING A PRECOOKED, FROZEN, PACKAGED MEAL

By

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CHAPTER I

INTRODUCTION

A. Statement of the Problem

Frozen food outgrew the novelty stage a long time ago. Today almost any food store, be it a large supermarket or a small corner grocery store, carries some frozen food for its customers. In the larger food chains the sales of frozen food amount to about 3 to 5 per cent of all sales, and the trend seems to be toward increasing the sales and production. The variety of frozen foods offered for sale is large and seems to be increasing. In the early stages, seafood was the large seller of the frozen food line; then vegetables, especially peas and string beans became popular. In fruits it was strawberries which made frozen food known and, even today, is one of the leaders in the field. But as frozen foods became more popular, new items were tried and sold. Whole new lines developed. An outstanding example is the frozen concentrate business. Frozen concentrated orange juice did not get on the market in any sizable quantity until 1948, but today this product accounts for a considerable portion of the frozen food sales. Another group made its entrance into the frozen food line a few years ago. Although

it has not as yet attained the prominence the juice concentrates hold, it is slowly but steadily growing and may turn out to be one of the important branches of the frozen food line. This group is usually placed with other hard to classify items in the statistical listings under "Specialties." A large part consists of prepared or partially prepared dishes. Some items, such as fruit pies, are made and frozen, and the housewife has only to bake them in the oven to get a finished product; other items are already cooked and need only to be heated to be ready to eat. So far, the growth of those specialties can be, in part, attributed to the additions of new items, but it seems that the continuous growth and increase of varieties is an exploration of the need of the consumer. If a new reservoir of consumer needs is tapped, an expansion of production in that field can readily be expected.

Today the housewife can, without too much trouble, get most of the ingredients for a well-balanced meal out of a frozen food display case in almost any large supermarket. But she still tries to prepare the meal by cooking the meat, or fish or fowl, probably baking the pie for dessert and making some hot rolls. If the housewife has to prepare dinner for only her husband and herself, she will find the shopping complicated by the fact that she usually

cannot buy packaged food in such small quantities. Most frozen food packages contain from four to six portions. A package of peas will, therefore, last for three meals. The frozen food must be divided before it is thawed out so that the rest of the package may be kept unspoiled. The left-over portions must be stored in a freezer and the process of dividing its frozen content must be repeated once more. If, at the next meal, peas are not used again, more frozen food must be purchased and part of it stored. This problem of storage may be a deterrent to the more extensive use of frozen food in small families. The comparatively large package of frozen food forces small households to carry a fairly large inventory (if the term "inventory" may be used in this connection) of frozen food to assure a fair amount of selection and avoid repetition in the dinner menu. A partial solution would be a smaller frozen food package. But the working housewife would still have to plan, select, and then, in most instances, cook the meal. For some food items this would be quite possible, but there are many which cannot be prepared economically in small quantities of one or two portions. A second and more logical solution would be to mass produce complete meals, freeze them, and package them individually. Those meals would not only eliminate

storage problems at home, since every package would contain enough for just one meal, but they would also offer some desirable services to the housewife. Many different menus could be presented to assure variety. There would be no need to cook the same dish or a very similar one because some food was left from the last meal and is still in the refrigerator. Coming home from work the housewife would not have to start planning a meal and shop for ingredients. An outstanding chef would have planned an interesting menu, the preparations would have been done under his watchful supervision. The housewife is assured of a well-planned and expertly prepared dinner. All that is left for her to do is to heat and serve the meal.

This paper will endeavor to show that such a meal can be produced. It will also investigate the various cost factors of such a product and develop some tentative sales prices. This study will also try to identify the potential market for this product, to see if the market is sufficiently large to warrant large-scale production of this product.

B. Purpose of This Investigation

The goal of this thesis is to find out if a precooked, frozen, packaged meal can be produced with the means and resources

available today. If such a meal can be produced, could it be sold at the retail level for a price which would make this meal available to a large section of the population? The author will also endeavor to show that this type of meal is a solution to the feeding problem of a particular section of the population. This section, often referred to by the name "white-collar worker," has, in many ways, some unique feeding problems, especially those people who are single or are young couples, both of them working.

C. Reason for This Study

The food distribution and the food service industries underwent considerable changes as they developed and adapted themselves to the changing needs of society. Both industries provided adequate service for a majority, but not for all people. Some smaller groups have to adapt themselves to those institutions and in some cases, this imposes difficulties. One group which has been somewhat overlooked is the white-collar worker, and especially the single one and the family of two, when both are working. The reason for it is quite simple. They did not form such a large group in our society before and did not present any problems much different from the rest of the population. But today this group is

becoming more prominent in numbers and their feeding problem is becoming more differentiated from the rest of the population. The white-collar worker has a job which usually requires not too much physical exertion. A man with a sedentary occupation will need about 2,500 calories a day to keep healthy, and a woman in a similar position, about 2,100 calories. Factory workers, performing considerably more strenuous work will need about 3,500 to 4,500 calories for their daily food intake. Since this packaged meal emphasizes small size and low cost, it would probably contain between 800 and 1,000 calories. This is sufficient for a white-collar worker, since the dinner usually furnishes between 35 and 45 per cent of the daily caloric requirement. This meal would be insufficient, however, for a factory worker. A packaged meal which would be satisfactory for him would have to be considerably larger and more expensive. From this point of view, it seems that a packaged meal for the white-collar worker would be more successful--at least in the beginning. The food distribution and the food service industries have not as yet adapted some of their operations to serve this segment of the population more successfully and more economically. In this group, not only the single person, working during the day, has a problem of preparing his supper after returning home. The

housewife, too, who is now in many cases also working, has the additional problem of planning, buying, and preparing supper for herself and her husband. This is quite a task, and today the alternatives are not too attractive. The working couple could go out every night and eat their supper in a restaurant. But at today's prices, this is not the most satisfactory solution. This requires the spending of a much larger portion of the income for food as would be required for other families of similar income. Another approach is being tried by many families. They tend to serve at home more of those dishes which require less time and effort to prepare. This may partly explain the prevalence of broiled and fried dishes. They are best suited because they take usually the least amount of time, but the meat cuts which can be used with this method are somewhat limited and usually expensive. Steaks and chops can be prepared rather quickly, and it is usually not too difficult to prepare them in a creditable manner. But the price again is such that they cannot be considered for every night's supper. The other group of meats which can be prepared rather quickly is not so expensive, but its popularity is not very great. Sausages, like frankfurters, are a possible answer, but not as a steady diet. Another possibility is chopped meat in its various

forms, such as hamburgers, meatloaf, and meat balls and their variations. This gives some variety to the cheaper dinner, but it really is not too interesting, and although it is faster than pot-roast, the preparation of meatloaf is still a great deal of work.

Another difficulty encountered in cooking at home for a small family is the purchasing of sufficiently small units of food, especially packaged and canned food. Unused portions of the original package must be stored in assorted dishes in an ever increasing refrigerator located in an ever decreasing kitchen. This study will point to the inadequacy of the supply of the proper food products in appropriate consumer packages and the difficulty of buying at reasonable cost the food to prepare a meal for just one or two persons. It will also explore the possibility of solving this problem by producing and retailing a low-cost precooked meal which can be preserved through freezing.

D. Methodology

The solution to the indicated problem will be a new type of meal, prepared, sold, and served in a way which would be considerably different from the customary methods employed in 1952. This imposes certain difficulties in the presentation of accurate

data. The description of the product can be done quite accurately, but the methods of production can only be proposed and the feasibility of the proposed methods can only be inferred from the successful operation of similar processes in other fields. The cost of the product can be established with a fair amount of accuracy by adopting the generally accepted methods of food cost accounting as used in the food service industry. With those procedures, a fairly accurate food cost picture will be developed. For the markup of the producer, wholesaler, and retailer, the customary markup for similar type products will be employed. In estimating the size of the potential market, United States Government statistics of the appropriate departments will be used, and their application or limitation as far as this project is concerned will be pointed out. Those statistics will also be used to find the amount of money a given group of people is spending for food, especially for their evening meal. Some indication of possible market acceptance was gained from interviews with leading men in the field, such as the vice president of a medium-sized food store chain, vice presidents of two large frozen food producing and distributing companies, buyers of food chain stores, and with some potential consumers.

E. Limitation of This Study

This is not a study of the trends of the food distribution industry or an analysis of the problems of the food service industry. Those two industries and their problems will be discussed only as far as they concern this study. The problems of size of packaged food are also only incidental to the problem of this thesis, and will only be discussed from that point of view. The thesis will limit itself to the shortcomings of the food distribution and food service industries as far as they concern the groups of white-collar workers mentioned before. This study will then examine the proposed solution, the precooked, frozen, packaged meal. Since the proposed meal is actually not in production, accurate data cannot be presented. But data will be presented from such processes or parts of operations which can be compared to those employed in the proposed solution. No attempt will be made to point out all of the technological problems involved in the production of precooked, frozen food.

CHAPTER II

THE CHANGING FOOD DISTRIBUTION AND FOOD SERVICE INDUSTRIES

Institutions grow with society and develop according to the need of its people. They are devised by the people after their needs become apparent and, through many changes, are adapted to the various needs of the community. This implies that the needs for the various institutions evoke responses and those responses are the institutions. Naturally, since there is a time lapse, and sometimes it is considerable, there are usually many problems which are not solved, and those which are solved present only partial solutions. As long as a group of people change and their needs and desires change, some adjustments must be made to adapt continuously the different institutions to their new surroundings. Providing food for the community is no exception. Since, for example, the American society changed considerably in the last few hundred years, the problems of feeding people changed and the institutions developed to accomplish these ends were created or modified accordingly.

As soon as any society passes the simple agricultural stage, which prevailed in the early times of the American colonies, some of its people move out of the production of food and devote their energy to other activities. This creates the problem of food distribution because now some people have to raise food not only for themselves, but also for those that perform other functions for the community. In the beginning, food distribution was quite a simple matter, since probably some of those services were paid in food. The ancestor of the supermarket of today was probably the early American trading post. Originally, trading posts acted as exchange and collecting points for natural resources, predominantly furs collected by the Indians. There the natives offered the skins to be traded for tools or trinkets. The expansion of the colonization towards the West, beginning in the eighteenth century, gave impetus to the enlargement of many trading posts into settlements. The storehouses of the post stocked not only the skins brought in by the Indians and the goods they received in exchange, but also some emergency rations, such as pemmican.[1] When those settlements

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[1] Vilhjalmur Stefansson. Military Rations, Pemmican. Activities Report. The Research and Development Associates, Food and Container Institute, Inc. Fourth Quarter, 1951. Chicago, Illinois. p. 249. ". . . the great fur traders, such as the Hudson's Bay Company, used to keep large stores of pemmican for years at a time against possible seasons of famine."

grew, the people in them needed many different items. In the beginning the need was mainly for tools, and therefore, the trading posts stocked them.

As the character of the community changed from an outpost to a settlement, the inventory in these storage warehouses began to change, too. It was not long before this storage place became a store: a general store. The original general stores can hardly be compared with a business establishment of today. They really were what the name implied: storehouses. There was not much point in displaying merchandise. The owner knew what each of his few customers could use and they knew what he had. When they needed an item, be it an ax or a few pounds of salt, they went to the store and got it. As the settlement developed and grew, its needs enlarged and the store enlarged with them.

On the eastern seaboard, in larger cities like Philadelphia, the population diversified considerably, and so it became impossible for the general store to satisfy the needs of all its customers. Again we see an adaptation of the institution to the need of the community with the appearance of the limited-line store. As early as 1789 reports on limited-line stores can be found in a city directory of Boston listing the following fields: bakery goods,

books and stationery, boots and shoes, china and glassware, drugs, dry goods, groceries, hardware, jewelry, lumber, millinery, ship chandlery, and tobacco [2]

In the Middle West and West, it was not until the middle of the nineteenth century that the general store began to lose ground to the limited-line store.

Approaching the second half of the nineteenth century, American ingenuity concentrated on increasing production. In this ever expanding economy, distribution was not considered the primary problem. It was production which challenged everyone's best efforts. But due to this overemphasis on production, at the expense of neglected distribution, an unhealthy growth of middlemen developed In some cases jobbers and wholesalers handled and rehandled goods many times more than was necessary. This created a considerable added cost to the public. Elimination of many of those unnecessary steps could lower the cost to the public. Thinking along those lines, George F. Gilman and George Huntington

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[2] Charles F. Phillips and Delbert J. Duncan. Marketing Principles and Methods. Richard D. Irving, Inc., Chicago, Illinois. 1949. p. 144.

opened a small tea store in 1859 on New York's Vesey Street. In their advertisement they stated:[3]

> We propose to do away with all these various profits and brokerages, cartages, storages, cooperages and waste, with exception of a small commission paid for purchasing to our correspondents in China and Japan, one cartage and a small profit to ourselves which, on our large sales, will amply pay us.

This idea proved extremely profitable and successful, and in six years the one small store expanded into a chain of twenty-five. This was the Great American Tea Company, the forerunner of the food store chain, the A & P. Company.

With the development of the transportation system, a new era of food distribution started. In 1869 the first transcontinental railroad was completed. Food could be shipped in large quantities at reasonable prices and at great speed. This made mass marketing feasible. But not until after the Civil War did the population of the United States increase to such an extent as to permit the establishment of mass distribution networks. Between the Civil War and World War I the population increase was tremendous. About thirty million people immigrated, and this, with the natural

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[3] John P. Nichols. The Chain Store Tells Its Story. Institute of Distribution, Inc., New York. 1940. p. 54.

population growth, created concentrated demands in many of the population centers. In addition, people learned to enjoy better food in greater varieties, thus enlarging even more the increased demand. Before World War I our distribution system seemed to have just about caught up with the increased production and demand. The war again put a premium on production so that after its completion the expanded productivity was too much for the now old institution of distribution. The depression of 1920-21 can, in some measure, be explained as a failure of distribution to keep pace with production. This depression indicated that, to lower prices, increased production alone is not sufficient. More efficient distribution, as in the middle of the nineteenth century, was also important. It was then that retail food chains demonstrated their superiority in distribution and between 1920 and 1929 their most spectacular growth took place. Some figures may indicate the increase:

TABLE I

EXPANSION OF CHAINS*

Company	Year	Stores	Sales (000)	Year	Stores	Sales (000)
A. & P.	1919	4,250	194,647	1929	15,418	1,053,693
Kroger	1917	516	23,342	1929	5,575	286,611
Safeway	1922	191	12,468	1929	2,340	213,496

* Charles F. Phillips. Op. cit., p. 214.

In 1919 the chains were doing about 4 per cent of the total retail business and by 1929, they were accounting for 22 per cent. Of the total chain business in 1929, 28 per cent was done by the grocery, and grocery and meat chains.[4]

The depression of 1929 again changed the picture of food distribution drastically. A new need arose. The public needed food at the lowest possible cost. Again the institution of food distribution changed to the need. It was the supermarket, with services stripped down to the barest essentials, with a low markup and high volume, which answered this need. Independents and chains alike discovered that the small service store was in many

[4] Charles F. Phillips. Ibid.

cases too inefficient and costly. It was small wonder that retailers who could, switched to the larger supermarkets to fulfill the demand of the customers for lower prices and less personal service.

From this quick glance back at the growth of the food distribution industry, it can be noticed that changing conditions demanded new approaches and new solutions. The industry was trying to satisfy, sometimes fast, sometimes slowly, the changing needs of its customers by modifying its own methods and operations. If a group of customers was sufficiently large and its needs were made known, then the industry tried to solve the posed problem.

Today, food markets cater to the need of the majority of the people. The supermarkets like to see, and on Friday and Saturday usually do see, customers come in and spend from $10.00 to $30.00 for their weekly family needs. This type of shopping does fit the need of the average family, and therefore, the majority of shoppers. But a sizable part of our population cannot fit itself successfully into this pattern. The small families of two adults and single persons living alone, who have somewhat limited means, find it difficult to shop for food economically this way. Those

people, too, like variety in food, but usually are limited by the fact that today it is inconvenient to buy food in small quantities. A roast for a family of five is not difficult to find, but it is hard to conceive a roast small enough to serve just two people or one person alone. If the family of two buys a larger roast it has to eat it not only when it is originally roasted, but also at least once more as a leftover, which means paying for a fresh roast and getting only reheated leftovers. The same holds true for many other food items. The turnover of food, if this term can be applied to this situation, in a small household is too slow to permit economic utilization of most foods to the same degree as in a large household. Part of the purchase units have to be stored for long periods of time, or the same item must be placed on the menu several times in succession. This problem has caused the housewife of the small family to purchase, wherever possible, the smallest available package. In some commodities this trend is hard to document, but in canned goods there are some reliable statistics available. The National Canners Association published, in 1951, some figures on canned fruits and vegetables which indicate a considerable increase in the use of smaller cans since they

came out after World War II.[5] Small families do not want to buy a number two can of green beans, which has about five to six portions, and after using two, keep the rest in a dish in an already crowded refrigerator. On the other hand, an eight-ounce can contains about two good-sized portions which are ample for the small family. Small wonder that the popularity of this can increased by leaps and bounds as soon as it was placed on the market. A similar can size is the number one (picnic), a little larger than the eight-ounce can and holding about three smaller portions. This size, too, showed great consumer acceptance as soon as it was placed on the market. The figures for green beans packed in cans are fairly similar to the trends in other fruits and vegetables.

TABLE II

ACTUAL CASES OF GREEN BEANS PER YEAR*

	1947	1948	1949	1950
Eight-ounce	------	345,858	539,348	920,360
No. 1 (picnic)	74,977	390,705	484,786	593,900

* National Canners Association. Ibid. p. 7.

[5] National Canners Association. Canned Food Pack Statistics: 1950. Part I - Vegetables and Part II - Fruits. Washington, D. C. June, 1951.

A similar trend took place in frozen food. According to an interview with a sales executive of the frozen food section of Libby McNeill and Libby, of Chicago 9, Illinois, the retail package shrank from an original sixteen to twelve ounces for almost all retail lines by 1950. That year the package was cut to ten ounces for some lines and in 1952 the firm is experimenting with an eight-ounce package for some items. It is interesting to note that in England, Birdseye frozen foods started off just as in the United States, with a sixteen-ounce package, and then changed to a twelve-ounce one. But in recent years, five- and six-ounce packages were placed on the market containing two good-sized portions. The success with them is great, since no leftovers have to be stored. This is an especially critical problem, since England does not have as many refrigerators as we have, and even less freezers.

The definite acceptance of smaller units of food, where they are available, indicates that a segment of the public, and apparently not a small one at that, prefers smaller units of purchase. It may further be interpreted that many people would buy other items, too, in smaller units if they were available. It could be that there is a bigger market in small unit packaged food items than the industry

realizes. But it also could be argued that each manifestation should be interpreted as an isolated case, each having its own unrelated cause, but this seems a somewhat less likely explanation.

Another significant trend in today's food industry is to offer an increasing amount of services with the food. Today's supermarket offers many and varied services, some quite obvious and others hidden. Generally speaking, they could be grouped into three types. One type of service makes the product available at a place more easily reached. In this group falls the concept of trading, of supermarkets, many departments under one roof, of bringing to the customer items which normally would be unobtainable at such prices, or maybe at any price, or would be too inconvenient to get. For example, in smaller towns a wide selection of delicatessen was often hard to obtain because there were not many well-stocked delicatessen stores. Now many a supermarket has a fairly complete line of delicatessen and people can more readily get access to them. Another type of service is demonstrated by a jar of preserves. The service is within the product. There is no need to make preserves during the harvesting season and keep them all year. A jar can be purchased whenever needed and no preparation, cooking, investment, and storage

is needed. The third type of service is directly connected with the sales transaction or the store and not the product. In this class we can place credit, delivery, carry-out boys, and others. The last trend seems to fluctuate with the prosperity of the economy. If people have money they like some of those extra services and conveniences and do not mind paying for them. The first type of service, namely, making items available, is inherent in the food distribution industry, since it is its business to make food available to the largest possible number of people at the lowest possible price. But the second type of service, the one which is built into the product, seems to contain a trend of increasing significance. In recent years more and more products were placed on the market which have eliminated a certain amount of work at preparation time. This has made it possible for the housewife to prepare meals with less effort and to spend less time in the kitchen.[6] Here again, we see that a manifested need is met, even if slowly by the food distribution industry. But we also see that larger families can use those services more advantageously

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[6] This Week Magazine. 1951. "Progress Report on Grocery Store Marketing." p. 55. ". . . it is estimated that today she (the housewife) spends about one hour, thirty minutes in the kitchen as against two hours, twenty minutes only four years ago."

than smaller ones. Since it takes practically the same amount of time to cook a given menu for four people as it takes to prepare it for two, the time is spent more efficiently cooking for a larger family. Therefore, the small family will appreciate even more the time- and labor-saving services offered by the industry.

The small families are the ones that are today in need of more time- and labor-saving in food preparation. When the husband and the wife, too, are working--and today this is not so uncommon--preparing a meal after a day's work is not much fun for the wife.[7] Another alternative for those people and the many single ones, that maintain a separate household, is to eat outside. This seems to be a reasonable solution at first sight. Today in many cases this seems to be, despite its great cost, a comparatively economical one.[8]

Today the great mass of the people have at least one meal away from home--the lunch. Since breakfast in many cases is

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[7] According to Statistical Abstract of the United States, 1951, pages 172-73, women in labor force as a percentage of all women fourteen years and over increased from 1900 at 20.4 per cent, 1910 at 25.2 per cent, 1920 at 23.3 per cent, 1930 at 24.3 per cent, 1940 at 25.4 per cent to 1950 at 33.1 per cent. The statistics indicate not only a shift away from early age employment, but also a definite increase of women at the ages of twenty to thirty-four.

[8] See Section C in Introduction.

only a very short meal, requiring not too much preparation in the kitchen, the only meal that requires any amount of planning, shopping, and preparation is the evening meal. Here again we can see that the modern trend of smaller family units and eating lunch at or near the place of work instead of home has sharpened the problem of preparation. When the housewife formerly cooked for a large family the noon, as well as the evening, meal some over-all savings in time and effort were accomplished per meal cooked. Dishes which had to be prepared for lunch could cook next to some that had to be made ready for supper. Not much more time had to be spent to cook two meals each for five people as may have to be spent now for preparing just supper for two people. The work per meal served actually may have increased in many instances. To escape this problem some people also try to eat their evening meal in restaurants. But two people eating every supper in a restaurant can run into some considerable expense.

Unfortunately, the food service industry is not sufficiently prepared to meet the need of this increased market. The increased cost of operation has caused the prices of prepared food to go up to such an extent that many restaurants are pricing

themselves out of the mass market. The companion piece of the self-service store in the food distribution industry is the cafeteria in the food service industry. There, too, the customer performs his own selection and pays as he checks out. But here the similarity ends. The self-service food market was able to bring down the food cost through increasing productivity of the worker, and so make it possible for the public to get more food for its money spent in the store. The cafeteria, too, lowered the labor cost by eliminating the services of the waiter, but the labor cost did not decrease too much, since the cost of the waiters is not too great and since now in his place serving line employees had to be used. Also, since waiters made a large part of their wages in tips, the restaurant did not have to pay them too much. On the other hand, cafeteria line servers did not receive tips, therefore their salary was considerably larger. Also, after World War II, the trend was to increase constantly the wages in this industry as in any other one, but here the results were considerably different. Before World War II the typical breakdown of the sales dollar in a restaurant was as follows: 40 per cent of the sales dollar went for the purchase of the raw food and 20 per cent was reserved for labor cost. A typical net profit was approximately 5

per cent. But in 1951 the typical figures are more like this: 35 per cent for food and 35 per cent for labor, and not too many places showed any substantial profit. This indicates that labor cost went up, but unfortunately, wages did not go up as much as in other industries so that the food preparation industry was unable to attract really well-qualified people. Actually, it lost quite a few, probably some of the better qualified ones, to higher paying industries. This means that those that stayed were not only more expensive, but less efficient. This explains partially the very high labor cost. But there is one other inherent difficulty in the food preparation industry, making it almost impossible to substantially lower the cost of meals served and so make it possible, too, for low income people to use the advantages of eating out.

This built-in inefficiency is the practice of producing the product to be sold practically in the sales room in a way which could be compared to custom tailoring. Many dishes have to be prepared to order, each one individually, almost all other ones have to be at least assembled a dish at a time from small quantities. Cooking itself, even in the largest institutions, cannot be compared to any other industrial operation performed with

scientific controls, precision, and assembly line methods and labor-saving devices. Besides, even in large cafeterias and institutions which could install some more advanced material handling methods and machines, there is still this one limitation: All like groups of food have to be started for preparation approximately at the same time to have them finished at the same time, and all components of a meal have to be ready at about the same time. This creates a maximum of work at preparation time and a high peak of activity at serving time, but during the rest of the work period the cook has usually to display a considerable amount of ingenuity to keep himself occupied.

This points out the difficulties of the food service industry. Under the present arrangement, it is very unlikely to be able to utilize the work potential of the labor force. According to some estimates, cooks in large kitchens spend only 40 to 60 per cent of their time working on food preparation. If a restaurant pays its cook $2.00 an hour for a forty-hour week, it is actually paying him $4.00 an hour for only twenty hours' work. But $4.00 an hour is over-paying him considerably, and actually it is no fault of the cook that the restaurant cannot provide him with eight hours of continuous work per day. This problem was

present before, but the wage level was generally lower and fewer people ate in restaurants, so the prices were not much higher; and those people that ate in them could better afford the prices. A proposed solution would be to divorce food preparation--or the kitchen--from food service--or the dining room This would make it possible to run the kitchen on a schedule geared to its own need and arranged so as to get maximum efficiency and labor economy. The dining room could be operated as a salesroom for meals, geared to those meals and not dependent upon the problems of the adjacent kitchen. This arrangement would make it possible to serve low-cost meals.

The problem of serving inexpensive meals in restaurants was approached to point out an alternative for small families to preparing meals at home. Both alternatives seem to have considerable drawbacks, indicating that actually today's food industries, the food distribution, and the food preparation industries alike, have really not solved the problem of feeding this segment of the urban population in an economical and at the same time labor-saving way.

A proposed solution to the problem of making available to the employed housewife a meal, which would be comparatively

inexpensive and also eliminate a large part of the work in planning, shopping, and preparing of it, would include the best features of both the food distribution and the food service industries. The ultimate in labor-saving could be reached if the working housewife were able to obtain an already prepared meal. The ideal, from the point of view of cost, would be to have her pay less for this meal than it would cost her to buy the food and prepare it. This could be done if meals were mass produced in assembly-line fashion in such large quantities that the producer could take advantage of quantity buying in season, of installing labor-saving devices, and of better utilization of labor in the preparation of those meals. The meals could then be preserved by freezing and packaging. This would utilize the best possibilities of the food service industry to bring a well-planned, tasty, and economical meal to the small, working family. The food distribution industry could then use the facilities of its efficient and economical distribution network to make this low-cost meal available to the neglected section of the population--the family of two where husband and wife are both working.

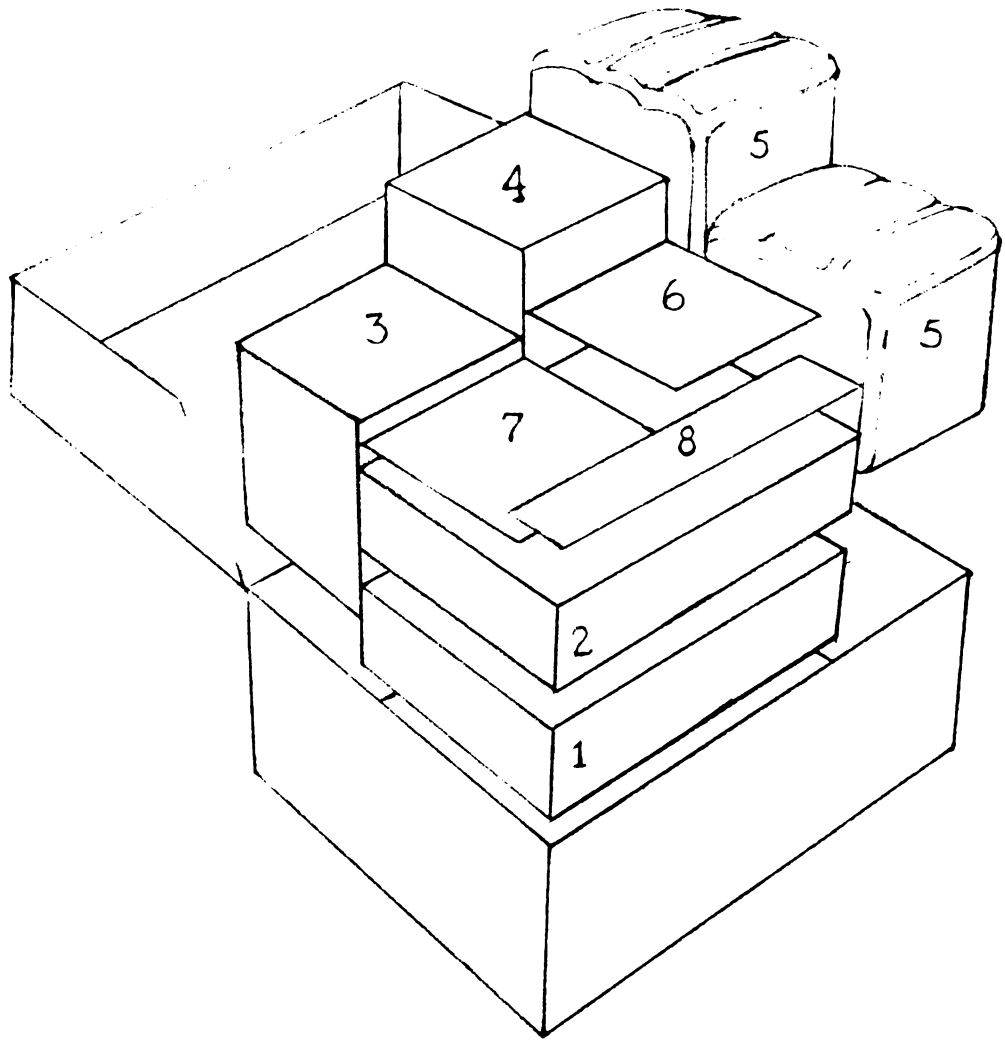
CHAPTER III

DESCRIPTION OF THE PRODUCT

A. Physical Properties

The precooked, frozen, packaged meal is assembled in a cardboard box which is 6 inches wide, 5 inches deep, and 2 inches high. This dimension is only 50 per cent larger than the standard 12-ounce frozen food package which measures 4 inches by 5 inches and is also 2 inches high. This means that the package will fit almost all display and freezer arrangements the standard frozen food package will fit. The package is the container for the components of the meal. To make sure that the package can be handled easily and without damage to the contents, it is important that the contents of the whole package are solid food without any air space. This has also the advantage of making the package as small as possible, permitting full utilization of the limited freezer display and storage space available. Since the package can be made solid, it permits stocking without fear of crushing, except under extreme conditions. The arrangements of the components within the package

depend upon those considerations and the normal shape of the food included. The following proposed arrangement will fit many foods, but should not be taken as the only possible one. The sub-assembly containing the main dish, for example swiss steak, will have the dimensions 4 by 3 inches, and will be 1 inch high. The swiss steak will fill the container completely. Exactly on top of this little box will be another one of identical dimensions. In it will go the dessert. It could be chocolate cake or a fruit cobbler or maybe a piece of ice cream. After cutting the overwrap along the lower edge, the top of the box hinges open, up and away from the observer if the packaged meal is held so that the inscription on the top can be read. In the lower left hand corner the meat package is placed so that its longer side is along the larger side of the container. The dessert package as mentioned before is exactly on top of it. Between these two packages and the rear of the container is just enough room for two 2-inch cubes. They contain two vegetables. One could be green peas and the other, home fried potatoes. The room left on the right side of the box is filled by two rolls of the "brown and serve" variety. On top of the dessert is a small package of granulated sugar and an envelope of powdered coffee. Lying next to it is a package



1. Meat
2. Dessert
3. Potatoes
4. Vegetable
5. Roll
6. Sugar
7. Coffee
8. Salt and Pepper

EXPLODED VIEW OF THE PACKAGED MEAL, SHOWING THE ARRANGEMENT OF THE COMPONENTS

containing salt and pepper. It consists of a strip about 1/2 inch wide and 2 inches long containing small pockets with salt and pepper. The package could contain a napkin to lend it a touch of completeness.

The package as described above presents only a few unique packaging problems. The large container and its overwrap are in no way different from the outside container of any other frozen food product, except that it may not have to be lined with cellophane. But the packaging of the components is somewhat different. The rolls can be wrapped in cellophane, but experiments must be conducted to see if those frozen rolls are sufficiently rigid or if they must be separated from the rest of the package by cardboard dividers. The soluble coffee and the sugar do not present any unusual problem. The coffee can be packed in foil and the sugar in cellophane. The salt and pepper will have to be packaged in cellophane or possibly foil. The two vegetables will have to be packaged in cellophane. There the important thing to notice is that the vegetables fill out the form of the cube completely without any air space and that the seal is carefully made. Most vegetables, except potatoes, will be uncooked, because it takes usually about as much time to cook them as it

takes to heat the main dish. The dessert can be packed in cellophane or in moistureproof waxpaper depending upon what the dessert may be. The main dish may have to be packed in foil if it happens to be chicken a la king or it could be cellophane or a film-lined cardboard box.

The outside of the package can be decorated with a picture with the appropriate heading and description. The picture, in color, can show the contents of the package as it would look served on a table. In the front would be a plate with the main dish and the potatoes and vegetables. To the left a plate showing the two hot rolls. At the right behind the main dish would be seen a cup of coffee and between it and the rolls, a plate with the dessert. Although it is important that the picture is as life-like as possible, a colored drawing is probably still better than a color photograph, since it makes it possible to emphasize or de-emphasize certain aspects of the picture. The picture would occupy the left two-thirds of the package. The 2-inch-wide strip on the right side of the box cover could be used for the trademark, heading, and description. The top right corner, about 1 inch high, would be reserved for the trademark. Below it would appear an accurate listing of the contents, like

a menu. This would be followed by a listing of the nutritional components of the meal. It might state that this meal has a given number of calories. It could list the vitamins and their amounts present in the meal and how much protein, fat, and carbohydrates the meal contains. On the front edge, detailed instructions on how to prepare this meal could be printed. These instructions are not only in words, but also in pictures to assure that the housewife is using the meal properly and to help her get maximum satisfaction from the package. It may be a good idea to print on the bottom of the package suggestions on table setting, decorations, and other hints to the housewife on how to make the dinner table appear more graceful.

B. The Food in the Package

The ideal packaged meal would be the one that could contain anything which can usually be served at the dinner table. Today's technological advances make it possible to preserve successfully many cooked dishes for variable lengths of time. Canned goods were the first large-scale practical solution along those lines. The next large-scale solution, and today a quite popular one, is freezing. Many new foods can be successfully frozen and

so preserved over long periods of time. Although cooked foods usually do not stand up as long under freezing as raw ones, a great variety of them can now be preserved by freezing. A step in the future would be the preservation of food, raw or cooked, by gamma radiation, using the radioactive waste materials of the atomic piles as sources of radiation. This technique is still in the future and the most practical method available today to give a high-quality product is freezing.

The main dish of the meal is the protein dish. It can consist of meat, fowl, or fish. Some of the varieties of meat lend themselves more readily to preservation by freezing than others. From the point of flavor retention, beef is more desirable than pork. Apparently the reason seems to be that the pork fat is less stable than the beef fat, and since some of the meat flavoring substances are fat soluble, the flavor is impaired by the instability of the fat. For the same reason turkey seems to be somewhat less stable than chicken meat under freezing. In seafood there seems to be a similar grouping of more and less flavor stable meats, but there the reason is less clear. Salt-water fish retain their flavor considerably longer than freshwater fish. In the cooked stage the difference seems to be less pronounced.

The reason may be that some of the flavor is lost in the cooking, and other flavors, of spices and condiments perhaps, are added.

In freezing cooked food, great care must be taken to obtain, upon thawing out, the desired flavor. Holding food at freezing temperature has peculiar effects upon the flavoring agents present. Some, like onions, become stronger; others fade out. And there are some that become stronger or weaker, depending upon the time and temperature of storage. Unfortunately, as of now, not too much is known about the behavior of spices and other flavoring agents under freezing temperature.[1] But fortunately, this is not as great a drawback as it may seem at first glance. Since this meal should appeal to as many people as possible, it is important that the foods have as little seasoning as possible. It may be better to enclose some seasoning separately for those people that like to use it.[2] Vegetables present no new problem. Since the cooking time of most of them is so

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[1] According to an interview with Dr. Pauline C. Paul, Professor of Foods and Nutrition, Michigan State College, during February, 1952.

[2] According to an interview with Mr. John Hofsase, Head Grocery Buyer for Grand Union Company, East Paterson, New Jersey, during December, 1951.

short, it is best to include them in the meal raw. Potatoes are somewhat different. They will have to be partially cooked to be ready upon reheating. Not all types of potatoes seem to be equally well adapted to freezing. Those that are fried or baked and so acquire a somewhat stronger outside cover seem to hold up better under freezing. In this group belong french fried, home fried, and duchess potatoes, potato puffs, and potato pancakes. Those are not the only types of potatoes, but are just an example. Sweet potatoes, especially candied ones, hold up very well under freezing. There seems to be a large variety of vegetables and potatoes available to please almost every taste and desire.

Desserts are probably the simpler part of the packaged meal. Today almost any baked good can be frozen successfully. So in baked goods alone, there is already a vast selection. Many cakes and pastries come under this classification, and the possibilities for variations are really great. In addition, many fruit pies and fruit cobblers can be used. Ice cream is another possible dessert and has the advantage of being comparatively inexpensive. The ice cream could be packed with some fresh fruit to be served as a sundae. The rolls in the package present no new problem. The "brown and serve" variety is on the market

already. The reason for including them in the package is to make the meal complete and save the customer the trouble of having to buy a dozen rolls if only two are needed. If the rolls could be purchased in smaller units, it would not be necessary to include them in the package and the meal pack would be reduced to the size of a regular twelve-ounce frozen vegetable package. The soluble coffee envelope is the same the army used to include in the K-rations during World War II and the envelope of sugar is standard with sugar manufacturers. The sugar may have to be packed in a waxed paper, but otherwise there is no difference. The small envelope of salt and pepper is the same one the airlines are using, and really does not pose any new problem.

Almost everyone can cook a steak, but the great economic advantage of this packaged meal lies in the fact that inexpensive cuts of meat can be used, and through careful planning and proper cooking, offer a meal which would normally cost considerably more. Steaks are expensive because a beef carcass has only a limited amount of steak, but has a lot of other meat, too. After the steaks and ribroast are used, there is still about three-quarters of the carcass left. To prepare this

meat requires more skill and considerably more time. This is one of the main reasons why a lot of people do not buy some of those cuts. It takes too long to cook them and many do not know how to cook those cuts to make an inviting dish out of them. To counteract this tendency and help sell all this meat, butchers put more and more of those cuts into chopped meat. Hamburgers are popular for at least two reasons. They are easy to make, and it takes little time to prepare them. Also they are, or used to be, inexpensive. Since some of the more expensive cuts now also go into hamburger, the price of this once cheap meat is now correspondingly higher. Since packaged meals can be prepared in a large establishment, it would be economically possible to employ a well-known chef, who could develop the different recipes for the complete utilization of cheaper cuts of meat. Therefore, when the housewife buys a packaged dinner, she not only buys food, but also the careful planning of meals, the advantages of wholesale buying, of expert butchering and excellent cooking. She also saves the long preparation time which usually goes with the serving of less tender cuts of meat. Last, but not least, she only has to buy one or two portions, as the case may be. This is of great importance, because many of those cuts of

meat cannot be economically handled in such small quantities. This meal would make it possible to utilize more fully the less tender cuts of meat. Today the working wife could use those lower-priced cuts of meat, but she does not have the time to prepare them properly, and often she does not know how to make a really appetizing dish out of a less tender cut of meat. But a good chef knows how, and he has the time and facilities to do it. To make this possible, buying has to be on a large scale production also. The working housewife would then buy in her packaged meal not only the food, but also all those services like preparation know-how, cooking time, and mass buying to give her a product she could not duplicate at the sale price. Naturally, this type of meal would be quite convenient, but this is not the main selling point. This meal provides services which are needed and today cannot be obtained.

CHAPTER IV

THE PRODUCTION OF THE PRODUCT

To produce a precooked meal, a sizable organization would probably be required. The magnitude could perhaps be visualized if the problems involving production were examined individually. As in many a group, charged with the performance of a task, the central person is responsible for the planning, supervision, and production. In this case the person would need to be an outstanding chef. He would not only have to be an executive chef in the tradition of the grande cuisine, but, even more important, he would have to be able to organize and supervise large-scale operations. In addition, he would have to display ingenuity in devising new recipes and new procedures for old recipes. This seems to be an impressive list of qualifications usually not associated with a chef, at least in the general public's mind. But today there are some chefs de cuisine who do have such qualifications. They are usually found in the larger hotels. There, good cooking is a tradition which must be upheld. But most of the larger hotels are now quite anxious to have very carefully worked out food cost

and labor cost budgets and controls. Cost consciousness is now being impressed upon many chefs, and some of the better ones are well versed in this aspect of the operation.

Chefs, having such talents and capabilities are normally not too plentiful. They usually command a considerable salary and are not prone to switch jobs. They do exist, however, in fair number.

In a plant producing a precooked frozen meal, the chef would be in charge of the planning of the meals, but he would have to do it in consultation with the buyer of the raw food. It would be the buyer's duty to go into the market and purchase the type of food which would make it possible for the chef to get the most profitable dishes produced. The buyer would have some great advantages over stewards of cafeterias and larger institutional kitchens. He could buy in large quantities and he could buy food when it is in season and plentiful, of top quality and fairly inexpensive. Then the chef would have to develop those menus which would be the most advantageous ones. He would have to consider several factors. What does the public like and what will the public actually buy? At what price will the public buy these different meals and how can the plant

profitably produce those meals at the desired prices? To answer those questions successfully, the chef will have to find a proper balance between those variables, which he can influence readily. In short, the chef must know how to translate the preferences of his potential customers into appropriate menus. If a carload of beef carcasses arrives, it would be his job to figure out how to utilize the meat so as to make the most of it. How much of the carcass should go into roasts, what should be used as steaks, what should go into stew, goulash, pot roast, cube steaks, meatballs, hamburgers, and meatloaf must be decided by him. Would it be better to use the briskets of beef for pot roast or could they be placed in a pickling brine to be made into corned beef and later into New England boiled dinner? It is up to the chef to figure out how much it would cost to produce the pot roast and the corned beef dinner and to decide under the given circumstances which to prepare. The chef will have to develop new recipes or modify old ones to adapt the cooking to mass production methods. This is a rather important aspect since, for still unexplained reasons, recipes cannot be adapted to large-scale cooking by simply multiplying the quantities given in a recipe for a small number of portions. One of the important contributions, at least as far as

the consumer is concerned, would be the development of recipes for inexpensive cuts of meat. Stew can be, as it, unfortunately, so often is, a sticky gravy with some overcooked vegetables and some undercooked meat. But a good chef knows how to mass produce a beef stew which would compare favorably with many a fancy roast or average steak. This is an art and requires not only the development of good quantity recipes, but also extensive experience of actual preparation techniques. The cutting of the meat into small pieces can be a factor in making the stew tender or stringy. It should be cut against the grain. Some cooks cut the meat any way it just happens to come under the knife. Browning the meat cubes at the proper temperature and the right length of time is an important factor in the flavor of the dish. Without going into the discussion of the preparation of stew, it can be pointed out that there are many detailed operations which can be and often are overlooked to the detriment of the resulting dish. It is up to the chef to see that each dish is produced so that it is equal to the best meal which can be prepared from the ingredients given. Translating the comparatively small-scale production of the grande cuisine into mass production will be the challenge to the chef. It will not only require some modifications

of the recipes but a change of attitudes toward cooking. The chef will have to select some of the outstanding dishes, standardize them and adapt them to mass production methods.

Another area of responsibility for the chef would be providing variety in the menu. Here again he would have to work very closely with the buyer. If the buyer has an opportunity to purchase a large amount of turkey at a very reasonable price, it is up to the chef to plan in such ways that a fair variety of dishes can be produced. To make sliced roast turkey out of all turkeys would be an obvious but not very smart solution. True, if all turkeys were of such quality that they could be roasted, it would not be wise to boil them. But even roast turkeys can be served in several different ways. Some people prefer certain parts. Drumsticks, especially small ones, could be packed separately and sold at a premium. Some people like turkey wings. Those of larger birds provide a generous portion of meat and could be packed one to a meal. This would be cheaper than trying to remove the meat from the turkey wing in larger pieces. A special delicacy are the so-called turkey oysters. They are two pieces of dark meat on each side of the center of the back. They have the shape of an oyster about 2 inches long and 1-1/2

inches wide. A pair makes a very nice portion and it, too, can be sold at a premium. But even if some of those cuts are not sold at higher prices, just selling them separately is profitable. Such cuts are hard to slice and cannot be made into neat standard-size portions. Therefore, they are often broken up into small pieces and are used in gravies or in making turkey salad. The salad is a fair profit item, but spoils rather rapidly after preparation. It also is not easy to sell all the turkey salad which could be produced. There are still other dishes which can be made from turkey. Turkey steaks are a new possibility. Boned and rolled turkey--"logs"--are another fairly new idea. If only a few turkeys are prepared, the trimmings are a waste which is hard to eliminate, but if many thousand turkeys are processed, there are sufficient amounts of trimmings left to be able to convert them economically into some attractive dishes. The small pieces of turkey could be used in turkey hash, in turnovers, turkey pie, creamed turkey, or turkey a la king. And most important there would be such a large amount of trimming left over to make it economical to set up a large-scale production line to assemble those dishes. Since only a small part of those

trimmings would have been sold profitably under average circumstances, this "sideline" is actually adding profit.

It is up to the chef to create a fair selection of dishes. Not only turkey lends itself to such a wide variety of treatments. With imagination, many other meats, too, can be utilized as completely and economically as was shown for turkey in the previous paragraphs. Seafood is another group which offers the chef an opportunity to create a diversified menu. To lend some glamor or a touch of foreign cookery, national dishes could be included in the selections.

The actual production of meals would be quite different from the preparation in larger kitchens. Practically all conventional kitchens have one thing in common--they prepare food to be served at a certain dining hour. This means that preparation for a given group of food has to start simultaneously and practically all food has to be served at the same time. This creates several peaks of production at the beginning of the preparation time and a climax of activity at serving time. Between those peaks of effort there are long stretches of comparative inactivity of waiting for the food to get done. This pattern of activity demands a larger staff of kitchen personnel than can

actually be justified by the total amount of work available. But this larger group of people is needed because peak loads cannot be avoided when food is prepared to be served at specific meal hours. In contrast to this arrangement, the production of frozen precooked meals is not limited by meal hours. Food preparations can be started not only once or twice, to be ready for lunch or for dinner only, but throughout the day continuously, so as to be ready later in the day in a steady flow of finished meals. This would make it possible to install many labor-saving devices such as band ovens and conveyors. The continuous flow of work and the labor-saving devices would make it possible to achieve a much greater productivity and also a much lower labor cost. To illustrate this concept, it may be practical to visualize the preparation of some menu. It does not make too much difference what item is selected, but it may be better, for illustration purposes, to choose turkey again. Assume that the buyer contracted for ten thousand eviscerated turkeys. This would amount to approximately 100 tons. To get this amount of turkeys delivered may take about 10 truck loads. It could be assumed that the delivery would be spaced so that only one or two truck loads would arrive each day or that adequate storage facilities were available

for the whole shipment. The turkeys would move from the refrigerated storage room to the butcher shop on pallets or on conveyors. There they would be checked for cleanliness, the gizzards, which are usually packed in wax paper and placed in the body cavity, would then be removed and the birds would be placed in roasting pans. From there, a gravity conveyor could move the pans to the kitchen. A cook would sprinkle some salt and seasoning on them and the conveyor would move the roasting pans to the band oven. This oven is the same type which large bakeries use to mass produce their baked goods. The oven consists of a long heated tunnel through which the food moves on a conveyor. The temperature of the oven can be regulated and the speed of the belt can be varied. This oven could be adjusted so that turkeys of a given size would be properly done when they emerge from the other side of the oven. Turkeys can be bought in weight classes of not more than 2 pounds difference. Most restaurants like to buy them at about 20 pounds dressed weight because this size has the most favorable bone to meat ratio. This indicates that most turkeys can be bought quite readily in uniform sizes and weights. In turn this makes for uniform cooking time. After leaving the oven the turkeys would travel on another conveyor for some time to cool

off sufficiently so that they could be sliced without breaking up into small pieces. It is important to remember that those turkeys would not be completely cooked, since the meat would have to be frozen and then reheated in the home. Since the meat is a little rare, it is easier to cut without running the risk of having it fall apart. After the turkeys are sufficiently cooled, they would pass, still hanging from conveyors, a table where girls would start to disassemble the birds. They would probably first remove the legs, then the wings, and then lift the breast-meat from the ribs in one piece from each side. Other girls could remove the turkey oysters and then the rest of the meat from the turkey frame. The oysters would go to the packing room, and so would the wings and some of the drumsticks. But the rest of the meat would move on a conveyor to the slicers. The white meat could be sliced on a machine which is used to make bacon slices. This machine slices and neatly stacks the slices in roofshingle fashion, making it easy to handle them later on without damaging them. The dark meat would have to be boned first, and may then have to be sliced by hand. Another possibility would be to press the meat into logs, freeze them, and then use a bandsaw to slice the frozen meat into

portions. After the meat is sliced, it would move on an endless belt past girls who would place the proper amount into the individual, portion-sized containers. The containers would go from there to a machine which would wrap, seal, and code the packages and then they would be ready to be quick frozen. After all the components of the meal are produced and frozen, a machine could assemble, package, and wrap them.

Throughout the preceding description of a suggested production process, the emphasis was placed on conveyors and machinery. In larger-scale kitchens of today, only limited use can be made of many labor-saving devices. But in the large-scale production of precooked frozen meals, labor-saving devices can be used to great advantage, since the work is of continuous, large volume, and sufficiently repetitive to make it worthwhile to install machines. The weight of food to be moved from one processing station or machine to the next is so great and the flow of material is so consistent that conveyors are the most practical means of transportation.

A great many dishes can be prepared similarly to the process described above, and almost all baked goods can be handled in a bandoven, cooled on conveyors, and then cut into

portions and packaged. But here are some items which cannot be prepared in this fashion. Gravies and sauces may have to be prepared in individual steam-jacketed kettles of 50 to 100 gallons capacity. From those kettles they may have to be piped to the place of use, such as the assembly line for the meal. There they would be dispensed through faucets. If stew has to be prepared, a long row of 5- to 10-gallon shallow steam-jacketed kettles would be needed. In front of them would be a conveyor going to the meal assembly which would carry the pans into which the kettles would be emptied by tilting them. Here, too, a continuous operation could be performed. Meat would come on the conveyor from the butcher shop. Then going down the row, one kettle would be filled and turned one after the other. By the time the last kettle of the row is filled, it may be time to come back to the first one and stir it and add some meat stock and seasoning and so on down the line again. French frying, too, could be done on a continuous belt system. Metal baskets in which potatoes, or chicken or shrimps would be placed could be carried on a chain which would move them through a large trough filled with hot frying fat. The cooking time would be regulated by the speed of the chain.

In this type of operation it would take some experimenting and some careful figuring to establish the exact procedures required for any particular dish. But once all the data have been obtained the process should be comparatively simple and the product should be of uniform high quality. This type of operation seems to fit more the automotive industry than the food industry. But actually, in some areas of the food industry, mechanization to such a high degree is today the accepted way of operation. The large bakeries are mechanized to such an extent that very few people are needed to produce the vast quantities of quality baked goods. Canning factories too employ the continuous flow system and mechanization to a large extent. The type of mass production suggested in this chapter for cooked meals is the proven system of the assembly line adapted to a new area of the food production industry. In the canning and the bakery industry the system has proven that it can be adapted to the handling and preparing of food. It would seem likely that this system could be adapted profitably to the rest of the food production industry.

CHAPTER V

THE POTENTIAL MARKET

A. The Probable Consumer

In the preceding chapters, it has been pointed out that the precooked, packaged, frozen meal was planned primarily with the white-collar worker in mind. This does not necessarily mean that there are not many other groups in the mid-century economy of the United States which could not successfully use such a meal. But it is felt by the author that the group of people, normally referred to as white-collar workers, is the one which would have a major problem solved by this packaged meal. The term "white-collar worker" is quite vague, and not very helpful as far as most statistical reports are concerned. Such an inexact term makes studies and accurate measurements impossible. But the term is useful if it can be defined more accurately, because it quickly identifies a given section of the population, at least as far as the general public is concerned. To give a fair description of the white-collar worker would require a long list of occupations in which he can be found. Another criterion

could be the locality of his employment. The white-collar worker seems to be a definitely urban phenomen. He, or she, as the case may be, is usually located in or near administrative or industrial centers. Generally speaking, the larger cities are the ones with the highest concentration of this type of worker. He usually is engaged, be it in a skilled or semi-skilled form, in the areas of administration, in business, or in government, and in the areas of distribution and services. The large army of office workers belongs under this heading, the many typists and secretaries, office boys and file clerks, bookkeepers and personnel men, are all part of this vast group. Another, almost equally large segment, is composed of salespeople. Visualizing the numerous stores in the downtown section of a larger city helps to see the many people which are required to make the modern network of distribution work smoothly. Most of the people employed in the stores could be called white-collar workers. Not only the sales personnel, the floorwalkers in department stores, or the buyer for a dress shop, but also those people charged with the advertising and with the financial transactions of a company can be termed white-collar workers. Many others are working in areas in which they perform services of a financial nature.

They may be employed by banks, insurance companies and brokerage houses engaged in various businesses. In addition to those areas in private enterprise, there are the many governmental agencies, be they on a local, state, or federal level. Not all governmental employees are white-collar workers. There are many professional people in the employment of governmental bodies and there are also many workers belonging to specific trades, but the bulk of governmental employees is engaged in general administrative duties. This partial listing of white-collar workers indicates that there is a great number of them in the economy and that most of them are concentrated in bigger cities. Statistically, the white-collar worker is elusive and hard to define. In the Statistical Abstract of the United States, 1951, the United States Bureau of the Census classifies the labor force by occupational groups.[1] But this classification does not contain the heading white-collar worker. Some of the occupations listed can readily be identified as

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[1] Occupation of Persons in the Experienced Labor Force and of Employed Persons (Except on Public Emergency Work), by Sex: 1940. U. S. Bureau of the Census, Statistical Abstract of the United States: 1951 (seventy-second edition). Washington, D. C. 1951. pp. 183-85.

white-collar workers. For example, there is a listing of clerical, sales, and kindred workers. Most of those could probably be classified as white-collar workers. Checking on the subheading reveals that some occupations are included which usually are not considered those of white-collar workers as for example, mail carriers and messengers. In the sales subsection, canvassers and solicitors, hucksters and peddlers and newsboys are included. Those too would usually not be classified as white-collar workers, although the rest of the subsection lists the type of sales personnel which would probably fit under this heading. Another section of occupations listed could yield some more white-collar workers. The heading is proprietors, managers, and officials, excluding farm. In this group the division is even more difficult to make. Railroad conductors, as a group, seem somehow not to fit in. Postmasters and miscellaneous governmental officials seem to fit the description much better as does the next group listed: other specified managers and officials. But the next classification is not too useful. It contains proprietors, managers, and officials not elsewhere classified, by industries. Many officials could be placed in this category, but it is difficult to imagine many proprietors as belonging in the same group. Since the

figures given are totals, it is difficult even to guess the number of white-collar workers in this grouping. The table in question is based on the census of 1940. People employed in all occupations except on public emergency work totaled 45,166,083. Depending on how the subheadings of the breakdown are interpreted, they indicate that the number of white-collar workers was anywhere between six and twelve million people. In 1951, the corresponding figure for people employed in all occupations is over sixty-one million. If the proportion of white-collar workers to the rest of the working force remained the same, then it can be assumed that the white-collar workers are now numbering about one-third more or between eight and sixteen million. Of this group, about one-third are women. This proportion is not the same in all subgroups. It varies from less than one-eighth in the subgroup called proprietors, managers, and officials, excluding farm, to a little over half among clerical and kindred workers. Saleswomen constitute only about one-quarter of all salespeople. Using those figures, it would mean that there were between 2-2/3 and 5-1/3 million women employed as white-collar workers in 1951. This seems somewhat low if compared to figures used in a report of the Curtis Publishing Company,

Philadelphia 5, Pennsylvania, dated March 5, 1952.[2] This report quotes a Department of Labor release as to the break-down of women workers by occupation groups as of April, 1950. From this break-down it appears that there were more women in white-collar occupations. In the classification clerical and kindred workers alone, this release lists 4,539,000 women and under saleswomen, 1,516,000. In the other classifications, it is hard to tell how many would fit under the description of white-collar worker. But service workers, except domestic, professional and semi-professional workers and proprietors, managers and officials, except farm, total 4,971,000. From this sum, between one and two million could be counted with the previous total and that would give about seven to eight million women engaged in white-collar jobs in 1950. Again referring to the study by the Curtis Publishing Company,

> . . . almost half of all woman workers are married women living with their husbands while only one-third are single. The other group consists of those who have been widowed, separated or divorced.

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[2] Woman in Industry, Information Section, Research Dept., The Curtis Publishing Company, Philadelphia 5, Pennsylvania, May 5, 1952

Assuming that the distribution among female white-collar workers is similar to the one within the total group of women working, then about 3-1/2 to 4 million of the female white-collar workers are married and between 2-1/3 and 2-2/3 million are single.

B. Food Expenditure of the Potential Customer

One of the criteria for the white-collar worker, not necessarily mentioned but usually implied, is his salary. It could be assumed that the lower range is about at the same level as that of a semi-skilled worker and the upper range is about equal to the average skilled worker. Unless the preceding statement is translated into specific figures, it would be difficult to use this information. It is assumed that the income range of white-collar workers, keeping the previous statement in mind, was between two and four thousand dollars a year in 1947. The year 1947 was chosen because the most recent statistical figures on urban family expenses for food are from that year. It could be stated that this range of a two to four thousand dollars yearly income is arbitrary. This may be true, but it also might be said that this qualification could be included in a definition of a white-collar worker and probably would exclude only a small

number of those previously selected by other criteria. This assumption will make it now possible to investigate the expenditure for food of this group of people. In 1949, the Department of Agriculture published a study on the Food Consumption of Urban Families in the United States, Spring, 1948.[3] On the cover sheet of this report there is a series of comments under the heading of highlights. Two paragraphs may be of particular interest to this study, so they are quoted below.

> Average family food expense. Urban families throughout the United States spent an average of $25.57 a week on food in the spring of 1948 or 32 per cent of their weekly income (before deduction of federal income tax). Food expenses per person came to $7.77 a week. These amounts included food and beverages, purchases for use at home, restaurant meals, and between-meal snacks but did not cover the value of any food raised at home or food received as gift or as payment for services rendered.
>
> Distribution of families by food expense. Approximately 60 per cent of the urban families that took part in this survey spent between $5 and $10 per person a week for food. Almost a fourth spent more than $10 and a sixth spent less than $5 per person. The median expenditure for food came to $7.60 per person per week.

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[3] Agricultural Research Administration. Food Consumption of Urban Families in the United States, Spring, 1948. United States Dept. of Agriculture, Bureau of Human Nutrition and Home Economics. Washington 25, D. C. Preliminary Report No. 5, May 30, 1949.

According to this study, the average income of an urban family in 1947 was $3,606 a year or $79.72 a week. The average family size was 3.29 persons.[4] The number of families used in this survey was 1,558. In the group, which had a yearly income below $2.000 were 257 families. In the $2,000 to $3,999 a year income group, there were 761 families. The $4,000 a year and over bracket was represented by 393 families. Not classified were 147 families. This may indicate that the average of the two to four thousand dollar a year group is somewhat below the average of the total group.

It was previously stated that, for reasons given, it was assumed that the white-collar worker is in the two to four thousand dollar a year income group. Since the white-collar worker is a city dweller, it can be assumed that the figures offered in the report on Food Consumption of Urban Families in the United States, Spring, 1948, are also representative of the white-collar worker, especially those figures which concern themself with the $2.000 to $3,999 a year income groups.

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[4] Ibid. p. 6.

The precooked, packaged, frozen meal has great appeal and utility for white-collar workers; the single person and especially the married couple, when both are working. The Food Consumption Study sheds some light on this problem, too. In the table headed Distribution of Families by Food Expense per Family Member, the families are broken down by size.[5] In the $2,000 to $2,999 a year income range, 42.2 per cent of the families of two people spend per person between $7.00 and $9.99 a week for food. Only 19.0 per cent spent between $5.00 and $6.99 a week, and 15.5 per cent spent between $10.00 and $11.99 a week per person for food. In the $3,000 to $3,999 a year income range, only 29.4 per cent of the families of two spent between $7.00 and $9.99 per person per week for food. Only 16.0 per cent spent between $5.00 and $6.99, 32.0 per cent spent between $10.00 and $11.99 and 21.3 per cent spent over $12.00 per person for their weekly food bill. Those data present insufficient information to compute accurately the average weekly expenditure for food per person in the $2,000 to $3,999 a year income group, but this is not necessary. White-collar workers closely approximate this group, but are not identical

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[5] Op. cit. p. 7.

with it. A figure, accurate down to a decimal place, may give an impression of preciseness which would only be misleading. Since the assumptions concerning the white-collar worker are not exact, but only approximations, although probably close ones, it may be appropriate to interpret the data used with this thought in mind. The figures mentioned above do not permit computation of exact averages, but from them, by inspection, can be found that the average weekly expenditure for food for a white-collar worker in a family of two was, in 1947, somewhere between $9 and $10. In 1952, this amount may be somewhat higher for at least two reasons. Prices and wages increased within the last five years and the white-collar worker probably makes today between three and five hundred dollars a year more. But since prices, especially of food, went up correspondingly, his buying power has probably not changed appreciably. An estimate of today's corresponding expenditure would be between $11 and $14. Those figures have the following significance. They are an estimate of how much this white-collar worker, for whom the precooked, packaged, frozen meal is designed, is probably spending for his weekly food bill. Based on the preceding figures, the potential customer for this meal spends probably between $1.50 and $2.00 a day for food. Out of this sum usually one-sixth is

spent on breakfast, sometimes even less than that. One-third or a little more is used for lunch, and the remaining half, or between $0.75 and $1.00 is spent for dinner. If the precooked meal is to replace other modes of buying dinner among this group of people, then people should not have to pay any more for it than what they are now spending for their dinner. In other words, the precooked, packaged, frozen dinner should, on the average, retail for between $0.75 and $1.00. At that price, an average white-collar worker could afford to buy such a dinner every day, obtain a tasty, nutritious, well-balanced meal, and stay within his present budget.

People usually do not budget themselves quite that accurately. Some days they may spend less and on others they may overstep their allowance. This, too, can be translated into price ranges for the precooked meal. Some of them may have to be less expensive, probably as low as $0.50, to help meet a tight budget, especially before payday. Other meals may be more expensive catering to what the merchant often calls the consumer's urge to splurge. Assuming that the public spends on this meal the same amount it would normally spend for the food used for dinner, it would actually get more for its money buying the packaged meal. When purchasing the precooked dinner, the consumer

not only buys the food, but also all the services and utilities built into this dinner. They are given to him at no extra cost as far as he is concerned. If he would want to duplicate them, they would add to his food budget considerably, and some simply could not be duplicated. Therefore, although the actual outlay in money may be the same, the consumer will receive more value for his money in the form of more and better services and better quality included in the product.

C. Location of the Potential Market

In the beginning of this chapter, it was again stated that the precooked dinner was planned with the white-collar worker in mind. In trying to define the term "white-collar worker," it was found useful to enumerate many occupations which could be listed under this heading. Generally speaking, this worker executes administrative functions in business and in government. Since administrative functions are usually carried out in centrally located areas, it indicates that most white-collar workers are located in or near centers of business, industrial, or governmental activities. Those centers are the larger cities. In some cities, this concentration is probably more pronounced than in others. Washington,

D. C., with its many governmental workers, has one of the very large concentrations of white-collar workers. New York, Boston, Philadelphia, and other big cities on the east coast have large numbers of them, too, but in those cities business and industry primarily contribute to the larger group of white-collar workers. Naturally, the east coast has no monopoly on this phenomenon. Every concentration of business, industry, and government creates a concentration of white-collar workers. Chicago and Detroit, Cleveland and Cincinnati, St. Louis and New Orleans, Denver and Dallas, San Francisco and Los Angeles, all have large groups of white-collar workers. In the larger cities these people tend to concentrate in apartment buildings. This is especially the case in New York, where living in apartments is probably more prevalent than in any other city. This type of distribution indicates a concentration of a great part of the potential market in a few of the larger metropolitan areas. This concentration of the potential consumer is very significant when the problem of marketing of the product is approached. This phase of the problem will be investigated in Chapter VI of this study.

CHAPTER VI

DISTRIBUTION OUTLETS

A. Prerequisites for Stores Handling the Product

A market is determined to a great extent by two factors: the product and the consumer. The interplay of these two components determines to a large degree the size, location, growth, and potential of a market, if economic forces are permitted to interact freely. If a product is placed in a market which the consumer can reach, and if the product has properties desired by the consumer and if he can pay for it, the product will sell. In previous chapters the product was described, its characteristics explained, and its utility to a specific group of consumers indicated. The next logical step is to describe the outlets by which the product could reach the market. Since this product, at least initially, is intended for the white-collar worker, it would be logical to try to reach this group by the most direct route--their places of shopping.

Where is this market located? In Chapter V it was pointed out that the white-collar worker is usually found in the larger administrative center of government, of business, and of

industry. Those centers, the larger metropolitan areas, are the market for the product under discussion. This is advantageous because the market is, geographically speaking, concentrated in a few, comparatively small areas. Within these areas the more densely populated sections, having the large apartment houses, are the more favored living areas for the white-collar worker. To sell to him successfully would require having outlets in or near those areas. The characteristics of the sales outlet discussed so far were determined largely by the consumer and his location. The product, too, imposes certain limitations and conditions which confine the location of outlets even further. The produce is a food item and one that has to be kept in freezer cabinets. This limits the outlets to stores which sell food and have freezer display cases. The item is fairly small in size and the purchase price is, comparatively speaking, not too great. To handle such items profitably would require a fairly large turnover. Another limitation imposed by the product is the fact that a fairly large selection of menus is needed. This requires considerable stock and display space, namely large frozen food display cabinets. To make these sizable installations pay, a considerable sales volume is desirable to keep the turnover at a reasonably high

rate. Translating those requirements into different terms, they mean: the stores should be located in an area densely populated with white-collar workers. An area corresponding to this description would be a middle-income apartment house district. This would assure a great concentration of potential consumers. A food store in this area, selling the product, should already have a fairly large traffic and a good customer following among those people. The store would also need to have the physical facilities to handle this product properly. It would need a larger amount of freezer display space devoted to this product alone, in addition to the freezer display cases it may have for its regular frozen food lines. The large display space is needed to offer a sufficiently varied selection and also permit an adequate stock on hand at all times. The selection does not only have to be fairly large to offer variations in the menu, but it is essential that several price lines be made available to the shopping public.

B. Stores Which Can Handle This Product Today

A store with the requirements mentioned above does not have to be created in many of the desired areas. Today's large supermarkets, be they independents or members of chains, meet

most of the requirements. In only one aspect many of them may be somewhat weak, but this one could be easily remedied. They may not have suificient freezer display space. But those supermarkets which are located in the proper neighborhood do have the large customer traffic and the floor space which would enable them to add the proper display equipment. Those larger stores are in a position to install and stock sufficient freezer space to offer adequate selections to the public without upsetting their balance between the different departments too much. Adding, for example, 20 feet of frozen food display cases may give ample display to the new product, but if the supermarket is one of the larger ones, this addition to the display area may not be proportionately too great. For a small store it would be almost impossible to do this without seriously curtailing some other department.

The supermarkets--at least, the ones discussed in the previous paragraph--are mainly located in or around the residential areas. The other possible place of sale would be near the place of work of the white-collar worker. This is mostly in or near the downtown shopping section where the department store is a likely choice for installing a large display of frozen dinners. The traffic in a department store is considerable. The white-collar worker

makes many purchases in it and many usually work not too far away from it. It would be fairly simple for a shopper to pick up one or two of those dinners before boarding the bus or the subway, and so skip the tedious task of shopping after arriving home. This would be especially convenient since a department store in a metropolitan downtown area, such as Macy's or Gimbel, having a very large traffic, can offer a great selection without too much difficulty.

C. Other Possible Applications

Selling the precooked, packaged, frozen meal to the white-collar worker is one of the reasons for developing this meal. But, he is not the only possible customer. Many a household could use such a dinner. A housewife may not be able to cook certain dishes. At other times she may be pressed for time and unable to prepare the dinner. If unexpected company arrives for dinner, it would be convenient to be able to go to the freezer and remove several prepared meals and, without having to neglect the guest, be able to serve a splendid dinner at the spur of the moment. Many people like to experience adventure in their eating. But visiting eating places famous for unusual dishes can be not only expensive, but at times inconvenient or even impossible. Those

precooked dinners could bring the food of such places to the dining room of any hostess. To make such selections exciting and different, the manufacturer of such dishes could sponsor clubs, such as today's Fruit of the Month and Candy of the Month Clubs. Each time period, it could be a certain day of the week, the producer would advertise a special dish. People belonging to the club could buy it at a lower price. Many such clubs could be promoted. For the outdoor man, game in season specially prepared could be a great attraction, especially for the many who did not get their deer on the last hunting trip. A seafood club could feature a different dish each Friday and make seafood an exciting adventure in good eating instead of a repetition of French fried cardboard with a variety of names on the menu.

Other ways of distributing the meal would be through home delivery. Many families now own freezers and their use is increasing. Stores could mail or hand out to their customers small pamphlets advertising bi-weekly or monthly delivery of frozen dinners. Such a small catalogue could be furnished by the manufacturer to help the store sell the meals. The housewife could order by checking off the desired items and mailing in the order. The selections could be grouped in specific meals and

the order could read: 10 beef stew, 10 turkey drumsticks, 15 roast beef, and 10 halibut dinners. Another possibility would be to offer a sequence of menus for a period of two weeks, and the whole set of dinners for two weeks could be delivered. There could be selections for heavier eaters and suggestions for children's menus. The planned sequences of meals in the catalogue would be a good selling point because even the selection of menus would be made easy. One decision will assure variety for the whole period. The selections could offer different price lines for groups of meals. After the ordering is done, it could be delivered once every two weeks to the customer's home, directly into her freezer.

For those people who like eating too much, and could well afford to lose some weight, packaged reducing diets would be the ideal solution. To avoid monotony, they could be planned for a group of meals such as for one week, and sold as one package. An attractive sales point could be: "Why spend money on medicine to reduce, if the same money can buy wholesome food and still accomplish the same results?"

From reducing diets to hospital diets is only a small step. Many special diets in hospitals are very expensive, not

because of the ingredients, but because of the amount of work involved in preparation. This is especially expensive in a small hospital where sometimes only one or two trays of one type of diet must be prepared. Several precooked meals for the most frequently used diets could be a great help and cost saving for many a smaller hospital. Salt-free diets are in many aspects not too different from regular meals, but often must be prepared separately in small quantities. High protein diets are in many ways quite similar to normal menus. In those areas prepared meals could be of considerable help. They would aid the hospital in keeping the food cost down. They would also free the dietician for more difficult diets and they would assure the patient a much greater selection and variety and, in many cases, probably a better quality meal.

The manufacturer producing the precooked meals has another possible source of sales--the industrial caterer. For this potential customer he will not need to package each meal individually. The caterer needs serving pans filled with individual portions, ready to be thawed and placed into the cafeteria serving counter and used to serve the people. Industrial feeding operations, too, have their difficulties today with the rising cost of food

served. The increased cost is not only due to the rising cost of the raw food, but also due to the increased labor cost and the rapidly increasing cost of new equipment. Some people in this industry feel that the ultimate solution to their problem lies in precooked frozen meals, packed in cafeteria counter pans. In England this system seems to be working satisfactorily for one fairly large industrial caterer. This operation was started sometime in 1951 and after about one year, was inspected by a group of American industrial catering managers and a cafeteria equipment manufacturer. Mr. Earl D. Triplett of the Food Service Department of the Ford Motor Company conferred with one of them after the group returned and those general impressions were conveyed to the author by him.

Some other possible applications of frozen precooked dinners may be found in the experimental use of them by some of the railroads in their dining car services. The Chicago, Rock Island and Pacific Railroad, having started this meal service on April 1, 1952, was unable to provide any accurate figure of its cost, since the operation is still too new. In March, 1952, the United States Quartermaster Food and Container Institute was testing for acceptance by the United States Air Force a precooked,

frozen plate to be used aboard planes. The author was present at some of the taste panel sessions, judging the acceptability of this plate. Most of the menus were accepted with only minor variations, such as a change of the vegetable components to improve the color combinations of the plate. The food was tasted by the author and it was felt that the meals presented were, in practically all aspects, considerably better than the average restaurant meal.

The United States Air Force has been studying the problem of precooked meals for several years. The activities concerning those meals are concentrated in Chicago under Lt. Colonel Harold C. Kirchner, United States Air Force.[1] These meals are being produced for the United States Air Force by a commercial enterprise in Philadelphia. But in this case, too, the projected rate of production is comparatively small and, although the cost is known, it is not too representative.

The airlines are also using precooked frozen meals to some extent. But these meals are rather luxurious and expensive

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[1] Chief, Air Force Liaison Office, Services Activities, 165 North Canal Street, Chicago 6, Illinois.

dinners. Since their cost is included in the plane ticket, the actual cost is unknown to the public. Some of the airlines themselves are not too anxious to let anyone know the cost of their food operations.[2] But since their operations, in terms of meals prepared at any one price in any one place, is comparatively small and the meals are more in the luxury class, it is assumed that their cost is fairly high.

The suggested applications of frozen precooked dinners are only those that come readily to one's mind and those that are actually being used in 1952 as far as is known to this author. There are probably other applications for this type of dinner and as soon as such a product can be in actual large-scale production, other uses would probably be found.

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[2] Dr. E. Mariano, Dietician, Transworld Airlines, Kansas City, Missouri. Written communication.

CHAPTER VII

THE COST OF THE PRODUCT

A. The Size of an Adequate Meal

One of the first problems encountered in cooking a packaged meal is the determination of the size of the meal. How big does a meal have to be to be filling? A meal is generally considered filling if it furnishes a person sufficient food to fill the stomach comfortably. The stomach of an average adult person holds about 1-1/2 to 2 quarts. This would be an indication of the size of an average meal. People who usually eat larger amounts have larger stomachs because this organ expands from continuous expansion. The opposite is also true to a certain extent. The majority of the people adjust their food intake to the amount of work they perform. Those performing light physical work, such as white-collar workers, usually do not eat as much as those engaged in hard manual labor. Therefore, the white-collar worker will usually be satisfied with a smaller meal than a man performing hard physical labor. This seems to indicate that a meal of about 1-1/2 quarts volume would be about the average size for a

white-collar worker. This meal does include not only solid food, but also liquids, such as a cup of coffee and a glass of water. Since a cup of coffee and cream have about 6 ounces and a glass of water about 10, this alone would account for one pint, and the remaining quart of food would have to consist mainly of solids. The dimensions of the suggested packaged meal are 6 inches by 5 inches and 2 inches high, or 60 cubic inches. Since the package is, except for the packaging material, solid food without any dead space inside, this package contains about one quart of solid food. This proposed packaged dinner would, if the coffee which is included in it and a customary glass of water is consumed during the meal, provide a filling dinner for the average white-collar worker and all those other people who have a similar size food intake.

From the nutritional point of view, an adequate meal must provide a sufficient amount of calories and the proper amounts of nutrients, vitamins, and minerals. Recommended Dietary Allowances, Revised 1945, of the Food and Nutrition Board, National Research Council, state in part the following suggestions.[1] A man

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[1] Anna De Planter Bowes & Church, Charles F. Food Values of Portions Commonly used. College Offset Press. Philadelphia, Pa. 1946, p. 4.

of 70 kilograms, which is about 154 pounds, in a sedentary occupation, should consume daily, among other things, 2,500 calories, 70 grams of protein, 0.8 grams of calcium, 500 International Units of Vitamin A, 1.2 milligrams of niacin, and 75 milligrams of ascorbic acid. A woman of 56 kilograms, about 123 pounds, in a sedentary position, should have 2,100 calories in her daily ration and 60 grams of protein. The requirements for the minerals are the same as for the man mentioned above. The daily need for vitamins is somewhat smaller than those for a man.

Dinner represents about 40 per cent of an average person's food intake. This means that the average male white-collar worker eats about 1,000 calories of food for dinner, and his female counterpart, about 840 calories. The other components of the daily diet cannot be broken down into percentages per meal. Some minerals, such as calcium, are present in only a few food items. When an adult person drinks a pint of milk he has consumed almost his total daily requirement in calcium. This can happen at any meal. In the case of calcium in milk, it usually occurs at breakfast. Similar situations prevent too definite a breakdown of the rest of the minerals and the vitamins into requirements per meal.

B. Cost Factors of the Meal

It is difficult to establish the price of a planned meal. To lend the projected cost figures more credence, it may be better to present accounts of actual meals which are in some respects similar to the proposed packaged dinner and infer from those figures what the proposed meal might cost. The United States Air Force buys a precooked frozen meal from Frigidinner in Philadelphia. This meal is packaged in compartmented, disposable aluminum plates and covered by a thin sheet of aluminum foil. In the Activities Report, published by the research and development associates, food and container institute, an article mentions this about the meals:[2]

> The present program of the Air Force consists of eleven menus. Following are three typical examples of menus that are to be purchased. One menu is intended for a breakfast and the other two are dinner menus.
>
> Glazed Apples
> French Toast
> Canadian Style Bacon
>
> Tenderloin Steak
> with gravy
> Potatoes Parisienne
> Succotash
> (Corn or Lima Beans)

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[2] Marion C. Bollman, Precooked Frozen Foods, Activities Report. The Research and Development Associates, Food and Container Institute, Inc. January, 1952. p. 261.

Roast Turkey
Dressing with Gravy
Buttered Peas
Candied Sweet Potatoes

> Each of the dinner menus contains a meat, a potato, and a vegetable item. Each component has been tested for suitability to precooking and freezing.

The author was present at some of the acceptance tests and sampled a number of those meals. The research section testing the meals was very cooperative and furnished accurate breakdowns of the menus by weight and total cost figures. The prices given are what the Air Force was paying for those meals. The figures are obtained from a cost analysis by the manufacturer and are based on very small-scale productions, in some instances for less than one hundred meals of one menu. This is an important factor in considering the cost of the meal, since such small-scale productions are quite expensive if the manufacturer is set up for a fairly large-scale output. This is the case with Frigidinner, the producer for the Air Force. To get a more objective picture, some of the menus produced for the Air Force were submitted to other kitchens for pricing. Four menus were selected. The Air Force had listed the components by weight; therefore, it was not too difficult to develop some fairly accurate prices. The management of the Union Cafeteria on the campus of Michigan

State College was asked to price the menus for production of two hundred portions. The dieticians of the cafeteria of the Robert S. Shaw Hall Dormitory, located on the same campus were asked to price the same menus, but for 1,500 portions. The results are as follows:

TABLE III

COMPARISON OF COST OF AIR FORCE MEALS WITH THE PRICING OF THE SAME MEALS BY TWO CAFETERIAS

	Air Force Cost	Union Cafeteria			Shaw Hall Cafeteria		
		Food	Labor	Total	Food	Labor	Total
Roast Turkey	$0.95	$0.45	$0.09 =	$0.54	$0.33	$0.06 =	$0.39
Roast Veal	0.79	0.51	0.06 =	0.57	0.20	0.03 =	0.23
Swiss Steak	0.90	0.38	0.06 =	0.44	0.34	0.06 =	0.40
Pot Roast	0.79	0.53	0.06 =	0.59	0.21	0.04 =	0.25

The figures from the Air Force are as of November, 1951. The figures for the Union and Shaw Hall cafeterias are as of June, 1952. Since prices for food did go up somewhat in this period of

time the actual difference is probably even greater. But on the other hand the cost of freezing and packaging the meal is included in the cost, and this raised the price of the meal. The aluminum plate and aluminum foil cover and the cardboard box probably add about $0.05 to $0.08. In this case the differences do not appear quite so great. If, in addition, it is taken into account that the price charged to the Air Force includes business expenses and a certain profit, then the price seems to be not too much greater than the ones given by the cafeterias. In a letter, Mr. J. Fisher, President of Frigidinner, Inc., producer of this meal, states:

> . . . the food cost would be approximately 42 to 43%; labor cost is around 28%; manufacturing overhead and general administration cost would run around 20% leaving a net of 10%.

If those percentages are applied to the cost charged to the Air Force, then the resulting food cost figures compare favorably with the others.

Shaw Hall Cafeteria seems still to have a lower food cost, but the Union Cafeteria seems to have a somewhat higher one. Since both cafeterias obtain their food from the same source, and since they probably pay the same price, it seems to indicate that their computations are not too accurate, or that some other variables distorted the figures.

TABLE IV

COMPARISON OF FOOD COST OF AIR FORCE MEALS WITH FOOD COST OF SAME MEALS IN TWO CAFETERIAS

	Air Force	Union Cafeteria	Shaw Hall Cafeteria
Roast Turkey	$0.399	$0.45	$0.33
Roast Veal (Shoulder)	0.332	0.51*	0.20
Swiss Steak	0.378	0.38	0.34
Pot Roast	0.332	0.53	0.21

* Roast Veal (Leg).

The menus were recomputed to check the results, and the following cost figures were used; namely, the prices Shaw Dormitory was paying during the month of November, 1951. Those would give a better comparison with the food prices listed by Air Force, which are also from this period. At that time the dormitory obtained eviscerated turkeys at $0.54 a pound. To compute the cost of edible meat, a formula suggested by George L. Wenzel was used.[3] He states that tom turkeys at about 20 pounds New York

[3] George L. Wenzel, Wenzel's Menu Maker. 1947. George L. Wenzel, Milwaukee, Wisconsin. p. 634.

dressed--the turkey is only bled and plucked--lose 20 per cent when eviscerated. When properly cooked the yield of usable meat is about 1/3 of the New York dressed weight. This is a fairly accurate yield analysis and differs only by a small amount from another yield study in Fowler and West, Food for Fifty.[4] The other components of the dish were priced similarly and then compared with the original itemized breakdown furnished by the Shaw Hall Cafeteria:

TABLE V

COMPARISON OF PRICING FOR AIR FORCE ROAST TURKEY PLATE

	Weight E. P.*	Shaw Hall Cafeteria	Recomputed Figures
Roast Turkey	3 ounces	$0.22	$0.2418
Dressing, Bread	1 ounce	0.01	0.0100
Gravy	2 ounces	0.01	0.0050
Green Peas, Frozen	3 ounces	0.04	0.0367
Butter sauce, 1/2 butter	1/4 ounce	0.01	0.0115
Candied Sweet Potatoes	2-1/2 ounces	0.04	0.0350
Totals		$0.33	$0.3400

* Edible Portion.

[4] Sina Fay Fowler & Bessie Brooks West, Food for Fifty. John Wiley and Son, Inc. New York. 1950. p. 185.

From this comparison it can be seen that in this case the original figures furnished by the Shaw Hall Cafeteria are practically the same the author arrived at. This does not hold true for the rest of the menus. It is interesting to note that the food cost of the Air Force meal is $0.399, a fairly close figure.

Roast veal, the next dish priced, shows considerable discrepancy. Roast boned and rolled shoulder of veal was the meat. Cooking shrinkage and slicing loss were estimated at 25 per cent. This may seem somewhat large, since there are no bones in this meat roll. But since this meat is rolled and tied, upon slicing the cooked meat, small pieces break away and the loss from slicing is greater. In the weight, the strings holding the roll must be considered, as it also contributes somewhat to the waste. Assuming a shrinkage of 25 per cent, the original figures furnished by Shaw Hall Dormitories and the recomputed ones for the menu are shown in Table VI. The food costs for the meat differ considerably and after careful checking, cannot be explained. The recomputed figures are about $0.02 lower than those of the Air Force meal.

The third menu computed for comparison has swiss steak as its main dish. The meat used for it was beef, top or eye round and the grade, United States Commercial (top). The quoted price

TABLE VI

COMPARISON OF PRICING FOR AIR FORCE
ROAST VEAL PLATE

	Weight E. P.*	Shaw Hall Cafeteria	Recomputed Figures
Veal: Roast rolled shoulder	3-1/2 ounces	$0.14	$0.2566
Gravy	2 ounces	0.01	0.0050
Carrots: sliced	3 ounces	0.03	0.0350
Sauce, half butter	1/4 ounce	0.01	0.0050
Potato Puffs	2 ounces	0.01	0.0100
Totals		$0.20	$0.3116

* Edible Portion.

was $0.95 per pound. The cooking shrinkage and cutting loss were assumed to be 20 per cent.

Again there is a difference, in Table VII, but not so great as in the previous menu. Compared with the computed food cost of the Air Force meal of $0.378, the recomputed figures show considerable agreement.

The last meal which was recomputed and compared was pot roast of beef. The meat used consisted of sirloin tips, and

TABLE VII

COMPARISON OF PRICING FOR AIR FORCE
SWISS STEAK PLATE

	Weight E. P.*	Shaw Hall Cafeteria	Recomputed Figures
Swiss Steak	4 ounces	$0.24	$0.2969
Mushroom Sauce	2 ounces	0.03	0.0175
Lima Beans, Frozen	2-1/2 ounces	0.04	0.0395
Sauce, half butter	1/4 ounce	0.01	0.0050
Creamed Potatoes	3 ounces	0.02	0.0100
Totals		$0.34	$0.3689

* Edible Portion.

the grade was United States Commercial (top). The price charged to the Shaw Hall Cafeteria in November, 1951, was $0.97. The cooking shrinkage and loss in trimmings was assumed to be 20 per cent. On this basis the following results developed, as shown in Table VIII.

The difference, especially in the cost of the meat, is almost $0.08 and is difficult to explain. But the food cost of the Air Force meal at $0.332 is not much greater.

TABLE VIII

COMPARISON OF PRICING FOR AIR FORCE POT ROAST PLATE

	Weight E. P.*	Shaw Hall Cafeteria	Recomputed Figures
Pot Roast of Beef	3 ounces	$0.15	$0.2274
Gravy	1 ounce	0.01	0.0050
Green Beans, frozen	2-1/2 ounces	0.03	0.0306
Sauce, Half Butter	1/4 ounce	0.01	0.0050
Au Gratin Potatoes	2 ounces	0.01	0.0275
Totals		$0.21	$0.2955

* Edible Portion.

All food cost computations were presented for at least two reasons. The first one was to show how much such meals do cost. The other reason was to show, that such computations can, within fairly small limits, accurately determine the food cost of meals which do not actually have to be prepared.

The meals previously discussed were in many respects similar to the proposed precooked packaged frozen meal. The differences between them are several. The Air Force meal could be called, if a colloquial term is used, a frozen blue plate. It has

just meat, one vegetable, and potatoes. The packaged dinner has in addition, two rolls, dessert, powdered coffee, sugar, and salt and pepper. Those additions will naturally raise the food cost if everything else remains the same. The two rolls, a piece of coffee cake, and the beverage, sugar and seasoning will add about $0.07 to $0.08 to the sales price of the package. Checking the size of some of the meat portions, it can be noticed that they are rather generous. Those portions were designed for some active men who develop a hearty appetite. If the portions, especially the expensive meat portions, are somewhat reduced, some savings could be accomplished. At 2-1/2 ounces per portion, a still adequate amount of meat, the food cost of the reduced Air Force plate would be somewhat lower compared to the original one (Table IX).

The savings range from about $0.04 to $0.08 per meal. If the food cost figure of the smaller portion is now assumed to be 42 per cent of the sales price, as the larger figure was previously, the sales price of this new plate can readily be computed. To obtain a sales figure for the complete dinner would now be simple. About $0.07 or $0.08 would have to be added--the sales price of the two rolls, and the dessert, the coffee powder, sugar and salt

TABLE IX

COMPARISON OF FOOD COST OF ORIGINAL AIR FORCE PLATE AND OF PLATE REDUCED TO 2-1/2 OUNCES OF MEAT E. P.*

	Original Plate	Reduced Plate
Turkey	$0.3400	$0.2997
Roast Veal	0.3116	0.2383
Swiss Steak	0.3689	0.2871
Pot Roast	0.2955	0.2576

* Edible Portion.

and pepper. The new cost picture would appear as shown in the following table.

TABLE X

SALES PRICE OF THE REDUCED AIR FORCE PLATE AND THE COMPLETE DINNER

	Reduced Air Force Plate	Complete Dinner
Turkey	$0.714	$0.794
Roast Veal	0.568	0.648
Swiss Steak	0.684	0.764
Pot Roast	0.613	0.693

In all previous computations it was assumed that the labor cost is about 28 per cent. This was the figure stated by Mr. Jacob Fisher, President of Frigidinner, the producer of the Air Force meal. The labor cost in the cafeteria in Shaw Hall runs about 28 per cent, so this assumption is quite accurate. But this assumption implies that the production methods used are the conventional ones--those used in any larger kitchen. In Chapter IV it was pointed out how a precooked, packaged, frozen meal could be produced on a larger scale. Under the proposed arrangements, it is possible to cut the labor cost considerably. Since production would be continuous, the cooks could utilize their time fully. At the present, typical kitchen arrangement, it is difficult for a cook to be productive more than half of the time. If many labor-saving devices such as bandovens and conveyors are used, they too would tend to reduce the labor cost considerably. Those two aspects would reduce the labor cost so much that it would not be too optimistic to assume a labor cost as low as 10 per cent. If everything else remains equal, this would mean a reduction of 18 per cent in the cost of the Air Force plate. The new sales prices would then be:

TABLE XI

SALES PRICE OF THE REDUCED AIR FORCE PLATE AND THE COMPLETE MEAL AT A 10 PER CENT LABOR COST

	Reduced Air Force Plate	Complete Dinner
Turkey	$0.585	$0.665
Roast Veal	0.466	0.546
Swiss Steak	0.561	0.641
Pot Roast	0.503	0.583

C. Markups

In the letter previously mentioned in this chapter, Mr. J. Fisher, the President of Frigidinner, states that in an operation producing frozen meals, 10 per cent of the sales price is net profit. This is a desirable figure for many a food service operation. Some obtain even better profit percentages, but lower ones--such as 5 per cent-- are more prevalent. Some larger cafeterias are supposedly operating successfully on even smaller profits. If the precooked, frozen dinner is produced on a very large scale, it would be possible for the manufacturer to be satisfied with a profit of about 5 per cent. This would be quite generous, if compared with some larger cafeterias who have similar profits. This 5 per

cent profit could be called the manufacturer's markup. The manufacturer usually cannot distribute his goods to the stores without a wholesaler. To find an appropriate markup for such a product, it would be best to use the customary distributor markup for frozen foods. According to Mr. George L. Mentley, the General Manager of Sales and Marketing, Birds Eye - Snider Division, General Foods Corporation, New York, the customary markup on cost is around 8 per cent.[5] To this the retailer adds his own markup, which is about 20 per cent in the frozen food line. Under pressure of competition or over-supply, some stores are using smaller markups, such as 15 per cent, and in some instances, such as in the faster moving lines of concentrated citrus juices, the markups may go even lower. To present a more realistic picture, it would be wise to assume that the markups are not quite so low. In Table XII it is shown how the different markups increase the sales from manufacturer to distributor to retailer and to the consumer. For each menu of a complete meal the first set of figures is computed for a 28 per cent labor cost and the second set for a 10 per cent labor cost. The manufacturer's profit is assumed to be 5 per cent, not 10 per cent as used in previous computations. The distributor's

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[5] George L. Mentley, oral communication, May 13, 1952.

markup on cost is assumed as 8 per cent and 20 per cent is used as markup on cost of the retailer.

The figures in the last column on the right in Table XII represent the retail prices based on the above assumptions. Prices would have to be rounded to the nearest penny and would then represent the actual prices the housewife would pay for the packaged dinners. Even with the original 28 per cent labor cost, the meals would easily fall within the previously suggested range of $0.75 to $1.00. At the lower labor cost figure of 10 per cent, two of the four meals fall even below the lower price limit.

The meat used in the four sample menus is not unusually expensive, but the dishes could not be called economy dishes. There are some menus which could successfully utilize cheaper cuts of meat and so reduce the price of the meal even further. The more expensive cuts of meat were chosen so as to indicate that even the more desirable and more costly dishes can be successfully produced and distributed at such a low price as to fit into the limited food budget of the white-collar worker.

TABLE XII

PRICE OF THE COMPLETE DINNER AT THE DIFFERENT STAGES OF DISTRIBUTION

	Labor Cost	Production Cost Plus 5% Profit for Manufacturer	With 8% Markup for Distributor Added	With 20% Markup for Retailer Added
Turkey	28%	$0.754	$0.814	$0.977
	10%	0.632	0.683	0.820
Roast Veal	28%	0.616	0.665	0.798
	10%	0.519	0.561	0.673
Swiss Steak	28%	0.726	0.784	0.941
	10%	0.609	0.658	0.789
Pot Roast	28%	0.658	0.711	0.853
	10%	0.554	0.598	0.718

CHAPTER VIII

SUMMARY AND CONCLUSION

The food distribution and the food service industries are social institutions developed to satisfy the manifested needs of society. Since such social institutions usually arise in response to a recognized desire, this implies that society first must have a need. After this need is recognized, and a solution for it is demanded by a sufficiently large group over a period of time, not until then will some arrangement be made to satisfy this need, at least partially, or perhaps completely. The two food industries mentioned above are no exception. They, too, developed in response to persistent and continuously changing needs of the different groups of society. In all those adjustments to the changes there is a certain time lag which is determined by the urgency of the problems faced and the size of the group posing them. In recent years one of the groups of modern society has slowly changed to such extent, that the two food industries, which served it well for a time are now unable to furnish service comparable to the one given before. This group comprises the large majority of the white-collar workers,

especially those that are single and the young married couples, in which the wife, too, is working. This group changed its characteristics sufficiently within the last few years, especially since World War II to pose problems of feeding, which sets them more and more apart from the rest of the population. The big difference is that a large proportion of the women of the young couples are now working to help contribute to the family income. This leaves the young housewife with very little time to prepare meals at home. After a day at work it is difficult for the young wife to plan a nutritious, balanced and appetizing meal, go out and shop for it, bring the food home, and then cook it. This is made even more difficult by the fact that there are so few items which can be bought in small enough quantities to satisfy the need of a family of two. Most food items are packaged in units of more than two portions and many other items, such as roasts, cannot be prepared in such small quantities. For those people, the food industries have not as yet come up with an adequate solution. The precooked, packaged, frozen meal is a proposed solution to this problem.

The meal consists of a main dish such as meat, fish or fowl, a potato in various forms, a vegetable, two rolls, dessert, such as cake or pastry, an envelope of soluble coffee, another one with sugar

and salt and pepper. The main dish is cooked so that upon thawing and reheating, the dish will be hot but not overcooked. The potatoes too are partially precooked, but most of the vegetables do not need it. Since most vegetables take only a very short time to be cooked, they can be prepared in the time it takes to reheat the main dish and the potatoes. The components of the meal are individually wrapped in appropriate packaging material and fit tightly together into a box 6 by 5 by 2 inches. This could be made possible by having each component of a standard size and shape, so that all of them would fit together easily, almost like a three-dimensional jig-saw puzzle. Since all items would be of certain standard sizes, an interchange of components between meals can readily be accomplished. The package would carry on the outside a colored picture of its contents as it would appear on the appropriate plate at a table setting. In addition on the top of the wrapper would be a list of the contents of the package, its calorie and vitamin contents and the amount of minerals present.

The production of this packaged meal would have to be on a very large scale. This would permit the utilization of mass buying and large-scale production to lower the cost of the meals. When buying in season, a high quality at a comparatively low price is

obtainable. If a large amount of one item is purchased it is possible to utilize many by-products and cuts of meat which, due to their normally small quantity, could never be used advantageously. When, for example, lamb is processed, the foreshanks pose quite a problem. If only a few of them are available, they are often placed into lamb stew with the breast of lamb. But if a few hundred lambs are processed, there are sufficient foreshanks available to set up a separate production line to make potted lamb shanks. This dish can be sold at a higher price than lamb stew and, in turn, makes it possible to sell the lamb stew at a somewhat lower price. The better utilization of food is only one aspect of large-scale production. Since many processes are repeated continuously, many labor-saving devices could be installed. The most significant ones would be conveyors, to move the great volume of production from one place of operation to the next. This continuous flow of work is made possible by one more important change in cooked food production. Most cooked food is started at a given time to be finished at a specified meal hour. Those two points in time are the busiest in the kitchen. The long period in between contains a low level of activity. This causes food production in kitchens to be very inefficient. If food preparation could be started continuously to be ready

at a later time in an uninterrupted stream, the efficiency of the kitchen could be greatly increased. Since a finished product of a kitchen is normally consumed at the time it is prepared, the continuous production poses the problem of disposal of the finished meals. If the meal, after complete preparation, is packaged and frozen to be sold and eaten at a later date, then this problem too is solved.

This meal is prepared primarily with the white-collar worker in mind. To estimate the potential market it would be important to define and count, if possible, the potential consumers and find out how much they spend now for their evening meal. If this packaged meal can be sold for about this same amount or less, the meal could be used by the white-collar workers regularly without upsetting their budget. The white-collar workers are not defined in statistical studies. To get some estimate of their number, Bureau of Census Statistics were used. The classifications of the labor force by occupation groups list many divisions which can be identified with varying accuracy as white-collar workers. On the basis of this information it seems that in 1951 there were between 8 and 16 million white-collar workers. The actual figure probably being closer to 16 million. Of this amount about half were women, and half of the women white-collar workers were married. Those people

have on the average an income of $2,000 to $4,000 a year. According to some statistics of the United States Department of Agriculture, city dwellers in this income range spend for food on the average between $9 and $10 a week per person in families of two during the year 1947. In 1952 this would probably correspond to an expenditure of $11 to $14 per week per person in a family of two. This would be about $1.50 to $2.00 a day. Since the average expenditure for the evening meal is about half of the total daily allowance, it can be assumed that the white-collar worker usually spends between $0.75 to $1.00 for his dinner. To compete successfully with his present ways of buying food the packaged meal would have to sell at the same or a lower price.

The packaged meal must be sold at or near sufficiently large concentrations of white-collar workers. Most of those potential customers are engaged in administration and sales jobs in business, industry and government. Those jobs are located in the larger metropolitan areas. In some sections of the country, especially in the East, the white-collar worker is concentrated in the larger apartment house districts of the bigger cities. The food stores serving those areas at present could be used as distribution outlets for the packaged meal, if they have certain characteristics. The stores should

probably be supermarkets, having a large traffic and following of those potential customers. They need some extra floor space to install a considerable amount of freezer display cabinets to assure an ample supply and sufficient selection without curtailing the regular frozen food line. The meals could be merchandised in many novel ways, such as through food clubs (seafood club, game club, foreign food club), home deliveries of two weeks' supplies of a variety of menus, special reducing diets and many other ideas. Some other possible areas of sales would be special hospital diets and possibly industrial feeding operations. In the latter case the meals would probably have to be packed in counterpans, maybe 40 portions to a pan, and frozen in them instead of being packaged individually.

To compute the probable cost of some of the packaged meals, the food cost, labor cost and sales price of actual meals were used and compared with cost figures computed by the author. The actual meals which were used for comparison were precooked, frozen dinner plates produced for the United States Air Force. Those dishes consisted of a meat, a potato and a vegetable item. The portions were quite large and for the proposed packaged meal they were reduced. Out of the different cost comparisons it was found that a precooked, packaged, frozen meal of sufficient bulk and calorie contents could

be produced to be retailed at $0.75 to $1.00. The retail price was arrived at by allowing a 5 per cent markup on sales for the producer, an 8 per cent markup on cost for the wholesaler, and a 20 per cent markup on cost for the retailer. Those markups are customary in the frozen food field.

At that price the white-collar worker would be able to buy such meals regularly without increasing his food budget. This meal would offer a well-balanced, well-prepared dinner. It would also relieve the working housewife of the task of planning, purchasing and preparing a dinner, storing the left-overs and planning the next meal around them instead of having fresh food. The proposed product has the characteristics which indicate that it can solve the feeding problems of the white-collar worker and probably of many other people in similar situations. According to interviews conducted for this study, qualified men in the appropriate fields support this assumption.

From the food chain field the following people, upon questioning, expressed favorable opinions of this product and had constructive suggestions to offer: Mr. Merrill Morris, Vice President of Jewel Tea Stores, Chicago, Illinois; Mr. John Hofsase, head grocery buyer at the Grand Union Company, East Paterson, New Jersey; and Mr.

Sharon Burnham, meat buyer of the Kroger Company Branch in Grand Rapids, Michigan.

In the area of frozen food production and distribution, encouraging comments came from Mr. George Mentley, general manager of Sales and Marketing of the Birds-Eye - Snyder Division of General Foods Corporation, of New York City; of Mr. Edwin Willkie, Vice President of Libby, McNeill & Libby of Chicago, Illinois; and Mr. Frank Walsh of Armour & Company, Market Research Department, of Chicago, Illinois.

It is the considerate opinion of the author that a precooked, packaged, frozen meal, which would be satisfying, nutritious and tasty, can be produced to retail for approximately $0.75 to $1.00, that there is a sufficiently large market to warrant large-scale production and that this product will satisfy a need of a considerable section of the population. It must be kept in mind that not all technical problems related to this meal, such as contamination and standards for sanitation and bacterial count, have been successfully solved, although numerous precooked, frozen food items have been marketed for some time.

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