King Edward's Hospital Fund for London

1.

Interim Report

Prepared for the King's Fund

by

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on the

FROZEN MEALS EXPERIMENT

at

Darenth & Stone HMC

Prepared in February 1969

KHK 510

INTRODUCTION

1 Because of the ever increasing difficulty of obtaining and retaining skilled catering staff, particularly in the larger cities and comparatively remote country districts, the King's Fund felt that better use of the few skilled staff available could be achieved by the introduction of automation and mechanisation into catering.

2 Automatic cooking equipment has a high output capacity but it is expensive and the expenditure could only be justified if used for a number of hospitals. However to cook meals in one hospital and deliver hot to another hospital, possibly some miles away, would only tend to lower the standard of meals even further. Therefore, if a good standard is to be maintained some method of holding the foods in suspense until required was needed. Quick freezing seemed to be the best solution.

Frozen Meals System

3 The principle of this system is to cook food on a production line basis, portion into containers, quickly freeze soon after cooking and store until required at 0° to -5°F. This central production unit could be within a hospital or remotely situated. It would hold a stock of 4 to 6 weeks according to menu. When requisitioned by a hospital the food would be conveyed in insulated containers to the hospital concerned where it would be immediately placed again in low temperature storage (0° to -5°F) until required at the point of service. It is thought that these units which might be termed depot kitchens would hold up to one week's supply.

4 The points at which service might take place would be either in peripheral finishing kitchens or from a central kitchen in conjunction with a plate service depending on the topography of the hospital. The food would be reheated direct from deep frozen in hot air circulation ovens and served immediately. It is felt that this system will give better control and providing the right appointments are made should result in:

A good standard of meal being maintained

Better use being made of the few skilled staff available

An overall reduction in catering costs (food and staff combined)

The Experiment

5 In considering this experiment it was thought that a psychiatric hospital group would be the most suitable in which to introduce the system because

(a) Psychiatric hospitals usually have a large amount of kitchen and storage area

(b) Most patients are ambulant and therefore the majority could attend a central dining room which would simplify the experiment in the first place

(c) Darenth & Stone HMC was selected because the management, Secretary, Medical Superintendent, Catering Officer and Senior Officers were enthusiastic to co-operate. It was also supported by the Regional Board.

6 In undertaking this experiment, it was also thought that the King's Fund should endeavour to ascertain the optimum size of production unit.

The Potential

7 This experiment can be considered to be in three stages with three phases in the first stage. The first phase consists of producing some 4 000 meals per week in the production unit situated in part of the main kitchen and ex-bakery at Darenth Park hospital where the normal methods of 'freshly' cooked meals continue to be served for Darenth Park hospital. The frozen meals from the production unit are stored at Darenth Park and eventually distributed to Mabledon hospital approximately 1½ miles away where they are reheated and served. Approximately 150 patients are served in a central dining room and 20 - 25 are served in two wards. Forty to fifty staff are served at mid-day. The second phase of the experiment is to introduce the service to Stone House hospital which will mean increasing production to 14 000 to 15 000 meals per week, there being some 500 patients and staff.

Introduction

8 The third phase will bring Darenth Park hospital into the system and this will raise the production up to 40 000 to 50 000 meals per week.
The further stages will mean the introduction of other groups of hospitals.

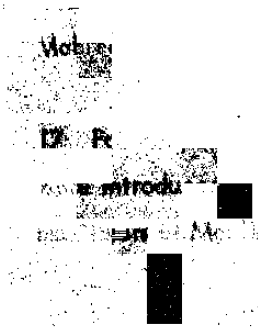
The Planning

9 In order to achieve staff savings it was considered essential to introduce a good deal of labour saving equipment in the first phase. Therefore the production unit is equipped to produce more meals than are required for the first two phases. The freezing plant is capable of freezing the requirements for the whole of the first stage (three phases). But low temperature storage installed at Darenth Park hospital is adequate for Mabledon hospital only.

10 At Mabledon hospital the dining room arrangements were reorganised and centralised. The patients' dining room was replanned so that there would be two separate dining rooms, one for patients and one for staff separated by a servery which would have separate service counters but communal heating units. Low temperature storage for 2/3 days was thought to be adequate initially although later with an officer in charge there should be a week's storage.

The Financing

11 It was estimated that the cost for the first phase, based on the above, would be about £36 000. The Regional Board allocated £10 000, the Hospital Management Committee contributed £2 500 out of their free monies and the King's Fund gave a grant of £23 000 plus expertise from the King's Fund staff estimated to be approximately £12 000 over three years.



POLICIES

12 Policy on a wide variety of items had to be decided before the experiment, some of which later, in the light of experience, had to be adjusted. The decisions and the reasons for them are given in the following paragraphs.

The Menu

13 Mabledon hospital, before the experiment, had a set menu for both patients and staff. Breakfasts consisted of a cereal followed by a hot main dish. The midday meal consisted of soup followed by a main dish with potatoes and vegetable. This was followed by a set sweet.

14 With the introduction of this new system it was decided to have a six week cycle menu. Breakfasts were to remain the same i e cereal plus a main dish. For the midday meal there was to be soup, followed by a choice of three hot and one cold main dish, with two kinds of potatoes and two kinds of vegetables. There would be a choice of three items for the third course.

15 The range of diets at this group of hospitals is not as great as is found in a general hospital and therefore it was considered that most diet requirements could be met from the standard selective menu.

Items to be frozen

16 It was decided to process all menu items that could be satisfactorily frozen. These included all meat dishes with the exception of cold meats, all vegetables and potatoes and all sweets. Fried eggs, boiled eggs and salads should not be frozen and it was decided to cook and serve these items as and when required at Mabledon.

17 Portion packs for such items as cheese, butter, biscuits, cereals, tea, coffee, etc were introduced to aid portion control. It was noted that there was sufficient spare man hours at Mabledon to enable the staff to produce instant soup and instant custard.

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Food Packs

18 In considering the installation of the plant it was essential to decide as to the form of container to be used as this would govern the freezing plant, the production unit's equipment and the finishing kitchen itself.

19 There seemed to be three main altematives:

(a) Plastic containers either bulk or individual packs

(b) A pre-plated frozen meal on a disposable dish either foil or plastic

(c) Foil containers either bulk or individual packs

Plastics

20 In considering plastic containers it was realised that the sealing of these would entail the purchase of expensive equipment to vacuum pack the products in the production unit together with equipment to de-seal them in the finishing kitchen. It was also felt that at this stage of development there would be difficulty in re-heating such items as required browning in an oven, e g steak pie, roast potatoes etc.

Disposable Plates

21 Due to the fact that many patients were long stay it was felt that a pre-plated meal on a disposable plate, whether foil or plastic, was not acceptable. The idea was therefore rejected for this stage of the experiment.

Aluminium Foil

22 Foil packs cannot be satisfactorily vacuum sealed only ice sealed. The life of ice sealed frozen food with full flavour is thought to be only one tenth of vacuum sealed foods. However, because it was intended to rotate stock on a 4 to 6 week cycle in accordance with the menu it was decided that there was no advantage in the longer shelf life. On the other hand there were certain advantages with aluminium foil. It is a good conductor of heat and cold. The normal hot air circulation oven could be used for reheating without worry of high temperatures. A further advantage was that it was thought that no comparatively expensive equipment would be needed for sealing and de-sealing. Therefore it was decided to use aluminium foil.

Lids

23 A plain cardboard lid gives taint to the food, therefore it was decided to have a foil lamination.

Size

24 It was decided to use a semi bulk pack which would contain some 5-6 portions. This would enable the patient to ask for a small or large portion of a particular item whilst enabling the catering staff to maintain good portion control, on the basis of the law of averages. This size would also be suitable for hospitals with wards of 20-25 patients allowing a choice menu to be offered without having to split larger packs.

25 It was felt to be desirable to have a container which would fit, what is generally considered in the catering industry to be a standard service counter cut-out (22" x 10"). To meet these requirements a foil container measuring 9" x 7" x 1¼" was produced.

26 However on the grounds of eye appeal it was thought that some foods would look better in round dishes. Therefore it was decided that fruit tarts should be in 9½" round foil containers (packs). The lid for these containers (packs) was cut foil pieces.

THE PRODUCTION UNIT

27 In considering planning the production unit a long term view was taken in that whilst the small numbers at Mabledon do not warrant the high expenditure on a mechanised production kitchen, it was realised that to put in equipment adequate for Mabledon only would delay, indeed might obstruct, further development. Further to consider Mabledon only could not be regarded as an experiment as it would only be a repetition of the Leeds experiment. However, in adopting this policy of mechanisation and to some extent automation it was thought possible to show that production could be more efficient and man hours (labour) could be saved by its

introduction. To the extent of money available mechanical equipment was installed. The layout is shown in Appendix A . . From this it will be seen that there are the normal boiling pans and steaming ovens.

Layout

28 In planning the layout consideration had to be given to

(a) Darenth Park hospital in which the production unit was being installed having to continue to produce meals on conventional lines for 2 or 3 years

(b) New ventilation equipment had already been installed, and the services were being laid for conventional boiling pans and steamers.

29 Fortunately the kitchen was in two sections having a dividing wall of 18" thickness apart from two 4' openings connecting the two halves of the kitchen. So by resiting some of the equipment it was possible to obtain enough area to plan packaging lines and introduce an automatic cooker with space for a further one when expansion became necessary.

30 In regard to the area for freezing and storage it was possible to make use of a disused bakery which was sited approximately 40' along the corridor from the kitchen exit.

31 The equipment which it was decided to introduce being different from the usual conventional kitchen equipment, is described below.

Continuous Cooker

32 It was originally thought that two continuous cookers would be required, one for boiling and one for frying. The output from the fryer was such that it became obvious that if the one machine could be designed to handle both operations a considerable saving in capital expenditure could be achieved initially. Discussion with a manufacturer revealed that this was a practical proposition providing the machine was fabricated in stainless steel. The machine had to have an adjustable speed of travel

from 3 minutes to 30 minutes. This machine has this propensity: indeed it can be adjusted to operated from 7 seconds to 42 minutes.

Humid Air Cooker

33 This is a low temperature cooker with a high humidity. It operates at 91°C (160°F) to 100°C (212°F). As this is a comparatively new introduction to the catering industry in England, although it has been used for many years by the meat and bacon processors, the manufacturerers kindly loaned one to the King's Fund for experiments in order that a decision could be reached in regard to its suitability for the production unit. Following these experiments a cooker was installed.

Conveyor Belts

34 To facilitate the transference of individual packs from one process to another it was decided to install conveyor belts. Because of the limitation of the building two had to be sited one at right angles to the other. The belts have a variable speed of 0-50' per minute and are formed of a continuous, washable, good quality non stretch plastic coated fabric. Care was taken to ensure that the 'packers' on the production line could easily reach across the belt if need arose. The height of the belt was standardised at 35" the same as all working and packaging surfaces.

Sauce Filling Machine

35 As strict accuracy was required for quantities of sauce it was decided to instal an automatic filling machine. It has a capacity of 10 gallons and it can be adjusted to deliver ½ oz to 20 ozs by the press of a button. It was also thought desirable to have an agitator to ensure that there would be an even distribution of garnish throughout the dispensing of the sauce.

Bag Sealer

36 It was decided that when the unit came into large scale production, sauces which normally are served separately, would be frozen in a plastic bag and re-heated by plunging into boiling water. To save labour it was decided to have an automatic bag sealer.

Foil Dispenser

37 To facilitate packaging it was thought desirable to have an automatic foil dispenser. A prototype was designed and installed on the packaging line.

Lid Sealer

38 A lid sealer for the oblong food pack was hired which was foot operated. Round packs were to be wrapped with foil by hand as there was no machine on the market.

Other points

39 Other points which although could not be considered automatic but nevertheless contribute to efficiency, were seats for operators. Seats for all operators are provided where they are static for a reasonable period. The height was particularly studied and a footrest also positioned on the stool.

40 In order to ensure a standard reheat time it is essential that the exact amount of food, according to the dish, is placed in the foil container. Accurate scales were purchased, one for each packaging point.

The Freezing Plant

41 Having decided on the size of food pack to be used and the items to be frozen it was possible to design the freezing plant.

42 The requirements of the plant were to reduce 800 lbs of food from an ambient of 90°F to -5°F in two hours. The systems of freezing available for consideration were

(a) Plate
(b) Nitrogen
(c) Blast

43 It was considered that the plate freezers on the market were not suitable for this operation. Nitrogen freezing was not a practical economic proposition.

Therefore the method selected was blast freezing which appeared to be the more flexible and was the cheaper of the two systems that might be used. Some difficulty was experienced in the planning stage in as much as that no company would guarantee the performance of their plant. Following discussion with the manufacturers it was decided to install two units to ensure that any breakdown in equipment would not incur a complete shut down of plant. One freezer was to operate with 2 x 10 h p compressors as specified by the manufacturers and a second freezer to operate with 3 x 10 h p compressors with appropriate adjustment to its size and plant requirements. Multiple units were installed rather than a single plant to insure that any breakdown in equipment would not mean a complete shut down of plant. All units, including the cold storage room, are fitted with automatic defrost, heated drain lines, door heater gaskets and internal door release mechanism.

Storage

44 It was decided to install in the production unit enough low temperature storage to cover a six weeks stock for Mabledon hospital. The room was to be sufficiently well insulated and powered to hold this stock at 0-5°F. It was thought a room measuring approximately 28' x 15' x 7' high would meet these needs. A 5 h p compressor was used. A floor heater mat was also fitted.

Transportation

45 It was considered that insulated containers would be required to carry the meals from Darenth Park hospital to Mabledon. It was thought to be expedient to purchase standard containers constructed of fibre board cas ing with 1" expanded polystyerene insulation protected by galvanised iron. A removable polythene insert which can be easily cleaned forms the contact with the foil containers. There are strap on lids.

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THE FINISHING UNIT
(Mabledon Hospital)

Storage

46 It was decided to have storage at Mabledon hospital for only 1 or 2 days in the first place in order to keep a tight control. Four 20 cu ft cabinets which would keep the food at 0° to -5°F were considered adequate.

Preparation for Service

47 It was decided that the best method of reheating the majority of the foods would be by hot air circulation ovens. Two were therefore installed, one from each of the English manufacturers (at that time). It was though a small number of foods might be better reheated by either steam or deep fat and therefore a steamer and a deep fat fryer were installed. Two boiling rings were also sited for the frying and boiling of eggs and the making of soup and custard (reference policy para 16).

THE OPERATION and Assessment up to date

The Menu

48 During the first few weeks of the experiment the menu was as the original policy. Later it was reduced to a 4 week cycle in order that the production could be scheduled on a 4 week basis and cut down the amount of frozen food required to be stored. It was also discovered that the range of choice was too great and tended to confuse patients, who were unaccustomed to choosing dishes. In view of this the choice of meats was reduced to a range of two hot dishes with two kinds of potatoes and two vegetables. The range of sweets remained as originally agreed. The breakfasts and evening meals remained as planned. At the weekend there was no selective menu as the numbers of patients and staff taking meals was reduced.

Items to be frozen

49 It was found that was no reason to deviate from the original policy.

The Containers

50 The containers were found generally to meet requirements, all the dishes containing five portions except chicken and fried fish which are in 4 portions and steak pie which is 6 portions. The fruit tarts are suitable for 6-8 portions according to meal requirements.

PRODUCTION UNIT

Layout

51 The layout up to date seems to be correct bearing in mind the building limitations as mentioned in para 27.

Continuous Cooker

52 Whilst there has been a number of teething troubles with this cooker, it was to be expected in view of the fact that this was the first to be purchased for dual

purpose (frying and boiling). Other factors, external to the machine may have contributed to some of the breakdowns, such as equipment required for fire regulations being added afterwards. Also the positioning of this equipment may have resulted in its being affected by draughts which cannot be avoided because of the dual operation of the whole kitchen, ie conventional cooking and production line cooking. Apart from these early difficulties the machine has come up to expectations. It has been found that the frying temperature can be reduced in this type of process resulting in a much longer life for the cooking oil. However to achieve this benefit it is necessary to have a greater production; otherwise the oil may have to be disposed of due to lack of use causing deterioration through oxidisation. It is also comparatively easy for management to assess the total time required to process a given quantity of produce. Thus it is possible to adopt factory production line principles, allowing for meal and trea breaks, personal relief and factory cleaning times. When output justifies it an automatic feed hopper should be added.

Humid Air Cooker

53 This cooker also came up to expectations. It was found that meat and bacon joints processed in this cooker gave higher yields than the conventional system of roasting and boiling and that consumers who tested the food could not detect the difference when they were offered cuts from both conventionally cooked and frozen joints, and those cooked with this low temperature high humidity system.

54 Some concern was felt with regard to the long cooking of joints at comparatively low temperatures and exhaustive bacteriological tests were undertaken to discover whether or not harmful organisms would be incubated or killed off during this process. Providing there was a strict control of the operation, no harmful bacteria would survive the process, other than the normal heat resistant spores which may also survive in conventional methods of cooking (roasting). In order to govern this and to ensure maximum control, all joints are packed in a standard plastic casing of 4" diameter by 14" long. They are then placed in the humid air cooker for $4\frac{1}{2}$ to 5 hours at 85°C (185°F), after which they are cooled rapidly before slicing and packaging. It should be noted that the time lapse between removal from the

cooker to slicing the freezing should be no more than one hour. This size of joint not only allows for good heat penetration, but allows a uniform slice to be packed in the foil containers, thus controlling the portion size even before scaling. All jointed meats are processed in this manner with different sauces and garnishes being added to the pack for roasts, braising, etc.

Conveyor Belts

55 The belts have operated fairly satisfactorily, but movement from one belt to the other which is at right angles still creates a certain amount of difficulty. Obviously more thought must be given to this operation.

Sauce Filling Machine

56 This machine has been used up to date for the addition of garnishes but not soup and custard. In this phase of the experiment it was considered undesirable to use it for these latter items as it would prove more economical (man hours) to arrange for the servery staff at Mabledon to make them.

Bag Sealer

57 This has been used experimentally only for sauce filling.

Foil Dispenser

58 This did not prove satisfactory in use and is being redesigned.

Lid Sealer

59 The foil sealing equipment is foot operated by female staff. Although the first sealer operated reasonably well an improved model was designed which is more efficient. The rate of packaging is timed to operate at some 8 packs per minute although with experience this could be increased to some 10-12 packs. This rate of packaging is sufficient for this phase of the development although consideration to the introduction of fully automatic machinery ought to be given for the next phase of the experiment.

60 With regard to the 9½" round foils, difficulty was at first experienced in hand wrapping. However with the machine developed by the manufacturers this operation is approximately the same speed as that for rectangular foil containers.

Other points

61 The stools provided were found to be effective judging from the observations made by the staff using them. The seats have adjustable backs and heights and are covered with non-absorbent washable plastic.

62 Considerable efforts were made to train the staff to use the scales and any process that has a time schedule had to be adjusted to ensure that sufficient time was allowed for the correct use of the scaling equipment. At this stage it was not possible to justify automatic scaling equipment but it is envisaged that consideration must be given to this as the unit expands to enable the labour content of this operation to be reduced.

Freezing Plant

63 The system of freezing is that the sealed foil packs are placed on to trolleys designed to fit the blast freezer, and wheeled into an air blast of -30°F for a 2 hour period or until the internal temperature of the pack has been reduced to -5°F. The frozen produce is then wheeled into the low temperature storage and held at -5°F until such time as the produce is required for despatch to the hospital.

64 Apart from difficulty experienced with door seals the plant has functioned satisfactorily, the higher powered unit proved to be the better. It should be noted that the freezers have to extract some 130 000 BTU's per hour.

65 However to ensure maximum efficiency of running future installations should have Star Delta starters in place of theDirect-in-line starters of the present units.

[redacted]

Storage

66 The 5 hp compressor used was found to be adequate and maintained the required temperature. It will be realised that the work for this plant is far less than for the freezing operation as it has only to maintain a low temperature, the only heat to be extracted being the body heat of any operator inside the cold room, heat produced by the cooling fans and heat leaking in from outside the cold room through the door when opened and the insulation of the cabinet.

67 It was found that close supervision of the refrigeration contractors work was necessary at each stage of the operation. For example the vapour seals on the cold room floor were not as per the specification and the floor was relaid 3 times before it was acceptable.

Transportation

68 The insulated boxes are taken into the cold store and filled the evening before despatch so that both containers of food and box are at -5°F. Immediately before despatching to Mabledon the boxes are sealed. There is a daily delivery two days in advance of the menu. This is arranged in case there should be any breakdown in transport arrangements.

69 The boxes have been tested for insulation value and it has been found that a box fully packed will rise only 1°F in six hours in an external temperature of 60°F.

70 As regards wear, up to date no damage has been experienced. The weight of the loaded box which holds 36 containers is 84 lbs and this has created hadnling problems with the female staff at Mabledon hospital. Consideration is now being given to having smaller boxes with a total loaded weight of no more than 30 lbs.

FINISHING UNIT
(Mabledon Hospital)

71 The cabinets installed have functioned reasonably satisfactorily. However on the grounds of conserving energy and indirectly saving labour a cold room to hold a week's stock is to be installed. By using smaller boxes as mentioned above it is hoped to save a certain amount of handling. For example, under the present system the boxes loaded in Darenth Park store, unloaded to store at Mabledon, and loaded on a trolley (after having been checked for contents) to be conveyed to the reheating units. By using smaller boxes which will be loaded in Darenth Park store with appropriate labelling for the correct day marked accordingly, they will not need to be unloaded from the boxes until the food is to be put into the reheating unit.

COSTS

Capital

72 The total capital expenditure for this first phase has been £32 262.17.0. divided between equipment £24 114.13.9. and structural including services £8 148.3.3. However the whole of this should not be costed against the setting up of the first phase. For example, the equipping of the dining rooms should have been a normal improvement expenditure. The same might apply to the continuous fryer which, although nearly six times the cost of replacing the present deep fat fryers at Darenth Park, the full cost has been set against the frozen meals experiment. However, it should be borne in mind that this continuous cooker would also replace certain steamers and boiling pans.

73 A summary of the expenditure (details Appendices B& C) has been as follows:

Darenth Park			
	Equipment	£19 777	
	Structural	£ 2 764	£22 541
Mabledon			
	Equipment	£ 4 337	
	Structural	£ 5 384	£ 9 721
			£32 262
Less			
Cost of upgrading dining rooms			
	Equipment	£ 2 292	
	Structural	£ 5 384	£ 7 676
			£24 586

[redacted]

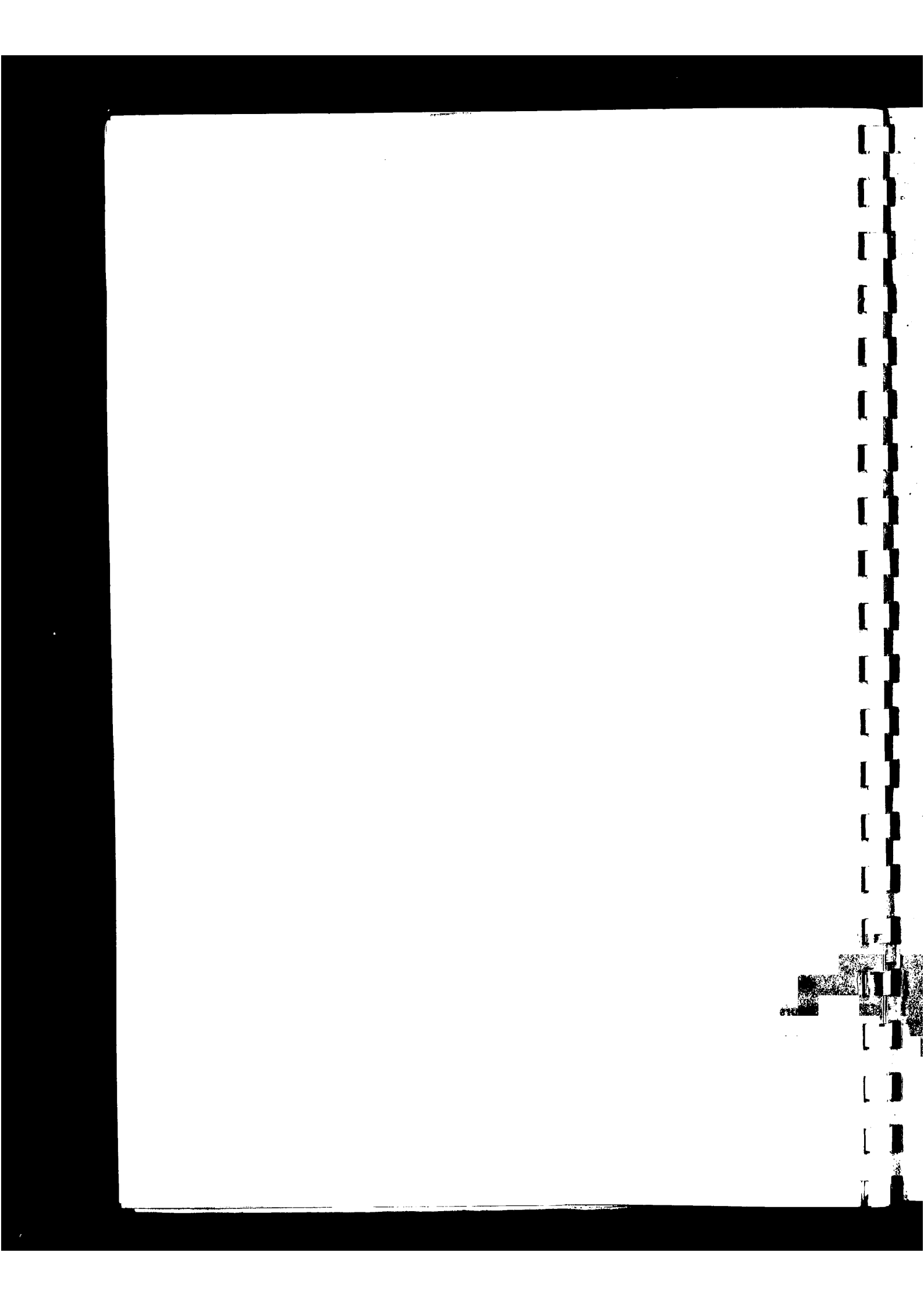
74 A comparison with a conventionally equipped kitchen is not being made at this stage as the production area and freezing plant are capable of dealing with the whole group. The final report will give comparable costs of equipment.

Maintenance

75 Under this heading coule be included the cost of staffing, gas, electricity, lighting, heating, depreciation of equipment, preventive maintenance, servicing of equipment and transport. To show the cost of gas, electricity, lighting and heating could be misleading because it would be an estimate based on the rated maximum consumption of each item. Further as the previous kitchen at Mabledon, which is now closed, was never metered there would be nothing on which to make a comparison. For what it is worth the impression gained by observers is that the cost would be little different on these items.

76 In regard to the maintenance and servicing of equipment it is felt that they may be a little more costly than for conventional catering systems but as no facts are available for the cost of servicing the previous equipment this item is omitted. Depreciation is another difficult item to cost. Gnerally 10% would be the allowance but it is well known that in hospital kitchens, equipment may still be in use that is 20 or more years old. So perhaps for this interim report this item should also be omitted although the final report must include this and give a comparison with the present conventional systems of equipping. Transport too has not been costed as from observations the number of hours was comparable with the previous system.

77 It is possible however to give a comparison of staff costs. Prior to the closing of the Mabledon kitchen nine staff were employed and the average man hours worked per week, over a period of 4 weeks (April 1967 because it was outside the holiday period) was 360 hours per week and this cost £682.14.9d. fpr the 4 week period. On this year's wage rates this would have been £725.13.5d. per



28 days. The dining room worked on average 360 man hours per week during the above period and it cost £597.0.6d. for the 4 weeks. On today's wage rates this would have been £650.0.6d.

78 It should be noted that the production for Mabledon can be done in 60 man hours per week although a total of 112 man hours per week are required to produce, store and dispatch meals for Mabledon and cost £175.12.8d. for 4 weeks. To make up a full working week the 4 staff are employed as required on conventional cookery for Darenth Park hospital.

79 The man hours worked by the dining room staff at present is 313 hours per week and costs £524.18.6d. per 28 days on average. In making a comparison it should be borne in mind that previously nursing staff served the patients. Today the nurses observe only and assist any patient needing help. This saving in nurses' time (approximately 17¼ man hours per day) is not credited to the frozen meals ystem as shown below in the comparison. Nevertheless it must be beneficial to the patients that the nurses are available. A summary of the costs between the two systems as costed for April 1967 and February 1969 is shown below:

Conventional System (as in April 1967)		Frozen Meals System (as February 1969)	
Kitchen staff	£683	Production kitchen	£176
Dining room staff	£597	Dining room	£525
	£1280		£701
Net saving calculated	£7527 per annum		

80 A fairer comparison would be to show the cost of the conventional system under the new rates of pay, as follows:

Conventional System		Frozen Meals System	
Kitchen staff	£726	Production kitchen	£176
Dining room staff	£650	Dining room	£525
	£1376		£701

On this calculation it is considered that a saving of £8775 per year could have been made.

[redacted]

81 To these direct catering labour costs should be added management costs. It is estimated that the Group Catering Manager devotes 25% of her time to Mabledon, 25% to Stone House and 50% to Darenth Park hospital. The Assistant Group Catering Officer was employed full time at Mabledon hospital. The two clerks in the catering office at Darenth Park worked a nominal 5% of their time on Mabledon in such items as typing menus, staff records, etc.

82 From a discussion with the Hospital Secretary it would seem that the following hospital staff as mentioned below were incolved with catering stock control, audits, etc. One storekeeper full time, female clerk's time 25%, male clerk's time 50% (vide 2nd Report King's Fund, para 22, July 1969).

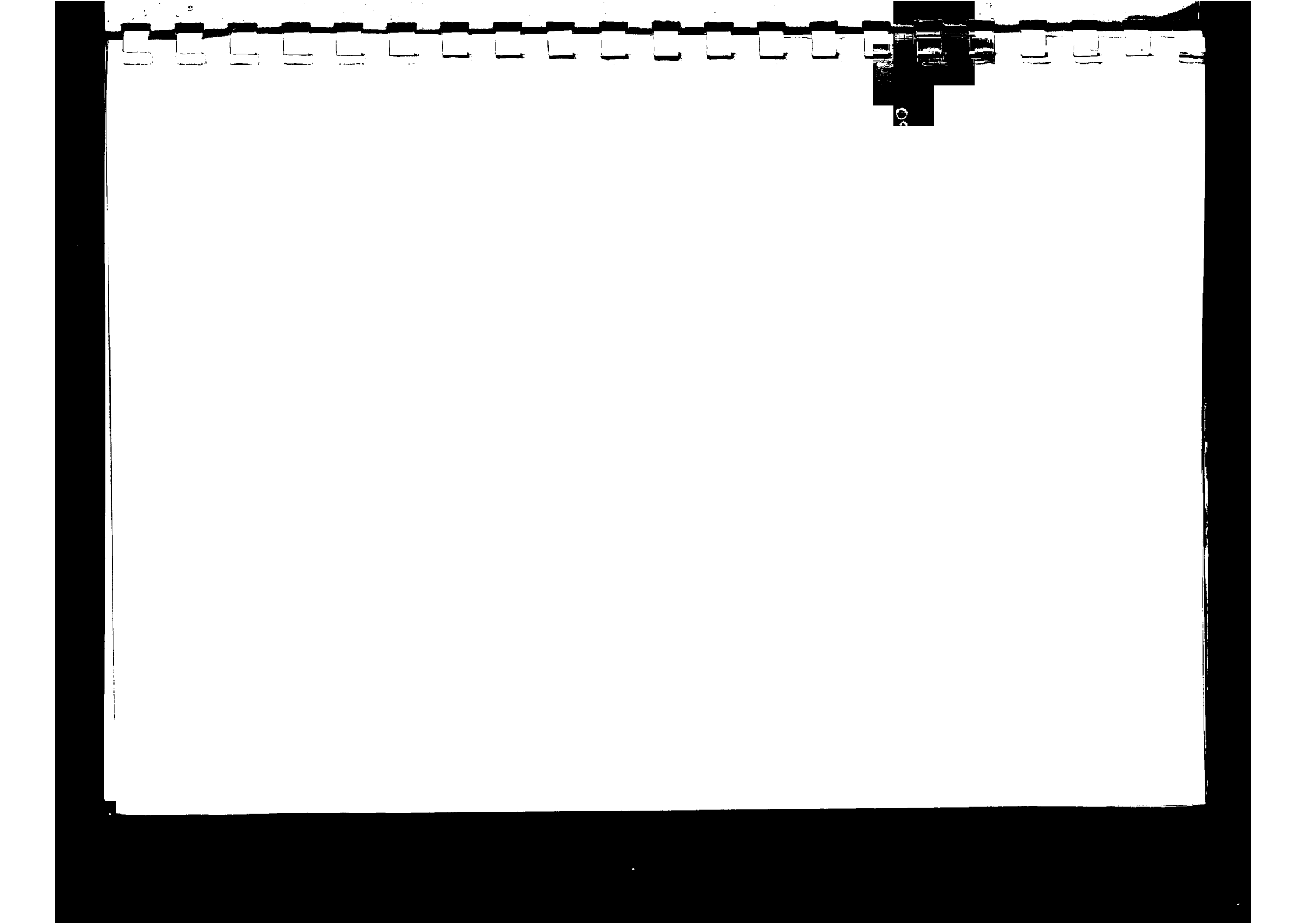
83 The management costs were £232 as against £177 for 4 weeks with the frozen meals service. Details are given in Appendix D.

Food Costs

84 A comparison of food costs is given below. The first column gives the cost per head per week 1967 on the conventional system, the second column is the cost for the frozen system.

July	£1 18 3	£1 7 4
August	£1 14 8	£1 10 7
September	£1 15 4	£1 6 1
October	£1 13 6	£1 9 1
November	£1 11 9	£1 7 6
December	£1 16 10	£1 8 11
Average	£1 15 1	£1 8 3
		5 9 (foil)
		£1 14 0

This indicates a saving of approximately £565 in a full year. It has now been found possible to salvage the used foils and it is estimated that a further saving of approximately £455 per annum can be achieved.



CONCLUSIONS

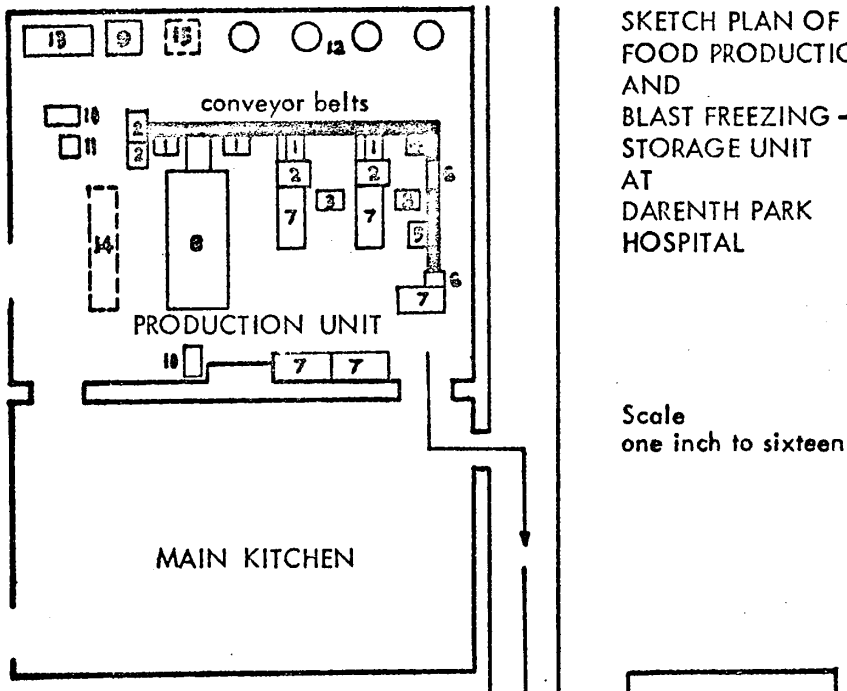
85 The conclusions reached by the King's Fund is that the frozen meals service maintains a good standard of meal presentation (better than previously), that the cost of food including foils is comparatively no greater than before, and labour costs are considerably reduced.

86 However the equipment in the production unit is under used and that the introduction of a second unit, ie Stone House, it should be possible to begin organising on production line principles, and so create greater efficiency.

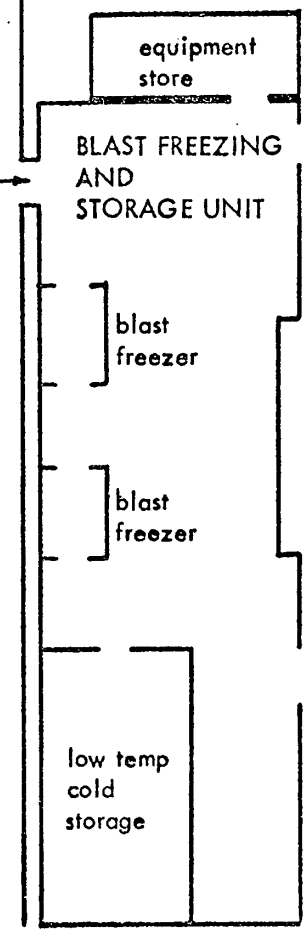
87 Whilst the freezing equipment is adequate for the 2nd phase the storage capacity will have to be increased. It is recommended that adequate low temperature storage is installed for the 2nd phase and to cover the 3rd phase as well since it would be more costly to install it in two separate stages.

APPENDIX A

SKETCH PLAN OF
FOOD PRODUCTION
AND
BLAST FREEZING -
STORAGE UNIT
AT
DARENTH PARK
HOSPITAL



Scale
one inch to sixteen feet



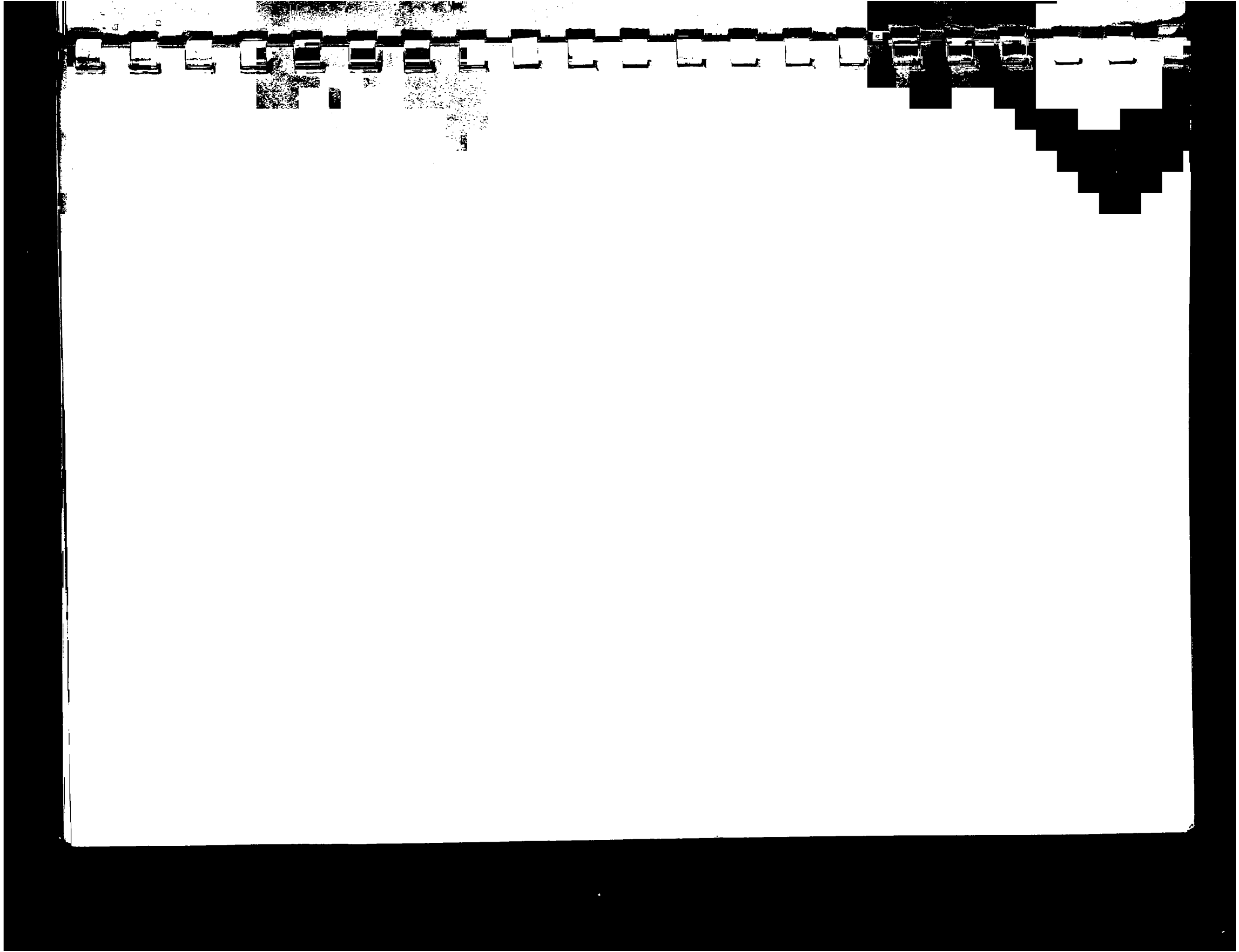
1 Mobile packaging units with scales and food pack dispensers
2 Mobile food trolleys
3 Mobile tables with slicers
4 Sauce dispenser
5 Mobile table
6 Food pack sealers
7 Tables
8 Continuous cooker
9 Humid air oven
10 Mixers
11 Puree machine
12 Main kitchen boiling pans
13 Main kitchen Wet steam ovens
14 Future continuous cooker
15 Future Humid air oven

CAPITAL EXPENDITURE

COST OF PRODUCTION UNIT

(Darenth Park Hospital)

	£ s d	£ s d	£ s d
STRUCTURAL (Building & Engineering)			
Cooking & Packaging area			
Pyro Cables	59 13 7		
Proportion of materials ex stores	100 0 0		
Proportion of direct labour	250 0 0	409 13 7	
Freezing & Storage			
Electrical supply cables etc	175 9 3		
Removal of bakery equipment excavations & air cooler housing	1929 4 8		
Proportion of direct labour	250 0 0	2 354 13 11	2 764 7 6
EQUIPMENT			
Cooking & Packaging area			
Freezing trolleys	720 0 0		
Humid air cooker	869 10 0		
Conveyor lines	995 0 0		
Sauce filling machine	1350 0 0		
Bag sealer	558 0 0		
Scaling equipment	120 0 0		
Mobile troughs, tables, units, etc	766 15 0		
Continuous cooker	4779 10 0		
Label printing machine	55 0 0		
Protective clothing	63 0 0		
Seating	87 8 6		
Sundry items	23 16 9	10 388 0 3	
Freezing & storage area			
Blast freezers	6321 0 0		
Cold room	2392 0 0		
Electrical controls	422 0 0		
Cold room racking	254 0 0	9 389 0 0	19 777 0 3
			22 541 7 9



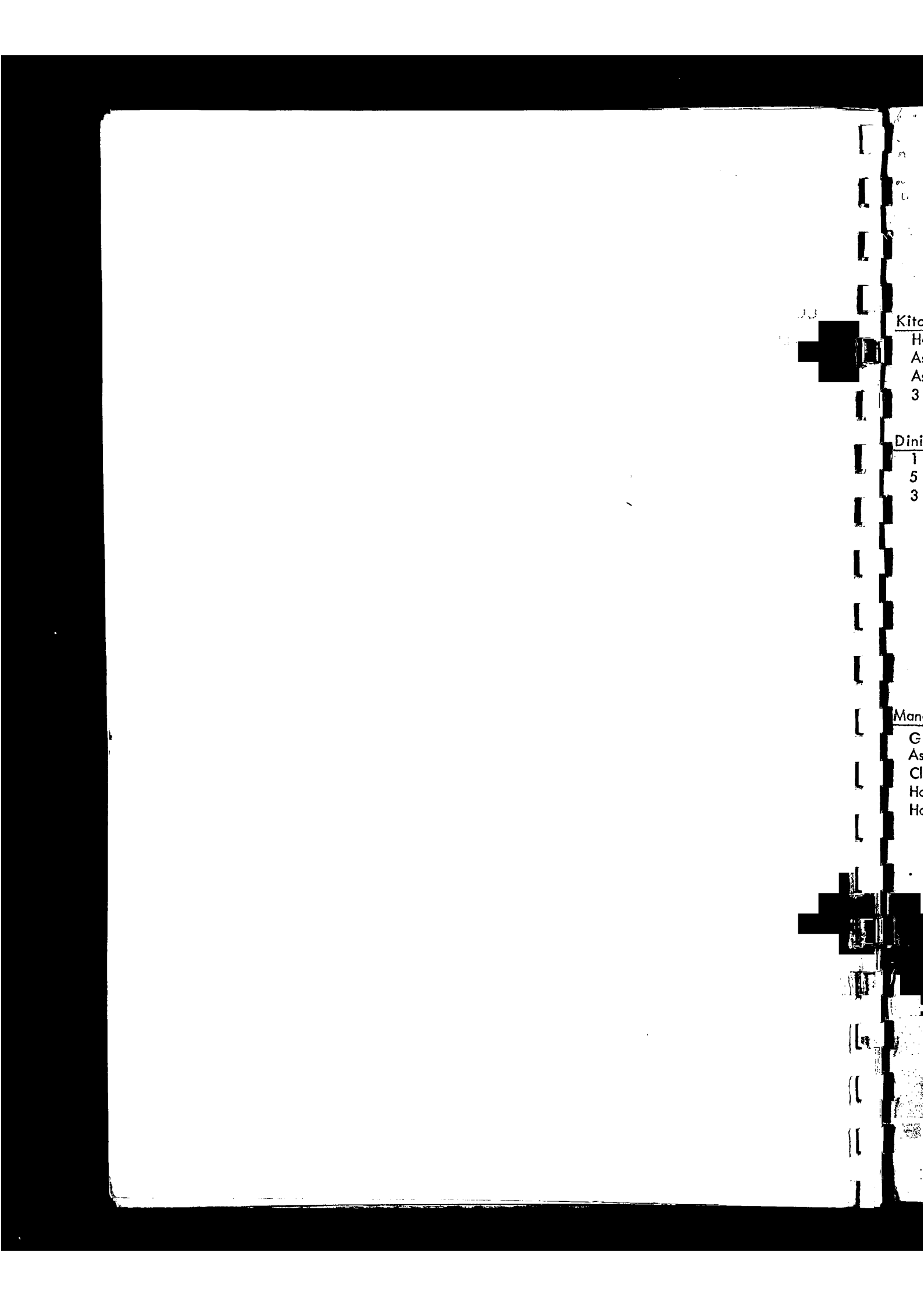
APPENDIX C

CAPITAL EXPENDITURE

COST OF MODERNISING DINING ROOMS
(Mabledon Hospital)

STRUCTURAL (Building & Engineering)	£ s d	£ s d
Partitioning	1 562 0 0	
Electrical supplies	686 10 0	
Dining room	2 204 10 3	
Ventilation	843 4 6	
Proportion of materials ex stores	88 0 0	5 383 15 9
EQUIPMENT		
Service counters complete	1 329 15 0	
Benching	166 0 0	
Deep fat fryer	117 12 6	
Refrigerator 20 cu ft	153 19 0	
Microwave oven	525 0 0	2 292 6 6
ADD		
Conversion to finishing kitchen	1 114 0 0	
4 x 20 cu ft low temperature refrigerators	931 0 0	2 045 7 0
2 Hot air circulation ovens		9 721 9 3

The [illegible]
has been
most provid
account pa[illegible]



STAFF COSTS

APPENDIX D

Comparison between conventional and frozen meals system

Conventional system at Mabledon

4 weeks actual costs April 1967. Adjusted for today's pay rates

	£ s d	
Kitchen		
Head Cook	147 3 3	
Asst. Head Cook	138 18 11	
Asst. Cook	113 18 8	
3 Porters	282 13 11	
	682 14 9	726
Dining Rooms		
1 Charge Hand	85 3 6	
5 Messmen	393 7 6	
3 Messmaids	118 9 6	
	597 0 6	

No Production Unit

Management		
Group C O 25%	32 0 0	
Asst G C O	85 0 0	
Clerical 5%	2 12 0	
Hospital Admin.(Mab)	50 18 0	
Hospital Stores "	61 13 8	
	232 0 0	

Frozen Meals system

	£ s d
Kitchen	
Closed	Nil
Dining Rooms	
Supervisor	57 5 0
2 Charge Hands	108 7 1
2 Messmen	170 9 7
2 Messmaids	99 16 11
2 Cafeteria Assistants	88 19 11
	524 18 6
Production Unit	
(calculated on 4/5 basic rate)	
1 Male Cook	65 15 4
1 Female Cook	50 10 8
2 p t Assistants	59 6 8
	175 12 8
Management	
Group C O 25%	33 12 0
Asst. G C O	89 5 0
Clerical 75%	60 0 0
Hospital Admin(Mab)	Nil
	182 17 0

	4 weeks	Pro rata annual cost
Conventional System		
(pre experiment) Actual cost 1967	£1512	£19 656
Adjusted cost 1967 for new pay rates	£1619	£21 047
Frozen Meals System	£ 884	£11 492
Annual estimated saving		£ 9 555

The estimated saving does not take into consideration that there has been no charge made for the overall supervision and management provided by the King's Fund staff. If this were taken into account perhaps a fairer estimate of saving would be £5000.