COUNCIL FOR NATIONAL ACADEMIC AWARDS

A NUTRITIONAL SURVEY OF SHEFFIELD SCHOOL MEALS.

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SUMMARY.

The aim of the Sheffield School meals survey was to investigate the nutritional content of the food as offered to, as eaten by and as left on the plate by the children at school lunch. The childrens' food preferences were also examined, together with any interrelationships between these and the plate waste results.

The survey was carried out in 35 primary schools, a sample size of 17.6% of the total number of primary schools in Sheffield. There were two parts to the survey: the measurement of food during school lunch and the administration of a food preference questionnaire.

The measurement of food yielded the following information:-

a) Amount of food served to the children,

b) Amount of food eaten by the children,

c) Amount of plate waste left by the children,

and from this information various nutritional calculations were made. Before the preference questionnaire could be handed out, a pilot survey was carried out on three different formats and the most suitable one was chosen for the major survey.

Information obtained from the questionnaires included preference ratios of the foods tested as well as indication of the childrens "understanding" of food items.

It was found that the nutritional content of the meals in Sheffield did not reach the standards set by the Department of Education and Science. The average plate waste value was 8% and several factors influenced the amount of plate waste including food groups, type of service, social

groups and teacher's participation in dinner duty.

The foods which the children liked best were chips and icecream and the least popular foods were vegetables. These preference ratios were affected by the type of questionnaire used, the age of the child and the name of the dish or food.

Preference ratios and wastage values of food groups correlated well but those of the individual food items did not. However, ranks of the popularity of foods obtained from the questionnaires correlated well with the ranking orders obtained from the waste measurements.

In conclusion, there are many factors, including preference, which affect the amount of food eaten at school lunch.

Abbreviations.

KCALS	-	Kilo Calories.
MJ	-	Mega Joules
RDI	-	Recommended Daily Intake (of nutrients).
HMSO	-	Her Majesty's Stationery Office.
DES	-	Department of Education and Science.
NAEMA	-	National Association of Educational Meals Advisors.
DHSS	-	Department of Health and Social Security.

CHAPTER I.

Introduction.

School meals surveys are usually carried out to assess the success or failure of the school meals service in satisfying the nutritional needs of the children. There is no point in providing meals which the children do not like and which will not be eaten. Consequently, the meals served must suit the tastes of the maximum number of children without encouraging bad food habits. Local government budgeting control cannot be ignored in the present economic climate, as a large amount of money is spent on school meals at the present time (gross annual cost in 1975-76 was £471,000,000).[1] It is important that the method of catering is as economic and as successful as possible and that the amount of food waste is kept to a minimum.

It is interesting to cover briefly the development of the school meals service during the last hundred years and to consider it in conjunction with the improvement of nutritional status in the population as a whole. The role of the school meal has changed throughout this century from one of a charity, available only to the very poor, to one of an accepted and necessary part of school life which is available to all children. However, free school meals, which are now given to children from families in need, can still be regarded as fulfilling a charitable role today.

1.1. A Brief History of School Meals.

(For a more detailed account see references 2 - 8.)

The school meals service has developed in this country in conjunction with the educational system. The first

schools for the poor in Victorian times was run by the church or by voluntary organisations, e.g. the British and Foreign School Society. Food was offered at these schools either as a charity or for a small charge. In 1870, an act was passed giving every child the right to be educated and the school boards were set up. The boards were given the power, if they chose to use it, to compel attendance at school by making byelaws to that effect. By 1876, 50% of the population were under such compulsion although this varied from area to area. The 2,568 school boards in England at this time were more or less compelled to provide meals in the poorer areas of the country, as otherwise the childrens' attendance at school would not have been possible due to their poor nutritional status. At this time, there was a scheme in progress called the 'code of grants': schools received their next quota of money based on the present educational achievements of the pupils. Many children were so badly fed that they arrived at school faint with hunger and this impaired their learning abilities. Thus, it benefitted the teachers to make sure that the children partook of some food whilst at school. One remark from a village school teacher was "this is not charity but far-sighted self-interest - we feed them in order to getmore money out of the government".

Mundella's Act in 1880 made education compulsory for children between five and ten years of age and this exposed still further the evils of poverty as hordes of diseased and starving children came into the middle class public eye. People were becoming more aware of the disparity in the social situation and the foundation stones were being laid for social reform.

The next step in the development of school meals was indirect, coming from information brought to light by the army. During recruitment for the Boer War, 1899-1902, many young men were found to be unfit and badly nourished and this led to the belief that the English race was in a state of deterioration. In 1903, a Royal commission on physical training in Scotland recommended that education authorities, together with voluntary organisations, should provide school meals. This led to the report of the Interdepartmental Committee on Physical Deterioration of 1904, which urged school feeding and regular medical inspection of children. These were some of the factors which led the government in 1906, to pass the Education (provision of meals) Act, empowering all LEA's to provide milk and meals for elementary school children who were unable to learn because they were suffering from malnutrition. The authorities were either to make use of existing voluntary services or to provide meals themselves, and an extra ½d. could be put on the rates for that purpose. It was not until 1914 that the Exchequer gave grants equalling half the cost of the school meals expenditure.

Between the wars, school meals continued and although they were not provided everywhere in the country they did relieve some of the strain of unemployment, with some authorities providing as much as three meals a day throughout the year. The number of school meals being taken only rose slowly between 1935 and 1939 from 143,000 to 160,000. However, studies in nutrition during the interwar years emphasised the importance of school meals. Sir John Boyd Orr[2] carried out a survey which concluded that a diet completely adequate for health according to modern standards

was reached only at an income level above that of 50% of the population.

During the second World War, there was a genuine demand for a mid-day meal for children from all walks of life as their mothers had to go out to work in the armaments factories and on the land. The government was also concerned with the possible effect of food shortages on children's health and wanted to ensure that they all had a good meal at midday: "There is a danger of deficiences occurring in the quality and quantity of childrens' diets..... there is no question of the ability to pay". In July 1970, the treasury increased grants to school meals, thus causing an improvement in supplies and doubling the number of meals taken. The uptake also increased because school meals had ceased to be a social stigma, when children from all backgrounds had them.

At the end of the war, school meals continued as an accepted part of school life. The service is still subsidised by the government and for most children there is a small charge whilst children from families in need qualify for free meals.

1.2. Role of School Meals Today.

The school meals service at present has several roles:

1) Nutritional role, with respect to being a social benefit.
2) Educational role.
3) A service of convenience.

1.21. Nutrition Aspects.

1.211. Nutritional Status of the Population.

The 1974 annual report of the National Food Survey[9] stated that "the average energy intake was 2320 Kcals (9.72 MJ) per person, 101% of the RDI. All nutrients obtained above the RDI except energy, iron and vitamin D in some larger families".

These values are, however, average ones and there is great likelihood that some families will have an over-consumption of nutrients whilst others will have an under-consumption.

Various surveys, medical and dietary, have been carried out under the auspices of the Department of Health and Social Security and they have all found that there is little under-nutrition in Britain. The only evidence of under nutrition is vitamin D deficiency and iron deficiency anaemia as found by Arneil, McKilligan and Lobo in Glasgow (1965).[10] From the author's personal observation, these are the two nutrients most likely to fall below the RDI when taking a dietary history.

However, sections of the community may still be at risk, Berry and Hollingsworth (1963)[11]. Children are one of the groups which are thought to be at risk and several workers have carried out surveys to determine their nutritional status. Bender (1974)[12] carried out such a survey and found no signs of even a reduced intake in social classes 1, 2, 3 or 4 but there was room for improvement in social class 5. Cooke et al (1973)[13] investigated a sample of schoolchildren in Kent and found that intakes for all

nutrients were either in close correlation with the RDI or above it, except for energy.

1.212. Factors affecting children's food consumption:-

1) Socio-economic group.

2) Number of siblings.

3) One parent families.

4) Mother's work status.

5) Eating patterns within society.

1.2121. Socio-Economic Group.

Following the HMSO classification of occupations,[14] the population can be divided into 6 social groups, partly on the basis of financial gain and partly on the basis of education. Wage differentials have changed radically in the last few years and now men in the lower social classes are earning the same if not more than the ones in the higher classes. Thus, Cooke et al (1973)[13] found that social class did not have an appreciable effect on energy consumption but nutrient intakes did vary, i.e. protein, fat and carbohydrate. Social classes 1, 2 and 3A had higher protein and fat intakes than 3B, 4 & 5 and correspondingly lower carbohydrate intakes. The proportion of animal protein was higher for social classes 1, 2 and 3A than in the others. Davie, Butler and Goldstein (1972)[15] found similar results when comparing nutrient intake to heights and weights of children. Intake of nutrients per 4.19 MJ (1000 Kcals) will vary between social classes even when the total energy consumption does not, hence the differences in height and weight. Thus, the difference in diet does not come from availability of money but rather from the education

of the mother and her priorities regarding the household budget.

1.2122. Number of Siblings.

This affects the nutrient intake of children in the same way as social class. Cooke et al (1973)[13] found that large families with four or more siblings had the lowest animal protein, total protein and fat intake but the highest carbohydrate intake. The total energy of their diets, however, was not any different from families with one child. This was confirmed by Davie, Butler and Goldstein (1972)[15].

1.2123. One Parent Families.

In a survey carried out by Metheny et al (1962)[16] fatherless children had a lower total energy intake than children with a father but had a better nutrient intake per 4.19 MJ (1000 Kcals). Possibly the mothers are aware that the children are more vulnerable without a father and therefore take extra care in planning meals. Children from one parent families may rely heavily on school meals as the work load and strain on the parent will be great and they might not have the time or the energy to prepare a meal in the evening.

1.2124. Mother's Work Status.

The effect of mothers' work status on nutrient intake of children is disputed. Some workers find little difference between children of working mothers and mothers who stay at home, e.g. Cooke et al (1973)[13], Leys et al (1963)[17], whilst others, Metheny et al (1962)[16], found that

children of working mothers had better diets whilst Davie Butler and Goldstein (1972)[15] found that they had lower nutrient intake per 4.19 MJ (1000 Kcals). It is possible that the motive for the mother going out to work is important in this situation. If the fathers' income is low and mother works to supplement this, their standard of living will be above that of their peers and if they spend some of the surplus on food for the children, they will have better diets. However, if the mother works for her own benefit and does not spend the extra money on her children, then their diet will not improve. These factors may account for the discrpancy in the results.

1.213. Current Trends in Eating Patterns.

Feeding patterns within society do not remain static but are constantly changing. Those factors which could affect the reception of school meals are as follows:-

1.2131. Many pupils and adults take little or no breakfast.

A trend within society is for adults to have little or no breakfast at all in the morning with children following this adult pattern. Lynch (1969)[18] states that 25% of a sample of boys and girls in the East End of London did not have breakfast. These findings agree with those of Osner and Thomas (1976)[21] who found that 25% of children at a socially deprived school in Sheffield went without breakfast. Similar findings were discovered in Germany when a survey showed that 22% and 25% of children in cities did not have breakfast. Essex - Cater and Robert - Sargent (1975)[19] also found that a small percentage of children went to school without taking breakfast. Bender (1972)[20]

found that 8% of children on average went to school without having breakfast. It would suggest that the provision of an adequate school lunch is very important for these children.

1.2132. There is a growing tendency in society for families to consume snack meals and convenience foods.

School meals traditionally prepare "home cooked" food but many people at home, influenced by television and shortage of time, rely more and more on factory produced convenience foods. Hence, the organoleptic properties of school meals may be very different to those of the food which the children receive at home.

1.2133. Only one or two main meals are taken in a day, as opposed to the three once taken and there is no evidence to suggest that the majority of families take a main evening meal.

Lynch (1969)[18] found that only 36% of children in a working class area had a main meal in the evening. Essex-Cater and Robert-Sargeant[19] also found evidence to suggest that not all children had a substantial evening meal. This agrees with a survey carried out by Osner and Thomas[20] in Sheffield where 30% of the children had snack teas instead of an evening meal.

Again, provision of a school meal would be beneficial in areas where this situation was occurring.

1.2134. Only four to five year olds, nursery school and play school children as well as these on medical advice receive free school milk.

Cooke et al (1975)[23] carried out a survey on school

children in Kent between 8 - 11 years of age, half of whom took school milk and half did not. It was found that, in the group taking milk, the children had a higher intake of animal protein, calcium and riboflavin. However, there was no difference in nutritional status between the two groups as measured by height, weight, arm circumference or skin fold thickness. Also there was no increase in obesity associated with the group taking milk. The workers came to the conclusion that school milk consumption was associated with an improvement in the quality of the diet especially in relation to calcium and riboflavin. It is interesting that a large number of children in the survey had intakes below the R.D.I. for calcium and riboflavin even though the survey was carried out in an area where the consumption of protein rich foods was above the national average, (National food survey Committee 1974.)[9] Thus, it may be assumed that in areas where the diet is poor, school milk may be a valuable source of protein and nutrients even for older children.

In conclusion, many children at school cannot concentrate in the morning. This has been thought to be attributable to television viewing but it could be due to poor nutrition if the evening meal and breakfast has not been nutritionally adequate. Lynch (1969)[18] also states that in one of his studies, 25% of a sample of boys and girls in the East End of London aged 10 to 11 years regularly fasted for 18 hrs. each day, from 6-30 p.m., when they had a snack, through to the following lunch time. Their milk intake, dental health and school attendance records were poor compared with the remaining children. If a proportion of children go without breakfast and do not have a substantial

meal in the evening, or do not have school milk, the school meal becomes nutritionally significant and its quality is very relevant especially when certain groups, (1.212) could be nutritionally at risk with respect to quality of their diet (in terms of nutrient balance) if not to quantity.

1.22. Educational Role of School Meals.

School meals should have an educational role to play - for as Lynch (1969)[18] points out food and education have always been closely related - as indeed the introductory chapter shows. However, this role of school meals has been seriously affected in recent years because teachers are no longer compelled to do dinner duty. Due to campaigning by various teachers unions, dinner duty has been purely voluntary since 1968. It is possible that teachers take more interest in the eating habits of young children in infant schools than they do with secondary school children and would therefore be more prepared to do dinner duty with infant children. When teachers are not present, it is difficult to maintain a restful and orderly atmosphere. A rowdy atmosphere results in an increase in plate waste of food. A 6 year survey in France Tracq and Kytspotter (1969)[24] found wastage resulting from unfavourable conditions in the dining room. In order that wastage is kept to a minimum, such disturbances should be prevented. One of the educational aims is to establish civilised standards of behaviour in the dining room.

Other aspects involve :-

1) Widening the variety of foods that the children eat.

This is possible if only a few foods are offered at home or if certain foods are neglected in the home diet. i.e. fresh

fruit.

2) Identification of foods and food types.

One way to accomplish this is to put up daily menus outside the dining area perhaps supplemented by annotated pictures, so that as time passes the children begin to recognise the foods. The teaching staff could reinforce this learning process by asking the children questions about the foods and encouraging discussion.

3) Correcting eating patterns.

Children may be shown that their own eating pattern is not necessarily ideal. Important points which may be conveyed are the importance of vitamins in fruit and vegetables, importance of a balanced meal and cutting down the amount of sugar and high carbohydrate food, Bender (1974).[11]

Ideally, school meals should reinforce the teaching of nutrition in the classroom and also help to establish good eating habits in adult life.

1.23. Role of Convenience.

It is well known that the school meals service has become the instrument by which large numbers of women have been enabled either to follow paid occupations outside the home or otherwise to manage their day without a mid-day committment at home. This is a very useful and necessary role of school meals. If the school is a considerable distance from the pupils' home, it becomes impossible for the child to go home, both for reasons of time and economy, so the provision of meals becomes a basic amenity. This is especially true of secondary schools which have a large catchment area. Primary schools tend to be nearer the child's home but road safety is often an important factor in this

situation. Young children should really be accompanied home by an adult and if this is not possible, school meals may be a safer alternative.

These three aspects of school meals show that various sectors of the community rely quite heavily on the school meal, either as a valuable nutritional supplement, as a necessary convenience or as a potential initiator of good food habits. So, it is very important that it is optimally nutritious, well-balanced and attractive.

1.3. Regulations of School Meals.

Until recently (April 1976) the nutritional targets set by the Department of Education and Science (D.E.S.) Circular (3/66.)[25] were 29 gms. protein (including approximately 18.5 gms animal protein), 32 gms of fat and 3.68 MJ (880 Kcals) for each average meal, i.e. one third of the R.D.I. for energy and fat and one half the R.D.I. for protein. In April 1976, two reports on 'Catering in Schools'[26] and 'Nutrition in Schools'[27] suggested that the recommendations for fat and animal protein should be discontinued so that only total protein and energy should now be taken into consideration. These two reports, 26 and 27, contradict each other as they do not make it clear whether these figures refer to the nutritional content of the food served to the children or to the food ordered.[55]

The circular 3/66 also recommends the frequency of dishes served, i.e. 12 meat and 8 non-meat days in every 4 week (20 day) cycle. Non-meat items include bacon, ham, liver, sausage, tinned meat, eggs, cheese and fish. In a memorandum on school meals,[22] it is suggested that few local

authorities adhere rigidly to this pattern but will vary it to suit local circumstances and tastes and to take account of the current state of the food market. In Sheffield, the pattern of main dishes in a 20 day cycle is as follows:-

Fresh meat - 10 days

Bacon, ham etc. - 6 days

Eggs, cheese & fish - 4 days.

This memorandum also advises that standards should vary with different age groups: 5 - 9 years, 9 - 14 years and 14 + years. Younger pupils under 14 should be offered a standard two course meal with some opportunity for choice at the upper end of the age range, i.e. a 'split' menu. More choice could be given to the 14 + age range, but this leads to difficulties in ensuring that a balanced meal is taken. However, it may still be preferable to the alternatives for which many older pupils may opt - Kimmance.[30]

In Sheffield the targets aimed for in menu planning in Primary schools are as follows and have been based on RDIs (1969)[27].

Infant schools - 20 g protein.

Infant and Junior schools mixed - 26 g protein.

Junior schools - 27 g protein.

Energy:

Infants schools - 2.51 MJ (600 Kcals.)

Infant & Jnr. Schools - 3.77 MJ (899 Kcals.)

The range of foods offered now has changed considerably since post-war years especially in schools which run a refectory system. Sheffield, for example, serves approximately 350 menu items (Appendix 1), a large proportion of which are served in secondary schools. The service also

attempts to cope with special diets for children with various medical disorders and also for children from different ethnic groups, e.g. Pakistani, Indian, and West Indian children. Dishes once considered to be foreign are now introduced:- e.g. curry, spaghetti bolognaise, pizza, sweet and sour pork and goulash.

It is obvious that school meals have changed considerably over the years as the general standard of living has improved and living patterns within society have changed from the pre-war situation.

CHAPTER 2 - THE SHEFFIELD SURVEY.

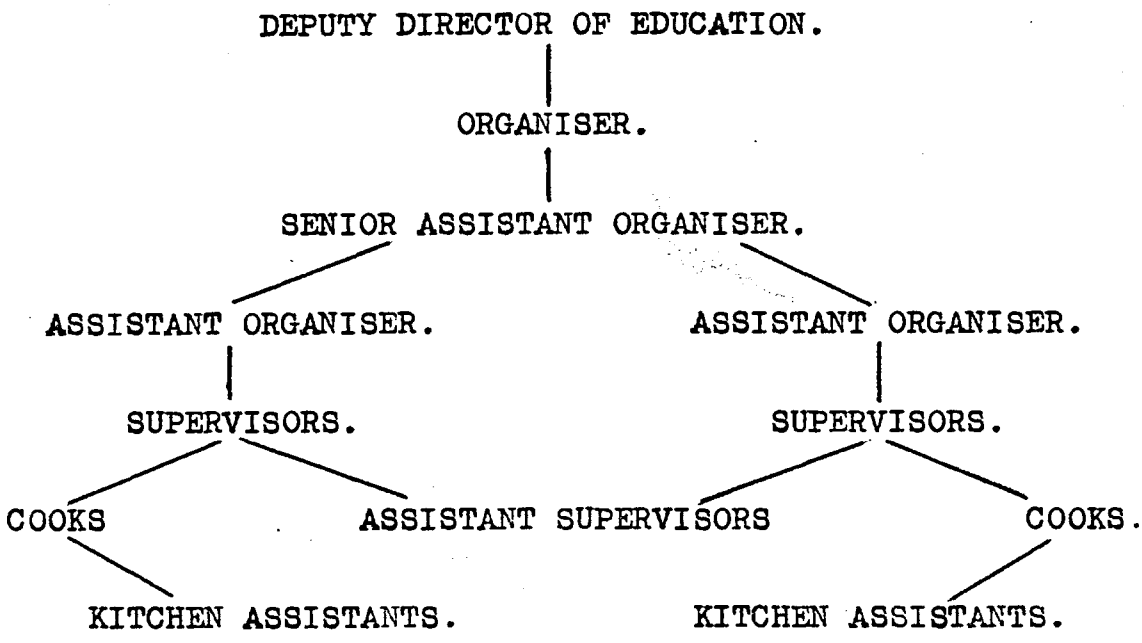
2.1. Organisation of Sheffield School Meals Service.

The following section describes the organisation of the Sheffield Service in 1973.

The school meals service was part of the Education department, with the organiser performing the role of head of the service and being accountable to the Deputy Director of Education. There were 186 Kitchens serving 262 schools, although since local authority re-organisation, the service has been expanded to take account of boundary changes. The kitchen assistants were under the supervision of the cook, who in turn was responsible to her supervisor. At that time, there were 33 supervisors in charge of groups of schools including infant, junior and secondary schools. There were 7 assistant supervisors to help the supervisors. The number of kitchens under each supervisor's control varied between 4 and 8 but these groups were arranged so that each supervisor had the same number of meals to serve each day. The supervisor moved between her kitchens on a rota basis, usually seeing each kitchen twice a week. The supervisor was responsible to the assistant organiser.

Fig: 1.1 see over.

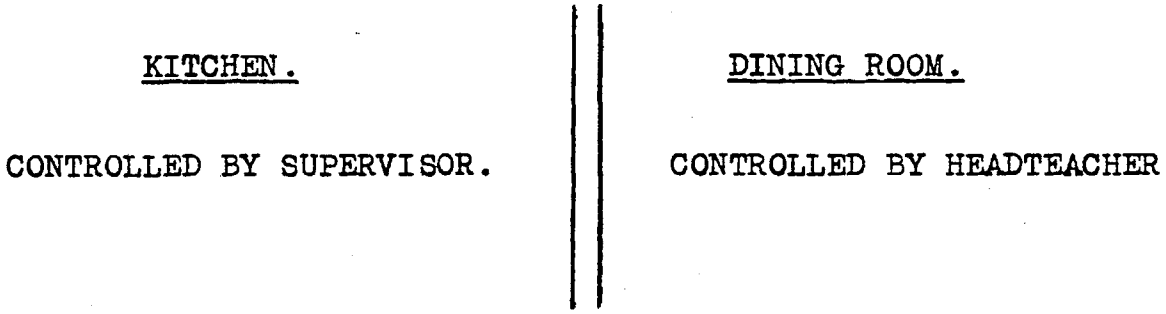
Fig: 1.1 Organisation of Sheffield School Meals.



The same system of meal service did not operate in all schools. In most secondary schools, a choice of menu was offered - this being an alternative choice. Only 7 of the 34 secondary schools had a refectory service which offered a large choice of main dishes, vegetables, desserts and drinks. It was hoped that this system would eventually be introduced into all senior schools. Some sixth form schools also had coffee bars. In the rest of the schools, two types of service were in operation:- hatch service and family service. Hatch service involved the children going to the serving hatch, collecting a plate and passing along the hatch collecting the individual food items and then taking their full plate to a table. In family service, the children sat at tables of eight and the food was brought to them in separate containers - each container having 8 portions. The children then served themselves at the table. In some schools, older children or teachers sat at the table, with

the younger children and acted as servers.

The area designated for meals in a school usually followed this general plan:-



Thus, school meals were the responsibility of two sectors, the school meals organisation and the teaching staff. The supervisor and her staff was responsible for the preparation and service of the meal, its quality, quantity and final appearance, i.e. all the work which took place on the kitchen side of the hatch. Once the food was served, it became the responsibility of the teaching staff. The Head teacher also employed dining room assistants and together they were responsible for the behaviour of the children, the speed at which the meal progressed, assisting the younger children to cut up their food, and the maintenance of a relaxed, quiet atmosphere in the dining hall. In some schools, there was a certain amount of disagreement about the way this division of authority occurred. The actual organisation of the type of service was also a source of disagreement; in some schools it was in the control of the kitchen staff whilst in others it was in the control of the teaching staff.

Thus, to carry out a survey in Sheffield, both the co-operation of the teaching staff and the school meals staff was required.

2.2. Objectives of School Meals Staff.

The aims and responsibilities of staff were elucidated by talking to a panel of catering experts to see what they perceived their role to be. Then, by a series of unstructured interviews, the views of the school meals staff were elicited. These two aspects were then compared and the following conclusions drawn:-

2.21. Organiser.

She is involved in:-

1) Administration of the service as a whole.
2) Communicating with the Education Department, parents and teachers.
3) Publicity.
4) Aiming to keep the overall cost of meals as low as possible by planning the optimum use of resources, equipment and labour.
5) Maintenance of nutritional standards.
6) Overall quality control, especially of ingredients and of the total service.
7) Overall responsibility of personnel.
8) Long term plans relating to organisation, management and costing.

2.22. Senior Assistant Organiser and Assistant Organiser.

Their duties comprise of :-

1) Assisting the Organiser with all her duties.
2) The Assistant Organisers are more involved with the day to day running of the service than is the Organiser, i.e. involved with personnel,

teaching staff, food suppliers etc. to ensure the service runs as smoothly as possible.

2.23. Supervisor.

Her duties are:-

1) Planning of menus, ensuring that they are nutritionally sound, within the cost allowed, reasonably popular with the children and of minimum waste.
2) Other paper-work duties include maintaining records of stocks, numbers of meals taken, requisitions, absence notes etc.
3) It is her responsibility to ensure that every child who wants a school meal receives one of the correct nutritional value and of the right quality and quantity. She should also make sure that the general appearance of the meal as served is satisfactory.
4) Maintaining good staff relationships, together with the recruitment, dismissal and training of staff.
5) Overall responsibility for cleanliness and general hygiene of the kitchen premises.

2.24. Cooks.

Their duties are:-

1) To prepare and serve meals on time.
2) To prepare meals with an appetizing appearance.
3) To minimise kitchen waste and plate waste.
4) Maintenance of kitchens, equipment, stores, crockery and cutlery.

Some of this information was drawn from a project carried out by A. White (1973)[28] whilst at Sheffield City Polytechnic.

2.3. General Introduction to Surveys.[31, 32.]

A survey is a planned collection of data which should:

1) Describe the attitudes of a certain population, e.g. voting for political parties, or
2) Predict how a population would react to a new variable, e.g. a new brand of chocolate or driving on the right, or
3) Assess any relationships between particular variables e.g. diet and dental decay.

Surveys, therefore, are usually carried out on a large scale and they last for some time, several months to several years. Most surveys follow the same basic pattern:-

1) Formulating the aims of the research.
2) Planning the work and reviewing the literature.
3) Sampling.
4) Field work - collecting the data.
5) Processing the data.
6) Statistical analysis.
7) Assembling the results, testing the hypotheses and comparing the results with the original objectives.
8) Tabulating results, relating the findings to other research and drawing conclusions and interpretations.

In any enquiry, one would like to investigate the feelings of every individual in the population, in fact to carry out a census. Unfortunately, resources, money, time and staff for an investigation of such proportions are

usually unavailable and so only a proportion of the population is surveyed. This proportion or sample must be representative of the whole population and thus sampling is one of the most difficult areas in survey work, for if the sample is not representative of the whole, the survey will be invalidated. Bias is often introduced into the results as a consequence of bad sampling and so the results obtained may not necessarily reflect the feelings of the true population but only of the sample population.

2.4. Objectives of the Sheffield Survey.

These were to investigate :-

1) The method of catering employed by the school meals service.
2) The nutritional content of the food offered to the children.
3) The nutritional content of the food eaten by the children.
4) The quantities of plate waste left by the children.
5) The childrens food preferences.
6) Any interrelationships between the various findings.

2.5. Introduction to Sampling.

Methods of Sampling.

There are various ways of taking a sample from the population under investigation. The size of the sample inevitably is a balance between money available, staff available and the accuracy that is required. The methods available[33] include

1) Random sampling,

2) Stratified sampling,

3) Systematic sampling,

4) Multistage sampling.

5) Quota sampling.

The type of sampling used for the Sheffield survey was chosen from the above list. One overall sample was required with two sub samples for the two sections of the survey: the food preference questionaire and the food measurements.

2.6. Sampling for the Sheffield Survey.

The method of sampling used was a variation of multi-stage sampling. The organiser did not wish a random sample of schools to be taken as, because of the organisation of the service, this would have involved too many supervisors. Thus eight Supervisors were chosen out of the total of 33 and all of their schools were used. These eight supervisors were chosen by the organiser, an attempt being made to take one supervisor from each geographical area in Sheffield so that, as far as possible, variations in social and geographical areas were covered.

Bias may have been introduced when choosing supervisors for the following reasons:

1) Account had to be taken of their work load and their level of experience.

2) Whether or not they could cope with a survey in their schools.

There were 268 schools in Sheffield :-

199 Primary schools,
7 Nursery schools,
28 Special schools,
34 Secondary schools.

The eight supervisors controlled meals in 55 schools - a sample of 23% of the total number of schools. This percentage was considered to be reasonable. Of the 55 schools 6 were secondary schools, 2 were nurserys, and 47 were primarys. It was decided to deal only with the primary schools. This gave a sample of 24% of the total primary school population.

Once the list had been drawn up, a meeting was held with the School Meals Organiser, head teachers, Polytechnic staff and the Deputy Director of Education. The survey was discussed and any schools wishing to opt out were asked to do so. 12 schools withdrew at this point and this left 35 schools or a sample size of 17.6%. This withdrawal could have been a further area for the introduction of bias as it was felt that those schools with something to hide would withdraw.* The survey was divided into two parts, the measurement of meals and the administration of the food preference questionaire. Sample sizes then had to be chosen for these 2 parts.

2.61. Food Preference Questionaire.

35 schools were asked to co-operate with this part of the survey. It involved the distribution of questionnaires to the schools along with briefing sessions for the teaching staff, and subsequent administration of the questionnaire to the children by their own class/group teachers. Obviously, this part of the survey involved more co-operation from the teachers and more disruption of normal school routine than did the waste measurements but surprisingly most of the teaching staff were willing to participate in the exercise

perhaps because it was something with which they were more familiar.

In all 31 schools returned completed questionnaires - 89% of the sample and 16% of the total number of schools.

2.62. Measurement of Food.

When deciding on the number of schools to involve in the food measurements, various factors other than obtaining a statistically reliable sample had to be considered. These included the number of staff available to complete a very time-consuming exercise, how much time was available and how much co-operation could be expected from the staff in the schools. As a result 22 schools were chosen which gave 16 Kitchens. Two schools were selected randomly from each supervisor using random number tables. For those supervisors who only had two primary schools, no choice was available and both schools participated in the survey.

The target was to visit two schools each week so that this part of the survey would take eight weeks altogether. 11% of all the primary schools took part in these food measurements.

CHAPTER 3 - FOOD PREFERENCES.[31-39]

3.1. Theory of Preference Testing.

Food preferences are interesting to study in conjunction with collection of waste food data, because, theoretically if one likes a food one eats it.[34] Presenting children with food they like should cut down on the food wasted on the plate although the food served should still be nutritionally adequate. Therefore, it is interesting to see if the children's food preferences do affect their nutritional intake at lunch time.

What constitutes preference? In general, if the food has a high preference, it is very acceptable to the individual and it is usually consumed at frequent intervals. This acceptibility includes smell, taste, tactual and temperature qualities, visual appeal and conditioning (as the result of previous emotional responses in connection with food).[34] Mechanical factors i.e. how easily a food can be eaten, also plays an important part. Food preferences and food attitudes will affect the kind of diet a person consumes, so having a fundamental influence on nutritional status. Food preferences together with cultural and social mores, indicate an individuals eating pattern and these are known as their food habits.[34] If good food habits are established early in life, the nutritional status of the individual is assured, assuming a good food supply is available. So nutrition education should be primarily interested in establishing good food habits based on sound nutritional facts.

There are many methods available for trying to deter-

mine food preferences, some of which are described below:-

3.11. Questionnaires.[37,38,39]

These can be given to the individual or to a group of people as a whole. There are several formats which they can have.

3.111. Rating Scales.[37,38,39]

Most food preference questionnaires consist of a list of foods with some space available for the respondents to indicate their feelings towards the food. The questionnaires can either be:

1. Open ended - with the respondent writing down whatever he/she feels about the item.

or 2. Closed - where the number of choices is limited.

The first type of questionnaire is very difficult to assess so the closed questionnaire is frequently used. The respondents are required to choose, from a series of expressions, the one which most closely indicates their feelings towards the food. These series are known as hedonic rating scales and are much simpler to analyse statistically than the open ended questionnaires. The following examples have been used in various surveys.[40-48]

1) Like, dislike.

2) Willing to eat, unwilling to eat, never tasted.

3) Like, indifferent to, dislike.

4) Refusual to eat because of dislike, never eaten.

5) Acceptable, disliked, not tried.

6) Very good, good, moderately well liked, tolerated, disliked, not tried.

7) Willing to eat often, willing to eat once a week, unwilling to eat, never tasted.

8) Smiley faces. Different expressions are drawn on faces which represent how the individual feels about each food item. It is of particular interest to children.

The actual number of scales chosen e.g. 3, 5, 7 is very important, with the number depending on the age and discrimination of the respondents being tested. One of the longer, more detailed scales may be suitable for adults but for young children a 3 or 5 point scale would be sufficient, Watts (1972).[41] A mark or number is placed in the column which most accurately represents their feelings for the particular food.

Questionnaires inherently have the problem of communication. They must be simple, unambiguous and easy to understand, with much depending on the literacy of the respondents.[37,38,39] With children, great difficulty is experienced in determining their food preferences as they are very changeable in their food choices. Many of them have not yet learnt to read or write and so they are unable to fill in their own questionnaires. Even if children can read and write, their recognition of foods and food types may be minimal. This difficulty could be overcome by showing slides of the food in question at the same time as the questionnaire is being filled in by the children. Another method of cross-checking would be to administer a similar questionnaire to the adults who have responsibility for the children, i.e. parents, school teachers, or dinner ladies.

3.112. Ranking Files.[34,35,36,37]

In this form, the individual has to put foods or lists of foods into an order of preference. This is only suitable for literate respondents.

3.113. Paired Comparisons.[34,35,36,37]

In this type of questionnaire, foods are put together in pairs and the respondent choses which of the two items he/she prefers. The interviewer could fill in this type of questionnaire for the respondent quite easily.

3.114. Trend Rating Scales.[34,35,36,37]

The respondent indicates the number of times he/she would eat the given food item in a certain length of time, perhaps one week or one month.

3.115. Attitude rating scales.[34,35,36,37]

A mark is placed in the appropriate position between two extremes of a line which represents the possible range of degrees of that attribute.

Other Methods.

3.12. Observation. - This is particularly useful for assessing children. They are carefully observed during a meal time and notes are taken of various factors. This can be done by field workers or by filming a video tape for analysis later on. Vance (1936)[48] found that the maximum number of subjects one fieldworker could watch was six. The following examples of data could be taken :-

1) The order in which the children taste and finish the food on the plate.
2) The observer's ratings of the children's reaction to the foods or meal e.g. pleasant, neutral, unpleasant, very unpleasant.
3) Observation of food consumption ad libitum.
4) The speed at which the children eat food and the size of the spoonful/forkful taken.

3.13. The Eye Camera. - This instrument measures pupil dilation. It is known that the eye has an involuntary response to pleasant and unpleasant stimuli. The assumption is that food that has a high preference will cause pupil dilation and food with a low preference will cause contraction. This type of test will depend enormously on the appearance of the food.

3.14. Waste Tests. - Collection and measurement of plate waste after a meal could be an indication of preference - assuming that low food waste at the end of a meal is an indication of high food preference. It could also be influenced by many other factors, e.g. standard of cooking, the atmosphere in the dining room, time allowed for the meal, the portion offered, the hungriness of the children involved etc. However, if an observer is present during the meal service and during the waste collection, all of these factors can be noted.

3.15. Taste Panels. - Taste panels are another method of elucidating preferences.[49] The respondents are presented with various dishes and asked to choose which they prefer. Two dishes (duo test) or three dishes (triangle test) may be presented. The respondents then have to indicate their

preferredfood in the duo test or the one which is different in the triangle test.

This method is really only suitable for a small number of respondents and a small number of foods. Using taste panels would have involved either carrying out sophisticated experiments at lunch-time in the schools or taking the children to the Polytechnic and carrying out the tests there. Either method would have involved a great amount of disruption and expense and would not have been practicable for the large numbers of food items which were to be investigated.

These are a selection of the many methods which are available to survey teams for determining food preferences. The decisions made in Sheffield were greatly influenced by financial considerations, staff availabilitity, equipment availability and the cooperation of the respondents, e.g. children, teaching staff and the school meals service. It was decided to administer a questionnaire to the children, and to the kitchen staff if possible, and to use the results in conjunction with those obtained from the plate waste collections.

The questionnaire was chosen for mainly practical reasons. Sophisticated equipment, like the eye camera, was not available due to insufficient funds. Other methods, e.g. observation would have required large numbers of personnel to operate them. Using questionnaires, a large number of children could be investigated with only a limited number of staff and only a small expenditure is needed for printing paper and postage. Another advantage is that the statistical methods for analysis of questionnaires are fairly easy to work out compared with the much more complicated analysis required for the other methods.

3.2. Development of the Questionnaire.[34]

The main features of a questionnaire are very important as it is a method of communication and so must be clear, legible and written in words which the intended recipients can understand. Obviously, it is fruitless using long sophisticated words for people with a limited educational background. The actual layout of the questionnaire is also very significant as it should be easy to follow and pleasing to the eye. For example, too many dark heavy lines in the form of grids should be avoided. The length of the questionnaire is also critical. If it is too long, some respondents will be discouraged from completing the format. However, if they are interested in the subject matter, the length of the questionnaire may be of little significance. Here a pilot survey can be of great assistance in finding out which type of format is the best for the particular respondents. It can save a lot of time and money by helping to find and overcome any problems in the design or any practical difficulties regarding the administration of the questionnaire.

3.3. Methodology of the Pilot Survey.

Before embarking on the major survey, a pilot survey was carried out on three different questionnaires to discover the best one for our purposes. The three types were:-

1) Self-administered questionnaire. (Appendix 2).

2) Group administered questionnaire. (Appendix 3).

3) Teacher administered questionnaire. (Appendix 4).

The self administered questionnaire had a pleasant appearance and was given to each child individually to fill in on their own. The group administered questionnaire was more

grid-like in appearance. Each child had his/her own copy of the questionnaire and the teacher had a more detailed copy which she read out to the class and the children put their answers on their own sheets. For the teacher administered questionnaire, only one format was given to each class teacher. The children's opinions were taken by asking them to raise their hands to indicate their preference and the teacher counted the show of hands.

All three questionnaires made use of the hedonic rating scales and as children were being tested, only three variables were used, Watts (1972)[41], dislike; like; neither dislike nor like. The negative word was written first in order to catch the respondents attention, as it is more common to write the positive indication first. Food items which were included were chosen from those served at school lunches, 110 items in all appearing on the questionnaire. Over 350 food items were served to children in Sheffield schools, including both sweet and savoury dishes. (see Appendix I.) This was far too many items to put in the questionnaire so only 100 were chosen, 10% being repeated as check questions to test the reliability and the consistency of the children's answers. Items were eliminated by choosing particular foods which were representative of various groups of foods in relation to their colour, temperature, texture and flavour.

Some form of description of the food items on each type of questionnaire was necessary as the respondents were children and possibly would not be able to identify the various foods listed. Ideally, a photograph or slide of each dish should have been shown at the time the questions were asked about the foods. However, this would

have been a very expensive and time consuming undertaking considering the number of schools which were investigated. The appearance of the food in the photographs would have been very important in such an exercise as the children may have tended to judge the photographs rather than the food as served in the school dining hall. Instead, descriptions of the foods were read out to the children by the teachers who were filling in the questionnaires. These descriptions were a possible area of introducing bias in the survey as the way in which the tea cher read out the description could alter the childrens' feelings. It would have been easy to introduce variations in the intonation of the voice, to emphasise certain words or syllables and to have shown expressions of like or dislike on the teachers' face. Those could all have influenced the childrens' responses and would have been particularly important if the children were indifferent to that particular food item. The teachers were made aware of this factor and were asked to be as fair as possible when reading out the description.

Method of Investigation.

The pilot survey was carried out in one middle school only and took 18 days to complete during which time all three questionnaires were tested. The school had 260 children divided into four academic years. Each year was divided into three groups, one for each questionnaire so that approximately 85 children filled in each type of questionnaire. Age ranges were from nine to thirteen years including both boys and girls. The school was chosen because the headmaster was very interested in the project and could incorporate the experience in teaching sessions. Two visits were

made to the school, one to chat generally with the headmaster to decide on the method of administration and the second to take the questionnaires. The headmaster then organised the survey with his own teachers and returned the questionnaire when completed.

3.4. Results from the Pilot Survey.

3.41: The preference ratios were calculated from the results as follows:-

Number of children who dislike the item = d

Number of children who were indifferent to the item = i

Number of children who like the item = l

$$\text{level of like } X_i = \frac{l - d}{d + i + l}$$

falling in a range of $-1 \leqslant X_i \leqslant +1$

To convert to a hedonic rating scale between 0 - 1

$$X_2 = \tfrac{1}{2} (X_i + 1)$$

$$= \text{a range of } 0 \leqslant X_2 \leqslant 1$$

The preference ratios were then examined in more detail as follows:-

1) Preference ratios from the three questionnaires.

2) Preference ratios of boys and girls.

3) Preference ratios of children who stay/occasionally stay/never stay to school lunch.

4) Preference ratios of different age groups.

Figure 3.1: Preference Ratios from the Three Questionnaires.

Duplicated Food Items. Reference number	Food Items	Rank in Quest. Type I.	Type I.	Type 2.	Type 3.	Food Items Found to be Sign. Different.
	Ice Cream	1	0.9730	.9452	.9291	
	Chips	2	0.9467	0.9658	.9764	
	Chocolate Sponge	3	.9412	.9306	.8967	
	Fish Fingers	4	.9392	.9097	.9213	
	Tinned Fruit	5	.9328	.8630	.7320	*
	Shepherds Pie	6	.9315	.8403	.8858	
	Roast Beef	7	.9315	.8767	.8858	
	Roast Chicken	8	.9155	.8082	.7205	*
	Beefburgers	9	.9028	.8567	.8867	
96-	Jam Tart	10	.8944	.8194	.7756	
	Jelly	11	.8933	.9041	.9094	
	Baked Potatoes	12	.8836	.8681	.7946	
34-	Roast Lamb	13	.8819	.8056	.5360	*
84-	Shortbread	14	.8803	.8836	.8465	
	Roast Potatoes	15	.8767	.8493	.9173	
70-	Shortbread	16	.8681	.8649	.7559	
	Fresh Fruit	17	.8649	.8681	.9669	*
	Chocolate Pinwheels	18	.8636	.8390	.7596	
	Sausage Rolls	19	.8562	.8699	.9331	
	Meat Pie	20	.8562	.8425	.9080	
	Rainbow Sponge	21	.8542	.7984	.7436	*
	Apple Crumble	22	.8542	.8219	.7377	
	Apple Pie	23	.8514	.7808	.8125	*
	Jam Sponge	24	.8485	.7612	.7823	
9-	Roast Lamb	25	.8478	.8028	.8740	
	Custard	26	.8451	.8904	.7244	*
63-	Jam Tart	27	.8429	.8356	.8465	*
	Chicken Pie	28	.8415	.6408	.7125	*
	Syrup Sponge	29	.8361	.7958	.6807	
	Lemon Sponge	30	.8333	.7887	.8156	
	Mince	31	.8288	.8108	.8789	
	Sausages	32	.8286	.9041	.9055	
	Australian Crunch	33	.8182	.5172	.7287	*
	Gravy	34	.8169	.8542	.8346	
	Fishcakes	35	.8143	.8958	.7683	*
83-	Chocolate Sauce	36	.8088	.8151	.7460	

110-	Chocolate Sauce	37	.8077	.8403	.7360	*
	Fruit Cocktail	38	.8060	.7826	.7276	
	Bread & Butter	39	.8041	.8264	.8307	
	Chicken Soup	40	.7986	.7361	.7976	
65-	Flapjack	41	.7984	.7971	.7500	
	Ginger Sponge	42	.7955	.8125	.6969	
	Mousse	43	.7951	.8028	.9054	
	Baked Beans	44	.7905	.8356	.8145	*
	Roast Pork	45	.7847	.8472	.8427	*
	Spaghetti	46	.7817	.7569	.7992	*
75-	Bakewell Tart	47	.7746	.7877	.8016	
	Tomato Soup	48	.7639	.6781	.7126	*
	Luncheon Meat	49	.7569	.7324	.7717	
60-	Bakewell Tart	50	.7569	.7671	.8120	*
12-	Stew	51	.7533	.7055	.6400	*
	Beetroot	52	.7466	.7569	.6865	
	Fruit in Jelly	53	.7465	.7464	.7360	
	Bananas & Custard	54	.7464	.8699	.7874	
	Lemon Meringue Pie	55	.7462	.7569	.6750	
101-	Flapjack	56	.7460	.8382	.7090	
	Lemoncurd Shortcake	57	.7407	.6692	.7143	
85-	Custard Whip	58	.7388	.7254	.6723	
	Boiled Ham	59	.7365	.8151	.7520	
	Rice Pudding	60	.7333	.7254	.7480	
20-	Stew	61	.7297	.7083	.6301	*
	Trifle	62	.7254	.7083	.7460	
	Jam Sauce	63	.7241	.7174	.5748	
	Fried Fish	64	.7222	.8380	.6800	
	Tomato Sauce	65	.7154	.7958	.6240	*
	Cheese Pie	66	.7132	.6620	.7559	*
	Scrambled Eggs	67	.7132	.6736	.6680	
	Cheese Flan	68	.7015	.6690	.1341	
	College Pudding	69	.7000	.5968	.5672	
	Eves Pudding	70	.6887	.6532	.6303	
	Stewed Apples	71	.6885	.6304	.6452	
	Fruit Flan	72	.6809	.6231	.5755	
	Peas	73	.6800	.7500	.6850	
58-	Mushy Peas	74	.6786	.7014	.7360	
	Pork & Onion Pie	75	.6765	.4717	.4675	
	Currant Sponge	76	.6746	.5956	0.6983	
	Scotch Eggs	77	.6721	.4922	.5320	
57-	Boiled Potatoes	78	.6714	.6549	.8189	*
	Cherry Sponge	79	.6695	.6716	.5645	
41-	Mushy Peas	80	.6690	.6712	.7598	*

	Cheese Cutlets	81	.6667	.2019	.3346	*
	Coconut Sponge	82	.6667	.7899	.7421	
61-	Custard Whip	83	.6642	.6875	.6549	
	Mixed Fruit Shortbread	84	.6633	.6066	.7727	*
	Creamed Potatoes	85	.6620	.7361	.7205	
	Blancmange	86	.6518	.6597	.7605	
	Lemon Sauce	87	.6486	.6538	.7043	
43-	Boiled Potatoes	88	.6471	.6370	.7717	
	Butterscotch Tart	89	.6429	.6719	.5766	
	Summer Salad	90	.6408	.7429	.6800	
	Carrots	91	.6400	.5205	.6496	
	Pineapple upside down Pudding	92	.6339	.6846	.6840	
	Tinned Tomatoes	93	.6250	.6319	.6958	
	Ham & Pineapple	94	.6210	.7534	.6825	*
	Rhubarb Crumble	95	.6197	.7671	.6825	
	Stewed Rhubarb	96	.6186	.5985	.6880	
	Winter Salad	97	.6176	.4921	.6647	
	Mincemeat Tart	98	.6129	.5942	.6422	
	Sultana Sponge	99	.5932	.5161	.7218	*
	Brisket	100	.5926	.5164	.5779	
	Braised Beef	101	.5686	.5809	.5760	*
	Liver	102	.5286	.5205	.4488	
	Cabbage	103	.5282	.4863	.5787	
	Sprouts	104	.5143	.3630	.4370	*
46-	Cauliflower	105	.5070	.5411	.5236	
56-	Cauliflower	106	.5069	.5411	.5885	
	Macedoine	107	.4773	.4394	.4331	
	Green Beans	108	.4214	.3636	.4134	
	White Sauce	109	.3770	.4254	.3868	
	Turnip	110	.2388	.3681	.4055	

3.41. Comparison of Preference Ratings from the Three Questionnaires.

The type of questionnaire used to investigate the childrens' food preferences did make some difference to the preference ratings. In 28 out of 110 items, the ratios were found to be significantly different from each other, the 28 items being :-

Apple Pie,
Australian Crunch,
Baked Beans,
Bakewell Tart, *
Braised Beef in Gravy,
Boiled Potatoes,
Cheese Cutlets,
Cheese Pie, *
Chicken Pie,
Chocolate Sauce *
Custard,
Fishcakes,
Fresh Fruit,
Ham & Pineapple,
Mixed Fruit Shortcake,
Mushy Peas, *
Rainbow Sponge Pudding,
Roast Chicken & Stuffing,
Roast Lamb,
Roast Pork,
Spaghetti in Tomato Sauce,
Sprouts,
Stew,
Stew,
Sultana Sponge Pudding,
Tinned Fruit,
Tomato Sauce,
Tomato Soup.

This was 25% of the menu items. None of the questionnaires produced preference ratios which were obviously different from the other two. Those foods which were significantly different included items from the middle popularity band except for baked beans. Of the paired food items included in the questionnaire, in four cases out of twelve*, one of the pair proved to be significantly different whilst the other one did not. This would indicate that the preference

ratios for the foods of intermediate popularity are not easy to define and can be affected by the type of questionnaire. However, 25% is a reasonable variation but it does indicate that care must be exercised when choosing a questionnaire design.

3.412. Preference Ratios of Boys and Girls.

The sex of the child did not appear to have much bearing on the preference of a food. The ratios of 5 out of the 110 items i.e. 4.5% were significantly different from each other.

These were scrambled eggs, roast beef and yorkshire pudding, fishcakes, winter salad and butterscotch tart - see figure 3.2. The girls preferredthe first three items whilst the boys preferredthe winter salad and butterscotch tart. Boys had preference ratios for more foods than did the girls with 37 food items falling in the 0.8 range whereas the girls only had 27, - see figure 3.3. Both sexes had 20 food items with preference ratios of below 0.6 although the girls had one food, cheese cutlets, with a value of 0.2. Leverton and Coggs (1951)[46] also found that many foods are liked equally well by boys and girls. The girls in their study were more willing to eat a variety of foods than were the boys.

From the results in this survey, it would appear that sex does not affect preference for the majority (96.4%) of the food items investigated.

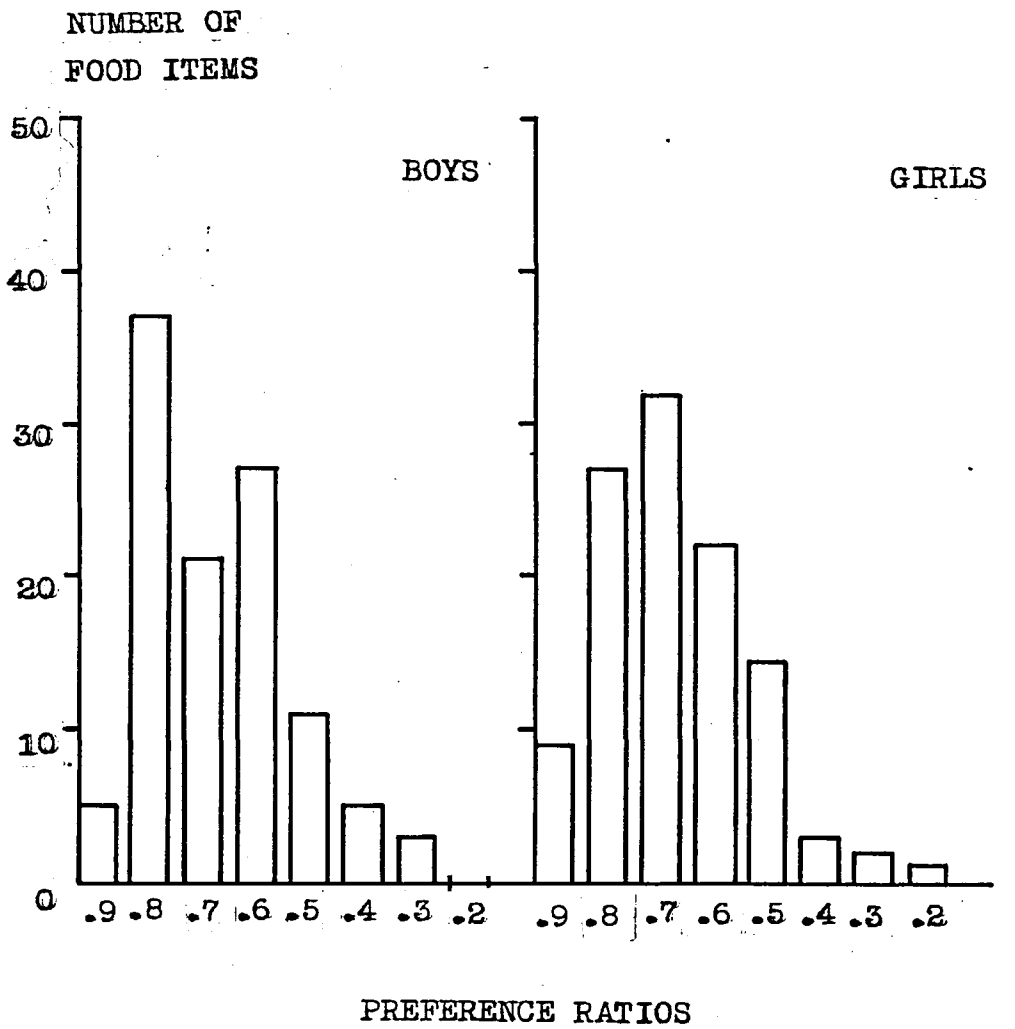
Figure 3.2: Preference Ratios of Boys and Girls.

Rank	Food Item.	Preference Ratios		Ratios Which were Significantly Different.
		Boys	Girls	
1	Chips	.9493	0.9620	
2	Ice Cream	.9412	0.9747	
3	Jelly	.9275	0.8737	
4	Fish Fingers	.9265	0.9231	
5	Chocolate Sponge	.9063	0.9605	
6	Sausage Rolls	.8864	0.8438	
7	Sausages	.8864	0.8506	
8	Jam Tart	.8846	0.8333	
9	Fruit Cocktail	.8810	0.7192	
10	Roast Beef	.8806	0.9241	*
11	Roast Lamb	.8788	0.8141	
12	Tinned Fruit	.8788	0.9122	
13	Shortbread	.8788	0.8846	
14	Fresh Fruit	.8768	0.8571	
15	Roast Potatoes	.8731	0.8544	
16	Roast Chicken	.8712	0.8526	
17	Baked Potatoes	.8712	0.8797	
18	Roast Lamb	.8692	0.7867	
19	Shepherd's Pies	.8657	0.9038	
20	Shortbread	.8603	0.8718	
21	Meat Pie	.8582	0.8418	
22	Roast Pork	.8582	0.7792	
23	Chocolate Pinwheels	.8511	0.8444	
24	Jam Tart	.8472	0.8333	
25	Apple Pie	.8456	0.7911	
26	Jam Sponge	.8448	0.7733	
27	Beef Burgers	.8433	0.9103	
28	Chocolate Sauce	.8413	0.8224	
29	Bakewell Tart	.8385	0.7342	
30	Bakewell Tart	.8333	0.7025	
31	Apple Crumble	.8309	0.8442	
32	Fish Cakes	.8281	0.8782	*
33	Mousse	.8279	0.7746	
34	Chocolate Sauce	.8279	0.7885	
35	Syrup Sponge	.8276	0.8041	
36	Mince	.8182	0.8210	
37	Gravy	.8182	0.8506	
38	Bananas & Custard	.8182	0.8026	
39	Custard	.8182	0.9103	
40	Flapjack	.8136	0.7877	

41	Baked Beans	.8116	0.8141
42	Flapjack	.8017	0.7847
43	Trifle	.7985	0.6447
44	Ginger Sponge	.7984	0.8092
45	Fried Fish	.7985	0.7662
46	Coconut Sponge	.7931	0.6831
47	Butterscotch Tart	.7813	0.5603
48	Lemon Sponge	.7797	0.8333
49	Fruit in Jelly	.7769	0.7200
50	Rainbow Sponge	.7755	0.8607
51	Jam Sauce	.7712	0.6765
52	Bread & Butter	.7647	0.8590
53	Custard Whip	.7619	0.6645
54	Boiled Ham	.7537	0.7937
55	Tomato Sauce	.7500	0.7639
56	Chicken Soup	.7424	0.7885
57	Summer Salad	.7308	0.6579
58	Luncheon Meat	.7266	0.7595
59	Lemon Meringue Pie	.7222	0.7770
60	Eves Pudding	.7170	0.6290
61	Lemoncurd Shortbread	.7091	0.6953
62	Rice Pudding	.7029	0.7532
63	Spaghetti	.7000	0.8269
64	Beetroot	.6985	0.7987
65	Cheese Flan	0.6953	0.6757
66	Custard Whip	.6905	.7067
67	Peas	.6884	.7372
68	College Pudding	.6875	.5926
69	Creamed Potatoes	.6846	.7115
70	Mushy Peas	.6846	.6948
71	Stewed Apples	.6842	.6370
72	Chicken Pie	.6827	.7417
73	Currant Sponge	.6810	.5959
74	Blancmange	.6803	.6343
75	Stew	.6765	.7750
76	Stew	.6765	.7564
77	Cherry Sponge	.6698	.6712
78	Tomato Soup	.6667	.7658
79	Rhubarb Crumble	.6667	.7179
80	Leon Sauce	.6630	.6429
81	Cheese Pie	.6615	.7095
82	Ham & Pineapple	.6583	.7200
83	Australian Crunch	.6429	.6122
84	Mushy Peas	.6418	.6948
85	Pineapple upside-		

86	Fruit Flan	.6275	.6639	
87	Tinned Tomatoes	.6270	.6299	
88	Brisket	.6200	.5000	
89	Boiled Potatoes	.6154	.7039	
90	Mincemeat Tart	.6189	.5942	
91	Boiled Potatoes	.5985	.6800	
92	Mixed Fruit Shortbread	.5980	.6610	
93	Scrambled Eggs	.5952	.7727	*
94	Winter Salad	.5909	.5085	*
95	Pork & Onion Pie	.5795	.5233	
96	Scotch Eggs	.5636	.5929	
97	Braised Beef	.5603	.5902	
98	Stewed Rhubarb	.5446	.6594	
99	Cauliflower	.5441	.5329	
100	Carrots	.5435	.6139	
101	Sultana Sponge	.5392	.5643	
102	Cauliflower	.5147	.5329	
103	Liver	.4851	0.5592	
104	Cabbage	.4706	.5395	
105	Macedoine	.4528	.4191	
106	Green Beans	.4385	.3537	
107	Sprouts	.4179	.4539	
108	White Sauce	.3818	.4178	
109	Cheese Cutlets	.3594	.2571	
110	Turnip/swede.	.3125	.3000	

FIGURE 3.3 : TO SHOW THE NUMBER OF FOOD ITEMS IN EACH PREFERENCE RANGE FOR BOYS AND GIRLS



3.413. Comparison of Preferences of Children Who a) Stay b) Who Never Stay and c) Who Occasionally Stay to School Lunch.

In the pilot survey, every child in the school filled in the questionnaire but they had to indicate whether they stayed, never stayed or only stayed to lunch occasionally. The preferences from these three groups varied very little as shown in figure 3.4.

There was not much difference in the preference ratios of the three groups of children. Eleven out of 110 items i.e. 10% had significantly different preference ratios.

The ratios from children who never stayed to school lunch were more different from the other two. The 'stay' and 'occasionally stay' groups had 73 and 80 of 110 items with preference ratios of over 0.7000 whilst the 'never stay' had only 58. With several of the items, notably cheese pie, shepherds pie, brisket, meat pie, beefburgers, winter salad and australian crunch, the 'never stay' preference ratio was different from the other two questionnaires.

With certain items, the children are likely to have an opinion of the 'school meal' variety e.g. meat pie or shepherd's pie. This opinion may put them off the dish so that a lower preference ratio is obtained from those children who have never tasted the item at school lunch. Thus, the major survey was carried out only on those children who regularly stayed to school lunch.

Figure 3.4:Preferences of Children who Stay to School Lunch with Varying Frequency.

Posit. on Questionnaire.	Food.	"Stay"	"Occasionally Stay"	"Never Stay."	Ratios which are Sig. Diff.
1	Scotch Eggs	0.5876	0.5227	0.3971	
2	Chicken Pie	0.7088	0.8333	0.6579	
3	Ham & Pineapple	0.7231	0.5556	0.6026	
4	Mince	0.8900	0.7000	0.7556	*
5	Braised Beef	0.5878	0.6176	0.5000	
6	Pork & Onion Pie	0.5031	0.6923	0.4265	
7	Cheese Pie	0.7741	0.5714	0.5610	*
8	Boiled Ham	0.7525	0.7667	0.8182	
9	Roast Lamb	0.8743	0.7857	0.7727	
10	Cheese Cutlets	0.3483	0.4000	0.1912	
11	Sausage Rolls	0.9045	0.8167	0.9091	
12	Stew	0.6667	0.7333	0.7556	
13	Shepherds Pie	0.9171	0.8966	0.7386	*
14	Fried Fish	0.7347	0.7593	0.7111	
15	Brisket	0.5922	0.6905	0.3649	*
16	Bread & Butter	0.8131	0.8276	0.8587	
17	White Sauce	0.4157	0.2800	0.3784	
18	Chicken Soup	0.7814	0.8036	0.7674	
19	Fish Fingers	0.9146	0.9483	0.9444	
20	Stew	0.6497	0.7586	0.7558	
21	Gravy	0.8081	0.8621	0.9419	
22	Tomato Sauce	0.7000	0.7679	0.6250	
23	Scrambled Eggs	0.6495	0.8148	0.7386	
24	Meat Pie	0.9015	0.8276	0.7955	*
25	Roast Pork	0.8385	0.8448	0.7727	
26	Beef Burgers	0.9196	0.9138	0.7000	
27	Sausages	0.8934	0.8393	0.8778	
28	Roast Chicken	0.7929	0.9286	0.7222	
29	Liver	0.5076	0.4630	0.4222	
30	Luncheon Meat	0.7741	0.6897	0.7273	
31	Roast Beff	0.9070	0.9138	0.8333	
32	Fishcakes	0.7872	0.8846	0.8977	
33	Tomato Soup	0.7400	0.7037	0.6222	
34	Roast Lamb	0.6837	0.8214	0.7000	
35	Cheese Flan	0.7312	0.7115	0.5897	
36	Turnip/Swede	0.3535	0.3519	0.3537	
37	Peas	0.7161	0.6724	0.6522	
38	Green Beans	0.3818	0.3889	0.5000	
39	Baked Potatoes	0.8333	0.8103	0.8750	
40	Cabbage	0.5558	0.4828	0.5111	*
41	Mushy Peas	0.7386	0.6207	0.6556	

42	Creamed Potatoes	0.7010	0.7037	0.7500	
43	Boiled Potatoes	0.7026	0.6207	0.7614	
44	Carrots	0.6225	0.5172	0.6304	
45	Beetroot	0.7374	0.7241	0.6477	
46	Cauliflower	0.5228	0.5000	0.5435	
47	Macedoine	0.4158	0.4524	0.5135	
48	Roast Potatoes	0.8950	0.8929	0.8556	
49	Sprouts	0.4162	0.5893	0.4333	*
50	Spaghetti	0.7929	0.7241	0.7791	*
51	Winter Salad	0.6409	0.5952	0.3793	*
52	Chips	0.9700	0.9655	0.9457	
53	Baked Beans	0.8232	0.7679	0.8000	
54	Summer Salad	0.6888	0.7857	0.6071	
55	Tinned Tomatoes	0.6632	0.7500	0.5909	
56	Cauliflower	0.5489	0.5000	0.5978	
57	Boiled Potatoes	0.7563	0.6429	0.7093	
58	Mushy Peas	0.7256	0.6481	0.6889	
59	College Pudding	0.5872	0.7500	0.5909	
60	Bakewell Tart	0.7668	0.8448	0.8250	
61	Custard Whip	0.6737	0.6304	0.6538	
62	Lemon Sauce	0.6941	0.7143	0.5690	
63	Jam Tart	0.8258	0.8750	0.8977	
64	Lemon Sponge Pudding	0.8241	0.8409	0.7286	
65	Flapjack	0.7813	0.9200	0.6167	
66	Mincemeat Tart	0.6229	0.7222	0.5294	
67	Lemon Meringue Pie	0.7116	0.7778	0.6951	
68	Syrup Sponge	0.7177	0.8846	0.8205	
69	Cherry Sponge	0.5944	0.8750	0.6029	
70	Shortbread	0.8116	0.9138	0.7667	
71	Eves Pudding	0.6291	0.7105	0.7273	
72	Tinned Fruit	0.7953	0.9138	0.8605	
73	Banana & Custard	0.7929	0.7885	0.8333	
74	Coconut Sponge	0.7563	0.8333	0.5811	
75	Bakewell Tart	0.7702	0.8103	0.8721	
76	Custard	0.7702	0.8571	0.9000	
77	Fruit Flan	0.6250	0.7368	0.4677	
78	Ice Cream	0.9425	0.9483	0.9556	
79	Fruit Cocktail	0.7423	0.8200	0.8250	
80	Jam Sauce	0.6510	0.7600	0.5541	
81	Jelly	0.9150	0.8793	0.8696	
82	Chocolate Pinwheels	0.8007	0.8235	0.7885	
83	Chocolate Sauce	0.7864	0.8462	0.7143	
84	Shortbread	0.8725	0.9074	0.8068	
85	Custard Whip	0.7081	0.7400	0.6571	
86	Apple Pie	0.8000	0.9138	0.8152	
8-	Currant S on e	0.6--8	0.6818	0.-8	

88	Rice Pudding	0.7400	0.7414	0.7273
89	Fruit in Jelly	0.7337	0.7500	0.7763
90	Butterscotch Tart	0.5977	0.7895	0.6250
91	Stewed Apple	0.6500	0.8200	0.5513
92	Rhubarb Crumble	0.6575	0.8571	0.7262
93	Sultana Sponge	0.6623	0.6429	0.5000
94	Mixed Fruit Shortbread.	0.7179	0.7273	0.6167
95	Trifle	0.7487	0.7143	0.6591
96	Jam Tart	0.7915	0.9286	0.8721
97	Jam Sponge	0.7668	0.8958	0.8625
98	Stewed Rhubarb	0.6390	0.6667	0.6795
99	Rainbow Sponge	0.7585	0.8571	0.8667
100	Ginger Sponge	0.7727	0.7407	0.6625
101	Flapjack	0.7538	0.8800	0.6379
102	Australian Crunch	0.7148	0.7188	0.3750 *
103	Lemoncurd Shortcake	0.7281	0.7727	0.5484
104	Mousse	0.8672	0.8269	0.7750
105	Apple Crumble	0.7692	0.9107	0.8182
106	Blancmange	0.7131	0.6364	0.7143
107	Pineapple upside-down Pudding	0.6839	0.6957	0.5833
108	Fresh Fruit	0.9041	0.8793	0.9667
109	Chocolate Sponge Pudding	0.9119	1.0000	0.8929
110	Chocolate Sauce	0.7839	0.9400	0.6711

3.414. Age Groups.

Age groups appeared to have a definite effect on childrens' food preference. The preferences for 48 out of 110 items i.e. 44% were significantly different from each other, see figure 3.5. There did not appear to be any pattern in the preference ratios, some dishes being more popular/unpopular in one age group whilst the other three were fairly similar, e.g. brisket, which was popular with the nine year old children but not with the others. However, most of the dishes had very different but random preference ratios for each food item. Those food items which were repeated did not always have good reproducibility, e.g. the preference ratios of roast lamb with the eight year old children was 0.4 and 0.8. Similarly, differing results for flapjack were obtained with the 11 year old children, 0.9 and 0.7.

It was hoped that preference for certain dishes would increase or decrease with the childrens' ages, but these results did not show this effect.

The nine year olds appeared to have higher preference for school lunch dishes with the ten and eleven year old children having a large number of lower preference ratios.

	Range of Preference Ratios.
8 years	0.9531 - 0.3235
9 years	0.9737 - 0.4364
10 years	0.9853 - 0.2250
11 years	0.9651 - 0.2143

see figure 3.6.

Beyer and Morris[53] found a great degree of similarity between the food habits of pre-school and elementary school children. This implied that training children to

Figure 3.5: Preference Ratios of Children in Different Age Groups.

Position on Questionnaire.	Food Item.	Preference Ratios. 8 years.	9 years.	10 years.	11 years.	Ratios found to be significant different
1	Scotch Eggs	0.5614	0.7019	0.4531	0.5390	*
2	Chicken Pie	0.6230	0.7400	0.7364	0.7576	*
3	Ham & Pineapple	0.6774	0.7182	0.6417	0.7083	
4	Mince	0.8571	0.8661	0.8309	0.8409	
5	Braised Beef	0.5727	0.6569	0.4753	0.6039	
6	Pork & Onion Pie	0.4245	0.6364	0.3558	0.5984	*
7	Cheese Pie	0.7031	0.7925	0.6328	0.7529	
8	Boiled Ham	0.7891	0.7818	0.7721	0.7299	
9	Roast Lamb	0.8083	0.9018	0.8692	0.8232	
10	Cheese Cutlets	0.3035	0.6000	0.2250	0.2143	*
11	Sausage Rolls	0.8750	0.9107	0.8955	0.9012	
12	Stew	0.7109	0.8482	0.6618	0.5882	*
13	Shepherds Pie	0.9141	0.9464	0.8134	0.8824	
14	Fried Fish	0.6935	0.7768	0.6567	0.7952	
15	Brisket	0.4643	0.8229	0.4661	0.5541	*
16	Bread & Butter	0.8516	0.8596	0.8333	0.7674	
17	White Sauce	0.4583	0.5000	0.3279	0.3506	
18	Chicken Soup	0.8438	0.9196	0.7955	0.6310	*
19	Fish Fingers	0.9531	0.8839	0.9328	0.9186	
20	Stew	0.6855	0.8482	0.6269	0.6012	
21	Gravy	0.8333	0.8545	0.8258	0.8314	
22	Tomato Sauce	0.7203	0.6161	0.6905	0.7342	
23	Scrambled Eggs	0.6875	0.7589	0.6563	0.6420	
24	Meat Pie	0.7969	0.9167	0.8731	0.9128	
25	Roast Pork	0.7742	0.8519	0.7388	0.9235	*
26	Beef Burgers	0.8538	0.8750	0.8788	0.9128	
27	Sausages	0.9444	0.8364	0.8485	0.9012	
28	Roast Chicken	0.6905	0.8571	0.7313	0.8824	*
29	Liver	0.4597	0.4821	0.5074	0.5000	
30	Luncheon Meat	0.7422	0.8426	0.7164	0.7471	
31	Roast Beef	0.8651	0.8571	0.9412	0.9070	*
32	Fishcakes	0.8629	0.5288	0.8462	0.9302	*
33	Tomato Soup	0.7460	0.6140	0.6912	0.7857	
34	Roast Lamb	0.4516	0.8704	0.5809	0.8706	*
35	Cheese Flan	0.7213	0.8704	0.4925	0.7683	*
36	Turnip	0.4683	0.4364	0.3125	0.2440	
37	Peas - Frozen	0.6641	0.7544	0.7090	0.6860	

38	Green Beans	0.4286	0.5083	0.3636	0.3353	
39	Baked Potatoes	0.8016	0.8534	0.7910	0.8895	
40	Cabbage	0.5000	0.7368	0.4167	0.5349	*
41	Mushy Peas	0.7063	0.8661	0.5909	0.7093	
42	Creamed Potatoes	0.7063	0.7232	0.6769	0.7267	
43	Boiled Potatoes	0.7177	0.8393	0.6923	0.6118	*
44	Carrots	0.7266	0.7018	0.5956	0.4826	*
45	Beetroot	0.7422	0.7679	0.6742	0.7118	
46	Cauliflower	0.4516	0.6667	0.4706	0.5238	
47	Macedoine	0.4915	0.6038	0.3559	0.3312	*
48	Roast Potatoes	0.8672	0.8860	0.8731	0.9176	*
49	Sprouts	0.4355	0.6161	0.3731	0.3706	*
50	Speghetti (Tinned)	0.7500	0.8571	0.7206	0.8110	
51	Winter Salad	0.4397	0.7889	0.5738	0.6571	*
52	Chips	0.9531	0.9737	0.9706	0.9651	
53	Baked Beans	0.7891	0.8684	0.7388	0.8554	*
54	Summer Salad	0.6111	0.7273	0.7045	0.7012	
55	Tinned Tomatoes	0.6855	0.7632	0.6172	0.5974	
56	Cauliflower	0.4435	0.7632	0.4706	0.5563	*
57	Boiled Potatoes	0.7097	0.8661	0.7077	0.6941	*
58	Mushy Peas	0.7097	0.9018	0.5985	0.6747	*
59	College Pudding	0.6759	0.7386	0.5965	0.4470	*
60	Bakewell Tart	0.8359	0.8125	0.7164	0.7800	
61	Custard Whip	0.7177	0.6250	0.6642	0.6567	
62	Lemon Sauce	0.6754	0.6596	0.5962	0.8077	
63	Jam Tart	0.8125	0.8393	0.8284	0.8795	
64	Lemon Sponge pudding	0.8468	0.8000	0.7692	0.8311	
65	Flapjack	0.6230	0.7547	0.7923	0.9118	*
66	Mincemeat Tart	0.6230	0.6667	0.5246	0.6719	
67	Lemon Meringue Pie	0.6525	0.6636	0.6667	0.8442	
68	Syrup Sponge	0.6000	0.7925	0.8095	0.7933	
69	Cherry Sponge	0.5328	0.7692	0.5692	0.6250	*
70	Shortbread	0.7656	0.9386	0.8529	0.7381	
71	Eves Pudding	0.3879	0.8163	0.7049	0.7045	*
72	Tinned Fruit	0.8770	0.7818	0.8538	0.7738	
73	Banana & Custard	0.8413	0.8571	0.7132	0.7988	
74	Coconut Sponge	0.7667	0.8889	0.7031	0.6364	*
75	Bakewell Tart	0.8281	0.8393	0.7424	0.7679	
76	Custard	0.8125	0.8727	0.8134	0.7353	*
77	Fruit Flan	0.4259	0.7024	0.6121	0.7109	*
78	Ice Cream	0.8750	0.9732	0.9853	0.9477	*
79	Fruit Cocktail	0.6750	0.7909	0.6923	0.8671	*
80	Jam Sauce	0.6167	0.7170	0.5726	0.68--	

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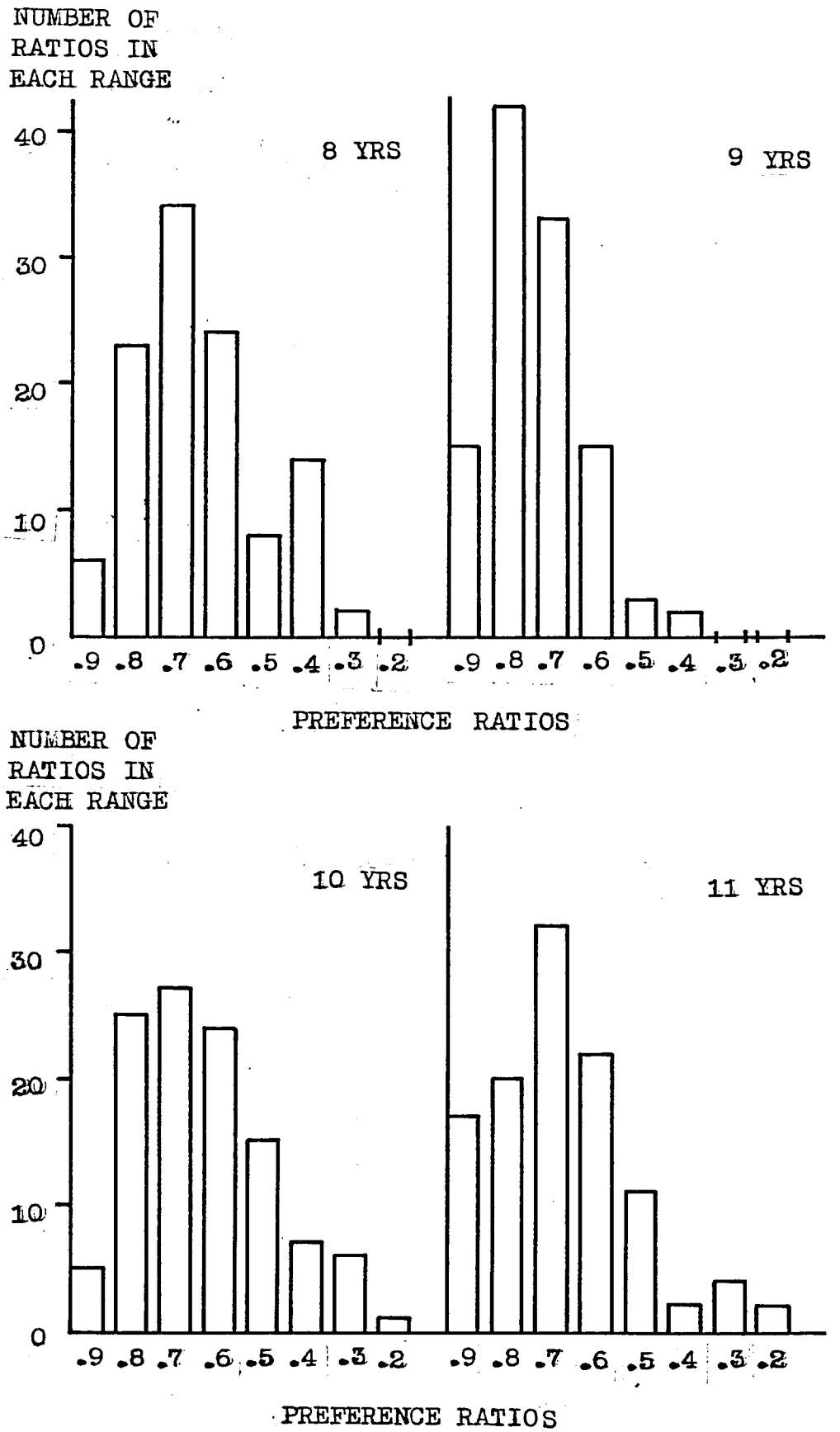
82	Chocolate Pinwheels	0.7200	0.9375	0.9314	0.6905	*
83	Chocolate Sauce	0.7578	0.7130	0.7794	0.8457	
84	Shortbread	0.7778	0.9196	0.8582	0.9000	*
85	Custard Whip	0.7951	0.6509	0.7015	0.6711	
86	Apple Pie	0.7969	0.8596	0.7985	0.8103	
87	Currant Sponge	0.5328	0.8673	0.6641	0.6410	*
88	Rice Pudding	0.7937	0.8571	0.7647	0.5988	*
89	Fruit in Jelly	0.6129	0.8491	0.6642	0.8313	*
90	Butterscotch Tart	0.7845	0.6711	0.5182	0.5227	*
91	Stewed Apples	0.6000	0.7549	0.5625	0.6962	
92	Rhubarb Crumble	0.6048	0.8091	0.6176	0.7994	
93	Sultana Sponge	0.5714	0.7549	0.5308	0.7055	*
94	Mixed Fruit Shortbread	0.6186	0.7813	0.6071	0.8088	*
95	Trifle	0.7540	0.8333	0.6567	0.7059	
96	Jam Tart	0.8516	0.8727	0.8433	0.7381	
97	Jam Sponge	0.7417	0.9118	0.8030	0.7500	*
98	Stewed Rhubarb	0.5508	0.8300	0.5923	0.6513	*
99	Rainbow Sponge	0.6964	0.7857	0.8475	0.7929	
100	Giner Sponge	0.7500	0.8839	0.7596	0.6605	
101	Flapjack	0.6210	0.8585	0.7692	0.7740	*
102	Australian Crunch	0.6364	0.7500	0.6122	0.7459	
103	Lemoncurd Shortcake	0.7698	0.6364	0.7049	0.6866	
104	Mousse	0.8750	0.7857	0.8065	0.9013	
105	Apple Crumble	0.8190	0.8818	0.8182	0.6989	
106	Blancmange	0.7200	0.6154	0.6032	0.8354	*
107	Pineapple	0.5273	0.8333	0.6034	0.7467	*
108	Fresh Fruit	0.9123	0.9286	0.8603	0.9419	
109	Chocolate Sponge	0.9397	0.9444	0.8582	0.9329	*
110	Chocolate Sauce	0.7460	0.7019	0.7836	0.8625	

FIGURE 3.6 : TO SHOW THE NUMBER OF FOOD ITEMS IN EACH PREFERENCE RANGE FOR THE FOUR AGE GROUPS INVESTIGATED



develop good food habits whilst they were young would help them to maintain good eating habits as they grew older. The Sheffield survey showed no significant difference in the most popular and least popular foods but there was a difference in the preferences of the intermediate foods with the age of the child. Pilgrim (1961)[51] did find that, in adults, preference for half of the foods investigated altered with age. The popularity of soup and vegetables increased with age and the preference for beverages, cereals, desserts and fruits decreased with age. If this is true in England, the overwhelming liking for dessert items and disliking for vegetables may not be too alarming if the preferences alter as the child grows older. From the Sheffield results, the older children, (ten and eleven year olds) had more dislikes than the eight and nine year olds. This may be that school lunch as a whole is becoming unpopular with the older children, as indicated by Kimmance (1972)[30] where the older children he investigated preferred other types of lunch to the school lunch. Perhaps, this survey looked at too small an age range so that no real pattern of changing food preferences emerged. If a wider age range could be investigated, e.g. 5 - 18 year olds, perhaps more significant changes in preference could be observed.

3.43. Questionnaire for the Major Survey.

Taking into account the findings from the pilot survey, the teacher-administered questionnaire was chosen for use in the major survey because the advantages outweighed the disadvantages.

Advantages:

1) It was the most suitable questionnaire for children of all ages and varying degrees of literacy. Very young children would have been unable tc complete the self administered questionnaire.
2) Minimum cost as it used the smallest amount of paper.
3) It was easy to distribute and only required a small number of staff to deal with it.
4) The teaching staff preferred this questionnaire and as they were going to administer the chosen one, it was vitally important to retain their cooperation.

Disadvantages:

1) Group effects. When a group of children are asked their opinions on a certain subject, one or several of children who are dominant in that group will sway the group decision, e.g. if the group leader dislikes shepherd's pie then the weaker children, who may be indifferent to it, may cast their vote as dislike. However, as no definite difference was noticed in the ratios obtained from the self-administered questionnaire compared to the other two, these effects cannot be very important in this particular case.
2) Children may not be reliable in raising their hands, either not raising them at all or putting them up twice, therefore altering the count.
3) With such a large number of items, it is possible that the teachers would make mistakes in counting the show of hands.

It was also decided that only those children who regularly stay to school lunch should answer the questionnaire.

3.5. Methodology of the Major Survey.

The teacher administered questionnaires were distributed to the schools over a 13 day period and they were all completed in 15 days except for those who opted out of the survey at this point. Each school was visited for approximately half an hour during which time the questionnaire and its administration was explained to the headteacher. A letter of guidance was left with the headteacher together with a more detailed letter for each teacher who was going to administer the questionnaire to the children. These two letters repeated all the information and details discussed with the headteacher in the interview. The questionnaire could then be filled in at leisure over a 15 day period, with each teacher fitting in sessions whenever possible. If the teaching staff discovered any problems, they were able to telephone the staff at the Polytechnic and discuss the matter. Each headteacher was left a stamped addressed envelope so that they could return the questionnaires as soon as they were completed.

As a result of the pilot survey investigations, only children who stayed to school lunch for at least one week in the previous term (Spring 1975) were asked to complete the survey. This involved approximately 5000 children.

3.6. Results.

Preference ratios* from the major survey were calculated ranked in an order where the most popular foods have a value nearest 1 and the least popular nearest 0. The results are shown overleaf divided into four food groups:- "Savour tarch"

* The preference ratios were calculated from the questionnaires of 3,315 children i.e. 66% of the survey. 1,685 questionnaires were not analysed either because they were incomplete or had not been filled in correctly by the teachers.

Figure 3.7. Preference Results from the Major Survey.

	"Savoury Starch Items.	Vegetables.	Desserts.	Savoury Items.
1.			Icecream 0.9224	
2.	Chips 0.9098			
3.			Chococlate Pin-wheel - 0.8774	
4.			Jelly 0.8633	
5			Chocolate Sponge 0.8596	
6			Shortbread * 0.8516	
7				Fish Fingers 0.8500
8			Jam Tart° 0.8432	
9			Shortbread* 0.8416	
10			Jam Tart° 0.8307	
11			Fresh Fruit 0.8256	
12	Roast Potato. 0.8121			
13			Bakewell Tart+ 0.8096	
14			ditto + 0.8083	
15				Roast Beef & York. Pud. 0.804
16			Rainbow Sponge 0.8041	
17			Custard 0.8036	
18			Apple Pie 0.7995	
19	Baked Potato. 0.7994			
20	Bread & Butter 0.7965			
21			Flapjack-0.7949	
22			Apple crumble 0.7924	
23				Sausage Rolls 0.7897
24			Jam Sponge 0.7884	
25			Choc. Spongex 0.7849	
26			Mousse 0.7839	
27				Sausages 0.7817
28				Shepherds Pie

2.	Baked Beans 0.7784			
30		Lemon Sponge 0.7770		
31			Roast Chicken 0.7763	
32		Flapjack- 0.7750		
33		Syrup Sponge 0.7723		
34		Chocolate Saucex 0.7715		
35		Banana & Custard 0.7688		
36			Gravy 0.7686	
37		Tinned Fruit 0.7685		
38	Spaghetti 0.7671			
39		Rice Pudding 0.7588		
40			Beef Burgers 0.7545	
41		Lemon Meringue Pie 0.7507		
42			Mince 0.7485	
43		Lemoncurd Short. 0.7453		
44			Chicken Soup 0.7444	
45		Ginger Sponge 0.7426		
46		Fruit Cocktail 0.7386		
47			Roast Lamb- 0.7361	
48		Fruit in Jelly 0.7309		
49		Jam Sponge 0.7286		
50	Creamed Pots. 0.7265			
51			Cheese Pie * 0.7201	
52			Meat Pie 0.7197	
53		Custard Whip o 0.7160		
54		Trifle 0.7156		
55			Tomato Soup 0.7149	
56			Roast Lamb- 0.7148	
57		Australian		

				0.7120
59				Fishcakes 0.7090
60				Boiled Ham 0.7039
61				Luncheon Meat 0.7008
62			Rhubarb Crumble 0.6990	
63			Blancmange 0.6980	
64	Boiled Pots.* 0.6926			
65			Butterscotch Tart 0.6924	
66			Custard Whip 0.6904	
67				Fried Fish 0.6859
68		Beetroot 0.6834		
69		Summer Salad 0.6825		
70			Coconut Sponge 0.6810	
71			Cherry Sponge 0.6799	
72			Eves Pudding 0.6749	
73			Currant Sponge 0.6712	
74	Boiled Pots. 0.6670			
75				Scrambled Eggs 0.6597
76			Mixed Fruit Short. 0.6576	
77				Chicken Pie 0.6552
78			Fruit Flan 0.6511	
79			College Pudding 0.6488	
80				Stew o 0.6454
81			Pineapple upside down Pud. 0.6379	
82			Stewed Apples 0.6366	
83				Stew o 0.6351
84			Mincemeat Tart 0.6267	
85			Sultana Sponge 0.6193	

86	Peas 0.6187			
87				Scotch Eggs 0.6138
88			Lemon Sauce 0.6095	
89	Carrots 0.6067			
90				Cheese Flsn * 0.5983
91				Ham & Pineapple 0.5913
92				Tomato Sauce 0.5845
93	Mushy Peas * 0.5821			
94	ditto* 0.5764			
95				Cheese Cutlets 0.5640
96	Tinned Tomatoes 0.5596			
97			Stewed Rhubarb 0.5570	
98	Winter Salad 0.5312			
99				Braised Beef in Gravy 0.5299
100				Liver 0.5222
101	Cauliflower o 0.5090			
102	ditto o 0.4991			
103	Cabbage 0.4974			
104				Brisket 0.4884
105				Pork & Onion Pie 0.4822
106	Green Beans 0.4465			
107	Macedoine 0.4382			
108	Sprouts 0.4372			
109				White Sauce 0.4116
110	Turnip 0.3898			

NB. Signs e.g. * ô ô + x - indicates duplicated food items.

3.7. Discussion of Preference Results.

The most popular food of all the items investigated was ice cream. Chips were the most popular potato-type item, fishfingers the most popular savoury item and baked beans the most popular vegetable. A meal comprising of baked beans, fish fingers and chips followed by ice cream would be very popular indeed.

The popularity ranges were as follows :-

Desserts	0.61	-	0.92
Savoury starch items	0.66	-	0.91
Savoury dishes	0.41	-	0.88
Vegetables	0.38	-	0.77

The percentage of menu items in each preference range is shown in figure 3.8.

The popularity ratings of desserts and potato items are very similar with almost 100% of these items having preference ratios of 0.6 and over. The savoury items have a much wider popularity range with the largest percentage falling in the 0.7 - 0.8 preference ratio range and 27% of the items falling below 0.6. Vegetables were the least popular food group with 64% of the menu items having preference ratios of less than 0.6, no vegetable had a popularity rating of over 0.8. Thus, it would appear that carbohydrate foods, either in the form of desserts or of carbohydrate accompaniments to a meal, form the favourite food group with vegetables being the least popular food group.

The least popular foods in each group were :-

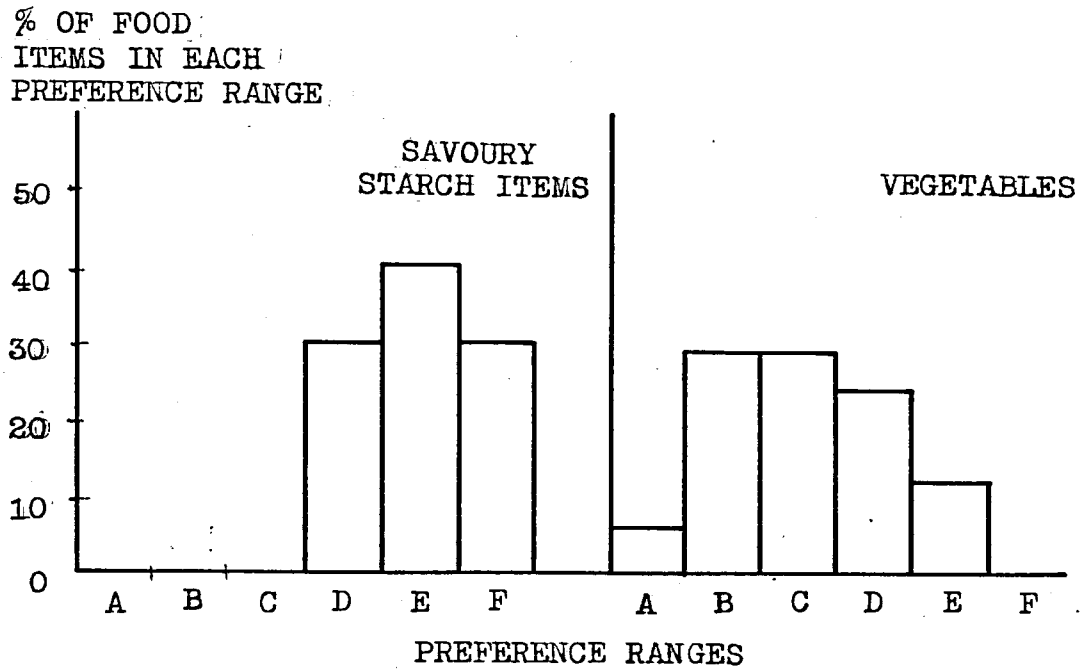
Potatoes - Boiled potatoes

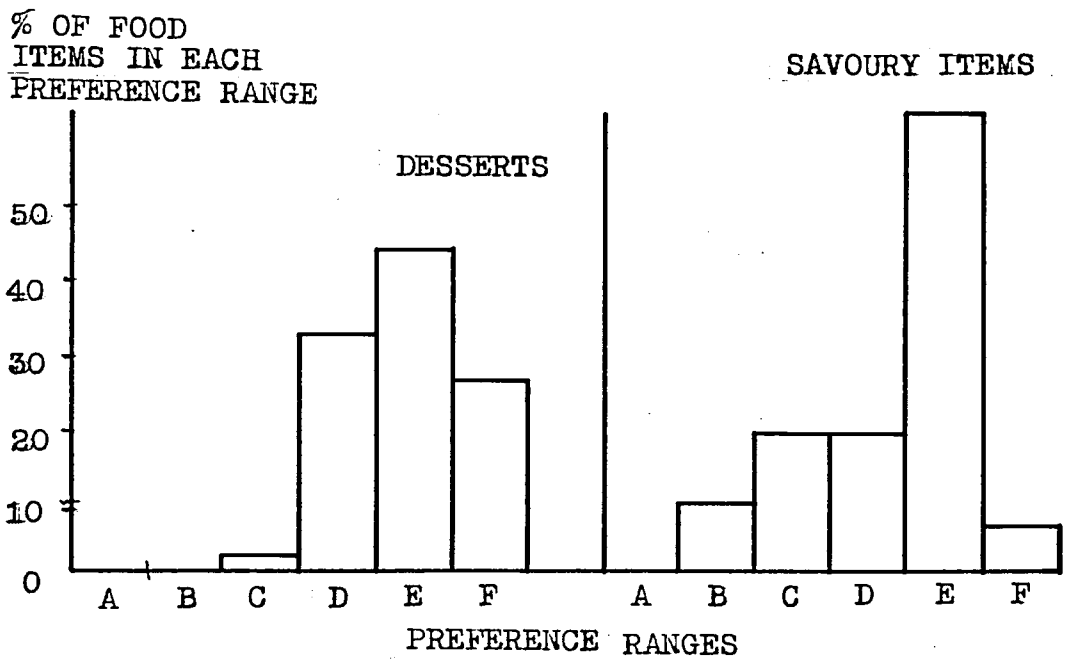
Vegetables - turnips

Desserts - stewed rhubarb

Savoury - White sauce, pork & onion pie.

FIGURE 3.8 : TO SHOW THE PERCENTAGE OF FOOD ITEMS IN EACH PREFERENCE RANGE FOR THE FOUR FOOD GROUPS





KEY

A	0.3 – 0.4	LEAST POPULAR
B	0.4 – 0.5	
C	0.5 – 0.6	PREFERENCE
D	0.6 – 0.7	RANGE
E	0.7 – 0.8	
F	0.8 and over	MOST POPULAR

There seems to be very little work in this field completed in England but a considerable amount has been carried out in the States. Breckenridge (1959)[45], in a survey investigating food preferences of $5\frac{1}{2}$ - $11\frac{1}{2}$ year old children from upper and middle class homes, found high preference for meat, icecream, potatoes, bread and milk. She also found low preference for cheese, vegetables, fish and fat meat. Although this study was completed a long time ago and in a different country, so that items like chips and fish fingers were not as popular or as available as they are now, meat, icecream, potatoes and bread remain as popular as ever. Cheese items (cheese flan, cheese cutlets) and vegetables were also found to be unpopular in the Sheffield survey but fish was more popular than in Breckenridge's study, in the form of fish cakes, fish fingers and fried fish. Cake and pastry fell in the middle range in the American survey, whilst in the Sheffield survey, they were in the most popular group of foods, the desserts. Interestingly, the results show that meat prepared alone e.g. roast beef, was more popular than stew, which agrees with the results from the American survey. Also, the more fatty meats, roast lamb and roast pork, were less popular than roast beef in both surveys.

Litman et al (1964)[50] observed that children liked milk, potatoes, bread, meat, butter and eggs whilst green and yellow vegetables and liver had low preference. Pilgrim (1961)[51] found that soldiers preferredgrilled steak, fresh fried potatoes, hot biscuits and milk whilst vegetables and iced coffee were the least popular foods. Baker and Ehlers (1949)[52] investigated childrens' food preferences, factors affecting their acceptance of food served and the

selection of balanced meals at school lunch. They found that meat, fish and egg dishes were well accepted whilst cheese and vegetable dishes had lower acceptance rates. Desserts also had a high acceptance value, particularly cake. Beyer and Morris (1974)[53] found that meat was the most popular item in pre-school and school age children whilst vegetables, particularly cooked vegetables, were unpopular. Breckenridge[45] also found this preference for raw vegetables. In the Sheffield survey, both summer and winter salads were reasonably popular for vegetable dishes.

Will these low preferences affect the nutrient intake of the children? Foods which supply an adequate amount of nutrients, e.g. milk, cereals, meat, eggs and fruit, are popular and are strongly disliked by very few children. Liver, cheese, green vegetables and root vegetables are unpopular and although they contain a selection of nutrients, these can be obtained from other sources in the diet. However, those foods known to be unpopular are only served infrequently so that probably a small amount of them is eaten on each occasion. One of the contributions vegetables can make to the diet is that they will increase the fibre content of the diet. This is especially the case as many children will be eating refined carbohydrates, e.g. white bread, white sugar, milled rice, as part of their normal food intake. A reasonable vegetable intake would help to ensure a good fibre content of the diet.

In most cases, the repeated food items had very similar preference ratios, the maximum variation being 0.003 for boiled potatoes, with the exception of cheese

flan. With this particular food item, the name was altered so that cheese flan and cheese pie were included in the questionnaire, both being the same item with the same description. Changing the food name in this way did alter the ranking of the two cheese dishes, cheese flan being number 90 and cheese pie, number 51. This would indicate that the name of the dish may have some bearing on the popularity of the food item. This agrees with Baker and Ehlers (1949)[52] who found that varying the name of the dish could increase the acceptance of the dish from 9% to 38%. Choosing a pleasant name for every dish and posting the menu each day outside the dining room may help to educate the children and to encourage them to eat their lunch. This factor probably has more significance in secondary schools where a refectory service is in question.

3.8. Childrens' "Recognition" of Food Items.

3.81. During the development of the food preference questionnaire, the question of how well the children understood or recognised the names of the food items arose. Did they know and recognise items such as roast beef, ice cream, liver, chocolate sponge and shepherds pie? The questionnaire attemped to investigate this factor by including one column in the format where the children could indicate whether they knew what the food was. This column was not worded 'how many children know what this food is?' because this approach was too direct and it was felt that many children would be unwilling to admit to not knowing the answer. Also, as all the children answering the questionnaire regularly stayed to school lunch, they would have all been presented with the food items listed. Therefore, recognition should have been 100% for all items,

assuming that each child knew what each food was. So the column was rephrased 'Number of children who have eaten the food'. This presumed that any child not recognising the dish would be unable to raise their hands when the show of hands was counted by the teacher.

After the counting of hands, the teachers could read out the description of the food so familiarising all the children with item. Then their opinions could be taken in the usual way.

Many of the teachers, however, abused this column and simply added up the number of ticks in the last three columns and entered this number in the first column. Consequently, analysis of this column in the major survey, was abandoned and only the pilot survey results were used. This was because the teachers in the pilot survey school were more cooperative and filled in the column conscientiously. It was originally intended to divide the results from the major survey into age groups and so see if the level of "recognition" increased with age. However, as only the one school was used, the age range was limited to nine to thirteen year old children and so the results appear for the school as a whole.

3.82. Results.

The results were expressed as a level of "recognition" from 0 - 1 as follows :-

$$\frac{\text{Number of children eating the food.}}{\text{number of children answering the questionnaire.}}$$

e.g. $\frac{15}{18} = 0.83.$ see figure 3.9.

Figure 3.9. Childrens "Recognition" of Food Items.

Level of understanding 0 - 1	Food Item.	Preference Rank.
1.0	Bread & Butter	20
1.0	-Chips	2
	-Icecream	1
	-Jelly	4
.99	-Fish Fingers	7
.98	-Sausage Rolls	23
	-Sausages	27
.97	-Gravy	36
	-Meat Pie	52
	-Beefburgers	40
	-Roast Beef & Yorkshire Pudding	15
	-Carrots	89
	-Roast Potatoes	12
	-Baked Beans	29
	-Jam Tart 1	8
	-Jam Tart 2	10
.96	-Stew 1	80
	-Shepherds Pie	28
	-Chicken Soup	44
	-Stew 2	83
	-Liver	100
	-Fish Cakes	59
	-Peas	86
	-Beetroot	68
	-Apple Pie	18
	-Fresh Fruit	11
.95	-Scrambled Eggs	75
	-Roast Pork	58
	-Tinned Fruit	37
.90	-Cheese Flan	90
	-Sprouts	108
	-Fruit in Jelly	48
	-Rhubarb crumble	62
	-Chocolate sauce	34
.89	-Tomato sauce	92
	-Boiled Potatoes 1	74
	-Lemon Sponge	30
.88	-Roast Lamb 2	56
	-Frien Fish	67
	-Roast Chicken	31
	-Cauliflower 2	102
.87	-Summer Salad	69
	-Lemon Meringue Pie	41
.86	-Creamed Potatoes	50
.85	-Ham & Pineapple	91
	-Boiled Potatoes 2	74
	-Jam Sponge Pudding	24
	-Flapjack 1	32
	-Mousse	26
.84	-Turnip	110
	-Green Beans	106
	-Coconut Sponge	70
.83	-Flapjack 2	21
	-Cherry Sponge	71
.82	-Fruit Cocktail	46
.80	-Blancmange	63
.77	-Syrup Sponge	33
	-Jam Sauce	49

3.83. Discussion.

The results were not worked out in age groups, only in overall figures. Figure 3.9 shows the level of "recognition" with the preference rank next to each food item. In some cases, the foods which were recognised most readily were also the foods with high preference ratings. e.g. bread and butter, chips, icecream and jelly. However, stew, carrots and liver were all well known but were not well liked. At the other end of the scale, chocolate pinwheels and rainbow sponge were two desserts which were very popular but the names were not recognised by the children. Foods like cheese cutlets, pork and onion pie and winter salad were unpopular and not well recognised, especially the dish cheese cutlets. Names like Australian crunch, college pudding and Eves pudding were obviously unfamiliar as the preference rank for these foods were quite reasonable.

All the children should have tasted the foods involved so that any food said not to have been eaten was likely to be one which was unrecognised. However, some children could say that they had not eaten a food if they had, in fact, tried it but had disliked it. The results did not show that meats, e.g. roast beef and roast pork were difficult to recognise. The names chosen for the dishes included in the questionnaire were obtained from the school meals staff rather than from the teaching staff. This would explain why dishes like Australian crunch were unknown to the children.

CHAPTER 4 NUTRITIONAL ASPECTS.

4.1. Nutritional Status of Children.

School meals must be considered in context with the nutritional status of the children who eat them. Nutritional status can be elucidated as follows :- a dietary history is taken either using the recall method or by measuring the food consumed. From this information, the nutritional intake can be assessed and considered in conjunction with the physical and medical status of the children. This is carried out by taking anthropoimetric measurements as well as looking for symptoms of various nutritional deficiencies.

In the introductory chapter, the conclusion was drawn that very few children in this country are malnourished but certain groups were found to be at risk with respect to diet. Children from poor socio-economic areas, large families, families on social security and one parent families are in this category. Not many children's diets are deficient in energy but many are low in protein and vitamins. In a s ituation where there is little money to go round, most of it is spent on the cheap staple carbohydrate foods. If the amount of carbohydrate is sufficient it will not lead to a decrease in energy intake, but the restricted choice will lead to a decreased nutrient intake and an unbalanced diet. So, it is vitally important that the school meal is nutritionally sound and well balanced.

4.2. Methodology of the Food Measurement Survey.

Food measurements were carried out in 22 primary schools in Sheffield. As some schools share kitchens,

this gave a sample of 16 kitchens. Ideally, all the food should have been weighed

1) before preparation, i.e. the food ordered,

2) after preparation,

3) after cooking,

4) at the time of service,

so that a complete picture of the food consumed could have been gained. However, for practical reasons, it was only possible to weigh the food served to the children and the total amount of plate waste. These weighings enabled the following information to be calculated.

1) Nutritional content of the meals as served and as eaten.

2) Percentage of plate waste.

The food ordered for one week in September 1976 for the eight schools investigated was also received, together with the total nutritional content of food ordered for all Sheffield schools in Autumn 1976. Thus, comparisons of the amounts of food ordered could be made.

4.21. Types of Service.

As already mentioned, two types of meal service were in operation in Sheffield and those will be described in detail as they influence the method of work.

4.211. Hatch Service.

In hatch service, food was placed in large service tins on the hatch and the children queued at the hatch whilst the kitchen assistants individually plated up the children's meals. In some schools, meals were plated up with standard amounts of food whilst in other schools the children were allowed to indicate whether they wanted a

small, medium or large portion of food. There was also a degree of variation between schools as to whether children were allowed to refuse constituent food items of the meal or whether they had to try a little of each one. This really depended on the policy of the headteacher as was the decision whether or not seconds were to be given out- assuming that food was left over after service.

4.212. Family Service.

In family service, children sat at small tables usually s eating 8 and the food was brought to the table in small service tins, each containing 8 portions. The children then served themselves whilst in some schools, older children/dinner monitors or teachers acted as servers. This type of service allowed a degree of choice in the amounts of food available to each child so that all the food was eaten up. In some schools, tins could be passed from table to table to ensure all the food was eaten. Second helpings were rarely served in this type of food service. It was much messier type of service, especially when the children served themselves, as they were observed to drop a lot of food onto the floor.

In both types of service, plate waste was scraped into one large container - usually an empty, large service tin. As the waste of individual food items was to be collected, the one large tin was replaced by the requisite number of smaller tins - each one being appropriately labelled. All kitchens/dining rooms had an area designated for waste collection and if at all possible this same place was used. If the area was too small and cramped, other arrangements had to be made.

In the separation and collection of the waste, the existing method of working was altered as little as possible.

Where the children were scraping and separating the waste themselves, one of the team had to observe the collection and help where necessary. The older junior children were quite competent but in infant schools a greater amount of help was needed. In most schools, however, one dining room assistant usually appointed herself to take charge of the waste collection and did this very efficiently. In schools where the co-operation was good and the normal routine altered as little as possible, the whole process continued smoothly with a minimum of fuss and disruption. In less co-operative schools, the process was not as smooth, these fortunately however, being few in number.

4.22. Method of Work.

One week, i.e. five consecutive days was spent at each school between 3rd February 1975 and 13th May 1975. On occasions, this was reduced to 3 to 4 days if the schools were unco-operative or if there were not enough people to carry out the measurements. Between one to four people went to each kitchen, the number depending on the size, complexity and number of sittings in that school. One person made a preliminary visit to each school during the previous week in order to meet the kitchen staff, dining room staff and the headteacher; to watch the meals service; to explain the method of work and to check on the availavility of equipment.

On each day of the survey, the volunteers arrived at

the school at about 11.30 a.m. and weighed the following items :-

Hatch Service.	Family Service.
1) The total food prepared for the children for both sittings.	1) As many of the service tins as possible including at least four of each food type e.g. potato, meat, vegetable etc.
2) The total food left unserved at the end of each sitting.	2) Any extra food served.
3) Any extra food served.	3) The plate waste which had been scraped into individual containers.
4) The plate waste which had been scraped into individual containers.	

Only food which was served to the children was measured. Any food which was to be served to teachers or kitchen staff was not taken account of and so a separate tin for staff waste had to be included in the arrangements.

In all schools except one, weighings were carried out on standard school meals scales obtained from the Kitchen stores and were accurate to $\frac{1}{4}$oz. In one exceptional school, scales were borrowed from the science laboratory.

All food was weighed in service tins, collection tins, pots, bowls or plates. At the beginning of the survey, all the tins were weighed before the food was served into them. This proved to be time consuming and interfered with the normal routine of the kitchen. Similarly, weighing the tins and containers at the end of food service proved to be unsatisfactory. It was noted that all the tins were made to British Standards Specifications so a list of tin weights was compiled (Appendix V) by taking 10 or 12 weighings for each tin type and calculating an average value, this average value then being used when working out

results.

Plastic plates and beakers were also found to be standard in weight but they were checked from time to time. Ceramic containers e.g. pots and bowls, were found to vary a great deal in weight, so that they had to be measured individually when used.

As there was a great amount of work to carry out in the 1 - 1½ hrs. allowed for the meal service, volunteers were needed for the survey. These were students recruited from the Department of Hotel, Catering Studies and Home Economics in Sheffield City Polytechnic. There were two full time researchers in charge of the survey who gave the students an informal briefing on the method of work in schools. A full time researcher carried out the preliminary visit to assess the kitchen and one also accompanied the volunteers on their first visit to a school in order to guide them through the routine. To further simplify the operation, standard tables were designed so that weighings could be tabulated uniformly. - See Appendix VI. These tables also served as a guideline to ensure the correct measurements were taken. In practice, very few students were sent to a school without a full time researcher.

The tables were taken back to the office and collated immediately. Any details which had been forgotten could then be noticed and collected the following lunch time. Other information which was collected during these visits to schools included the number of children staying to school lunch that day and notes, regarding general kitchen conditions, teachers participation in dinner duty and the co-operation of kitchen, teaching and dining

room staff, were taken by members of the survey team.

The next stage of the survey involved taking the information from the tables and getting it into a form from which the nutritional content could be calculated. The results were expressed as follows :-

1st Sitting.						2nd Sitting.
Menu item.	Total food served.	Amount Food served per child.	Amount food wasted per child.	% food eaten.	% food wasted.	ditto

These calculations were carried out by students in the maths department and were checked by a member of the survey team.

4.3. Problems Encountered During the Food Survey.

The difficulties experienced can be divided into two areas, 1) problems with personnel and 2) practical difficulties.

4.31. Personnel. Kitchen staff, teaching staff and children.

The kitchen staff felt that their expertise as cooks and as managers was being examined. Consequently, everyone was on their best behaviour, the atmosphere was somewhat strained and it was felt that the periods during the visits were not absolutely representative of what usually happened. The supervisors planned attractive menus which were known to be popular with the children and on occasions, the menus were changed to more advantageous ones if only a short warning of the visit was given. The teaching staff also affected the situation in some schools. Some were

very resentful of the Polytechnic because the Polytechnic received more financial help from local government than the schools. Some were not interested in dinners at all and therefore remained uninvolved. The attitude of the dinner ladies was often a reflection of the headteachers attitude so that if he/she was hostile towards the project, so were the dinner ladies. Other headteachers, who normally never appeared in the dining hall, took great interest during the survey and actively encouraged the children to eat more food.

The children wanted, in the main, to please the team. Therefore, some may have left food because they felt that it was required of them, whilst others may have eaten more than usual for the same reason.

The conclusion was drawn after visiting several schools that it was best to remain in the kitchen out of sight of the children so that they were aware of as little disruption in normal routine as possible.

Some of these problems were insumountable, e.g. the attitude of some of the staff could not be changed. If the results had been affected too badly by this type of behaviour, then they had to be abandoned. Where food was removed from the dining area and hidden or the menus changed, allowances could be made. The staff remained vigilant at all times and estimated any food which "disappeared". In actual fact, most of these actions had the affect of reducing the calculated average portion size, if only slightly.

4.32. Measurement of Waste.

The measurements were accurate to the nearest half ounce because of the following factors :-

1) The scales only measured to the nearest half ounce,
2) an average weight of both tins and food was taken which could introduce some inaccuracy,
3) Estimations of food, e.g. extra helpings or missing food, would probably be inaccurate.
4) food dropped on the floor and food left on the sides of the tins was not taken account of, both these factors making the true portion size smaller than the calculated one,
5) measurements of gravy and custard were not very accurate. The two sauces were served in jugs and the jugs were very difficult to empty completely during the meal service. Thus, again the actual portion sizes would be slightly less than the calculated ones. It would be impossible to give an estimated level of error due to the complexity of the whole service.

4.4. Results.

4.41. Overall Plate Waste Value.

The results were calculated from 19,663 schoolchildren's lunches.

schools investigated was obtained. This compares favourably with several other surveys, e.g.

Essex-Carter and Robert Sargeant	(1975)[19]	10% Plate Waste
Bender et al	(1972)[20]	10% ditto
Lynch	(1969)[18]	8% ditto
Bender et al	(1977)[54]	10% ditto
Millross et al	(1973)[58]	13%

The plate waste values as calculated for each food item measured is shown in figure 4.1. These values are ex-

Figure 4.1. Overall Plate Waste Results.

(TOTAL PLATE WASTE = 8% of TOTAL FOOD SERVED.)

Food wasted on the plate expressed as a percentage of the food served.

% Waste	Savoury Items.	Vegetables.	Desserts.
0			Tinned Pears
0.5			Coconut Shortcake
0.5			Neopolitan Sponge
0.5			Vanilla Sauce
1	Chicken Soup		Chocolate Shortcake
1			Icecream
1			Tinned Fruit Salad
2	Sausage	Scalloped Potatoes	Mousse
2		Bread & Butter	Chocolate Sauce
2			Rice Pudding
2			Chocolate Iced Spon
2			Chocolate Sponge
3	Apple Sauce	Baked Beans	Apple Crumble
3		Saute Potatoes	Waggon Wheels
3			Apple Pie
3			Rhubarb Pie
3			Lemon Sponge
4	Fish Fingers	Chips	Eves Pudding
4	Roast Chicken		Custard
4	Stuffing		Tinned Peaches
4	Cheese Sauce		Bakewell Tart
5		Roast Potatoes	Australian Shortcak
5		Tinned Spaghetti	Iced Sponge
5			Ground Rice
5			Pineapple Sponge
6	Shepherds Pie		Ginger Sponge
6	Scrambled Eggs		
6	Boiled Egg		
7	Mince	Cauliflower	Baked Sultana Spong
7	Hash		Custard Whip
7			Syrup Tart
7			Cornflake Tart
7			Rice Crispie Crunch
8	Fishcakes		Quaker Oat Tart
8	Yorkshire Pudding		

9	Cheese Flan		Fruit in Jelly
10	Gravy		
10	Cheese -grated		
10	Beef Hot Pot		
10	Boiled Ham	Creamed Potatoes	Lemon Meringue Pie
11	Luncheon Meat		Butterscotch Tart
12			Almond Slice
13	Baked Fish		
14		Peas	Fruit Shortcake
14		Carrots	
14		Beetroot	
15		Tomatoes - tinned	
16		Winter Salad	
18	Sausage Pie	Turnip	
19	Tomato Sauce	Kidney Beans	Rhubarb Crumble
19	Roast Beef		
19	Steak & Kidney Pie		
19	Ham & Pineapple		
20	Cheese Cutlets	Mushy Peas	
21	Pork Cobbler		Fresh Fruit Salad
21	Parsley Sauce		
22	Salad Cream		
23	Liver		
25	Fried Fish		
25	Roast Pork		
30		Cabbage	
35	Braised Steak		
35	White Sauce		
53		Macedoine	Blancmange

pressed as the amount of food wasted on the plate taken as a percentage of the food served to the children.

However, the plate waste values varied considerably depending on the food item, particularly with which food group the food item could be identified - figure 4.2. Vegetables incurred the highest plate waste values, followed by savoury sauces and meat items, whilst "savoury starch" items, desserts and sweet sauces had the least waste. Other workers, e.g. Bender et al (1977)[54] have found that waste depends on the menu, freedom of choice of food, the portion size and the attitude of the dinner supervisors.

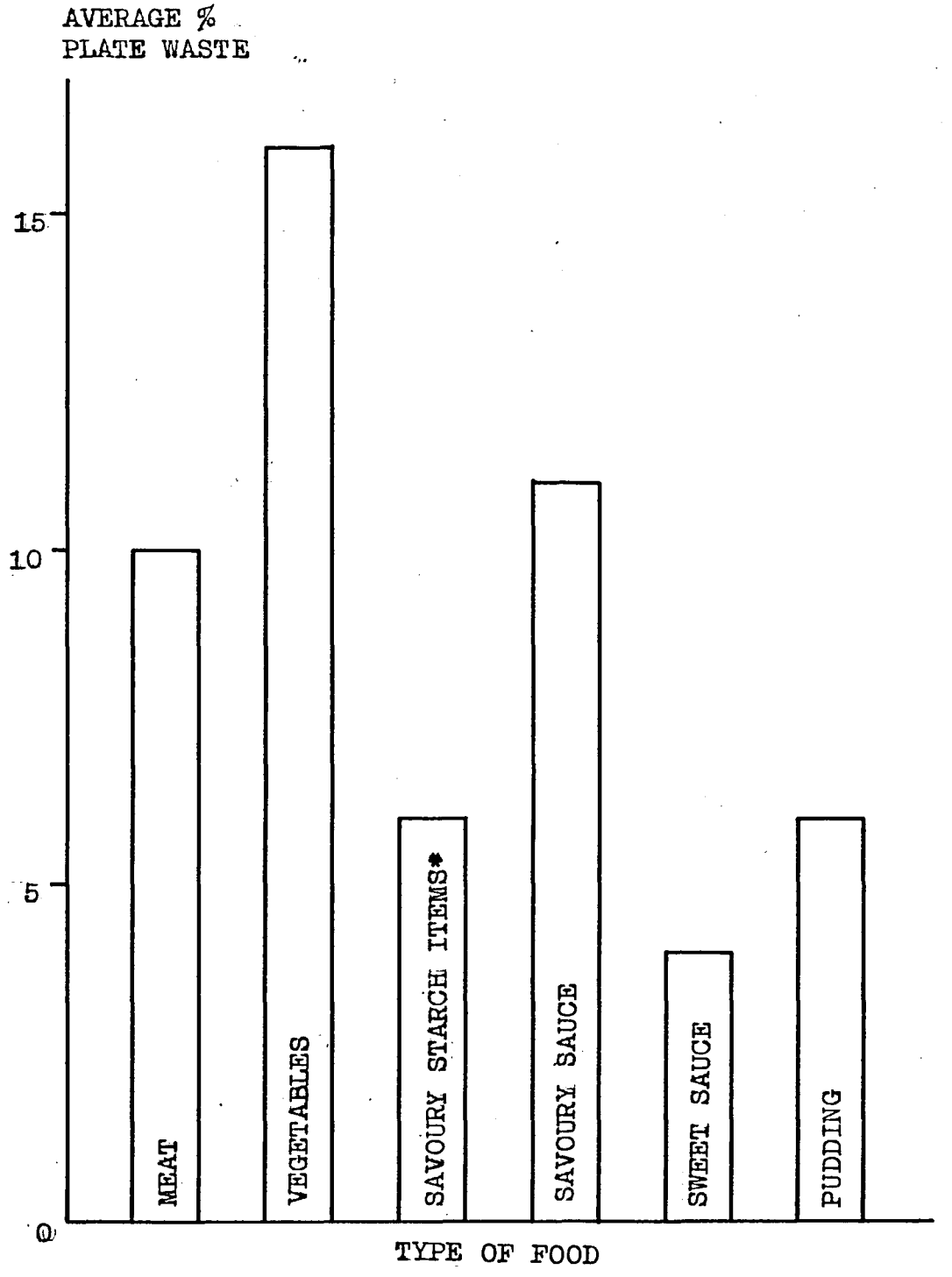
4.42. Factors Affecting the Plate Waste Results.

Other factors which might have affected the plate waste results were :-

1) time of the meal, i.e. whether first or second sitting,
2) type of service, i.e. whether hatch or family service,
3) infant and junior age groups,
4) teachers' participation in dinner duty,
5) Social groups.

see over.

FIGURE 4.2 : AVERAGE PERCENTAGE PLATE WASTE OF EACH FOOD GROUP



*FOOTNOTE: SAVOURY STARCH ITEMS INCLUDES POTATOES AND BREAD AND BUTTER

4.421. First or Second Sitting. - See figure 4.3.

Percentage Waste.	Number of Plate Waste Observations.* 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40 and over.
First Sitting	222	53	27	20	15	8	10	7	9
Second "	324	79	54	30	25	13	22	9	19

Using the chi square test, no significant difference was found between the plate waste values of first or second sitting.

4.422. Type of Service.

The two types of service, hatch and family, have already been described in section 4.21.

Percentage Waste.	Number of Plate Waste Observations.* 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35 and over.
Hatch Service	220	61	45	30	18	9	21	30
Family "	326	71	36	20	22	12	11	14

Using the chi square test, there is a significant difference between the plate waste values of hatch and family service. These results did not show whether waste was higher for hatch or for family service although there is some indication that it may be higher for hatch service, see figure 4.4.

* Footnote. The number of plate waste observations in each table refers to the number of percentage waste values for individual food items which fall into each waste percentage range.

FIGURE 4.3 : TO SHOW THE AVERAGE PERCENTAGE PLATE WASTE IN EACH FOOD GROUP FOR FIRST AND SECOND SITTINGS

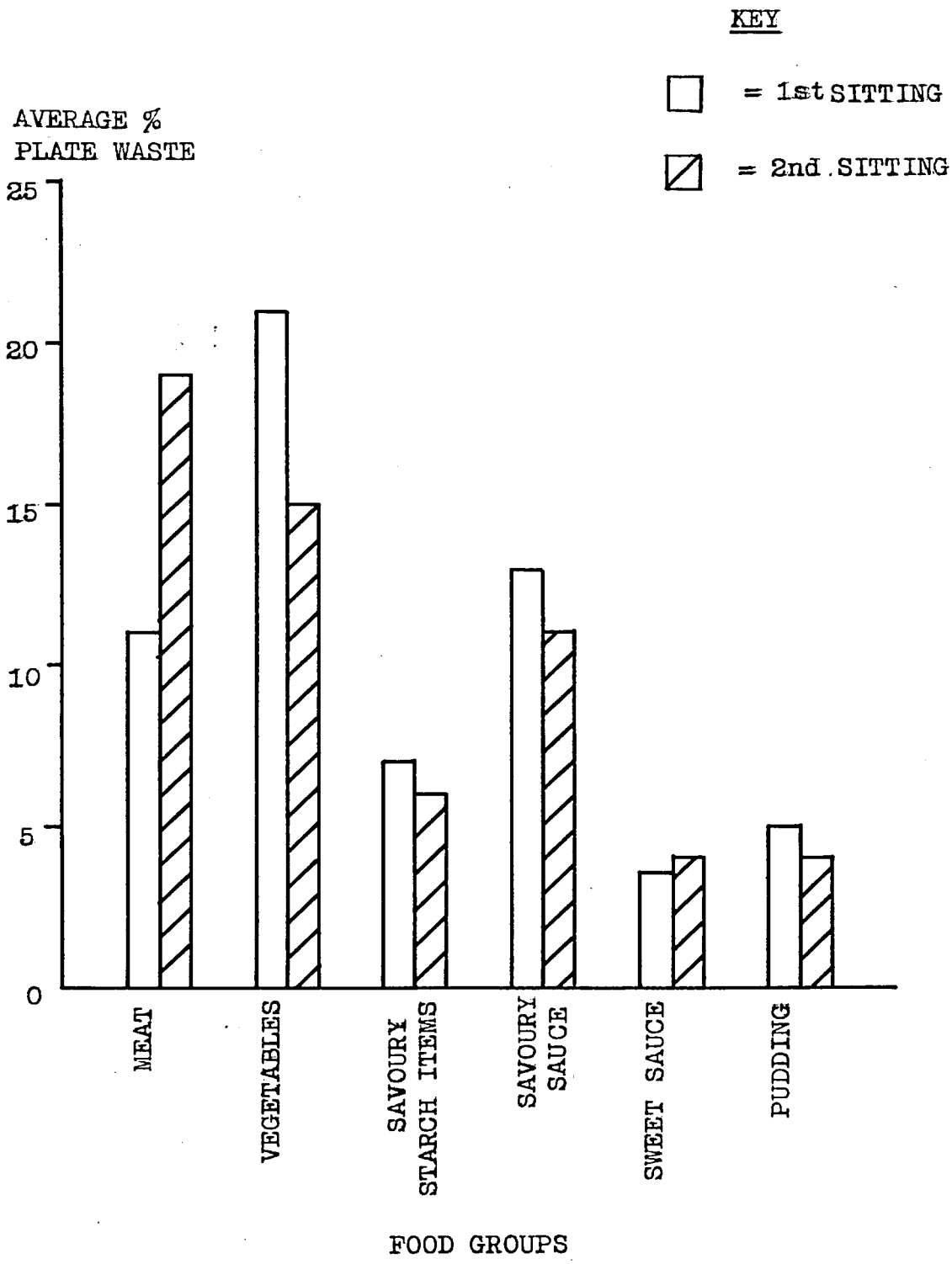
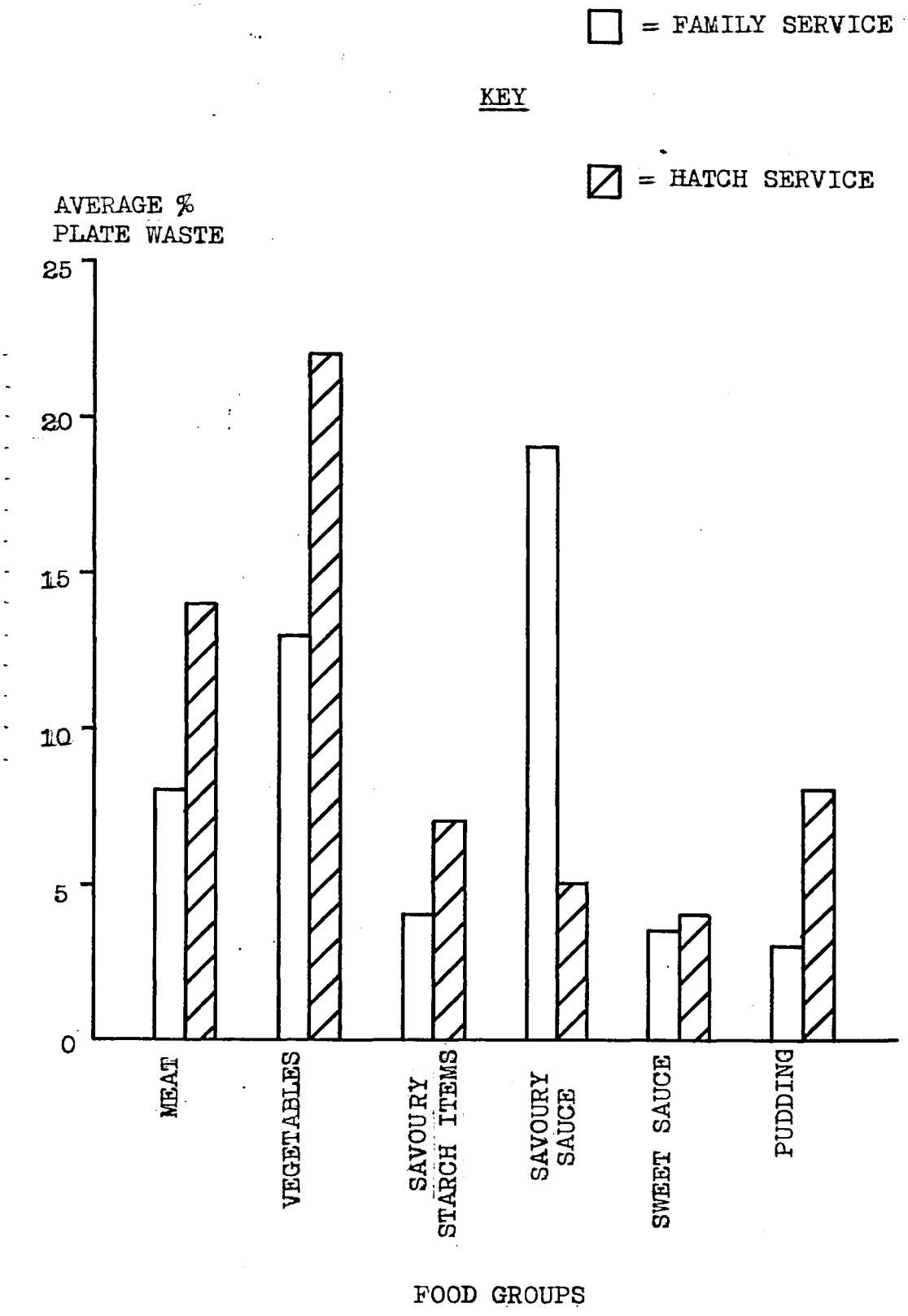


FIGURE 4.4 : TO SHOW THE AVERAGE PERCENTAGE PLATE WASTE IN EACH FOOD GROUP FOR HATCH AND FAMILY SERVICE



4.423. Infant and Junior School.

Infant schools included children from 4 - 8 years of age whilst junior schools included children from 8 - 13 years of age.

	Number of Observations.*									
Percentage Waste.	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45 and over.
Infants	214	54	38	28	13	10	17	6	6	6
Junior	332	78	43	22	27	11	15	10	5	11

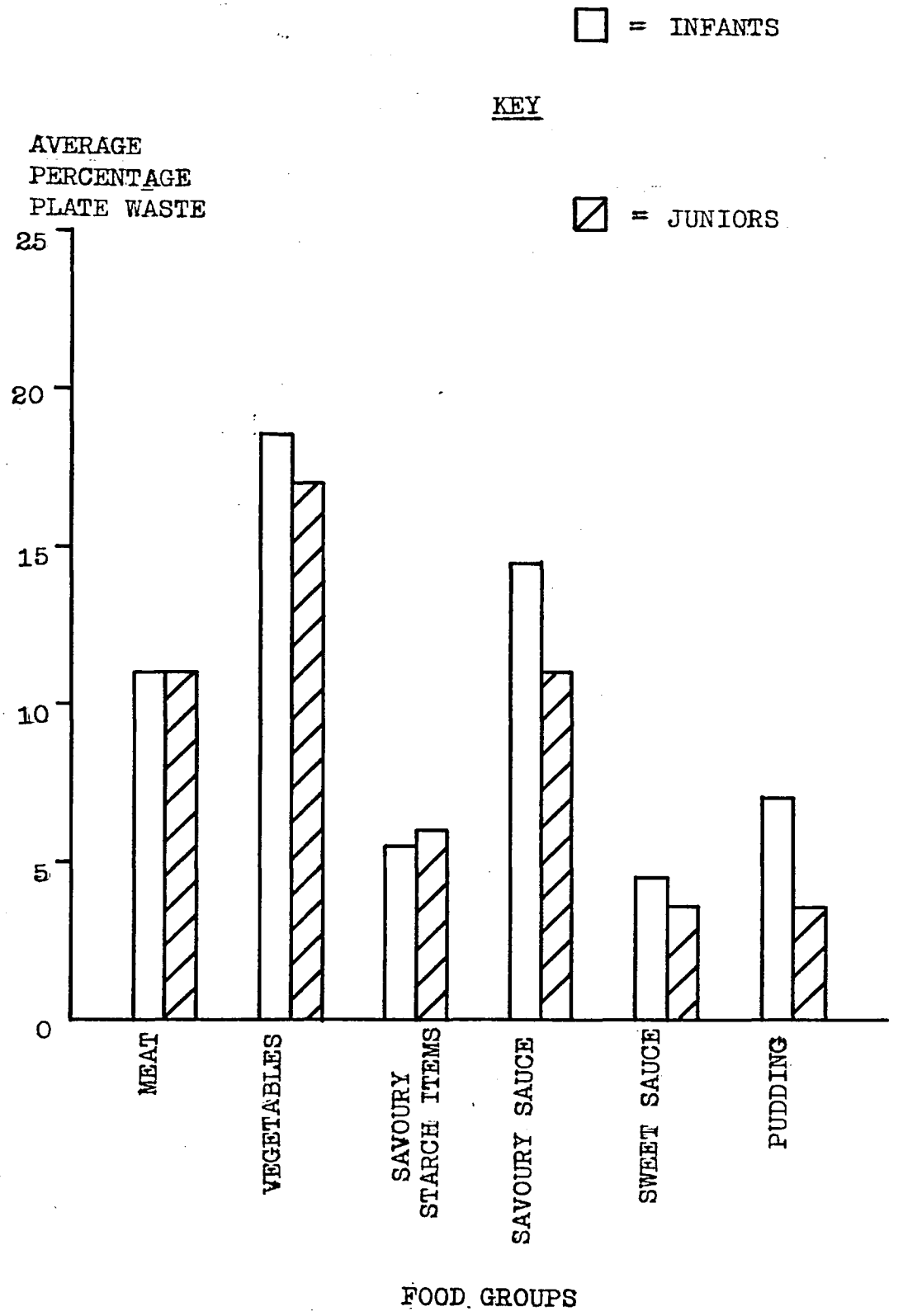
The chi square test indicated that there is not any significant difference in the plate waste from dining rooms in infant and junior schools - see figure 4.5.

4.424. Teachers Participation in Dinner Duty.

When each school was visited, it was noted whether the teachers attitude to school dinners was positive and whether they sat with the children during the course of the meal. Schools were then placed into one of the following categories :-

HIGH	The teachers sat with the children at the table or walked around the dining room, in both cases actively encouraging the children to eat.
MEDIUM	The teachers sat together at a table in the dining room and took occasional interest in the children.
LOW	Either the teachers did not go into lunch at all, taking no part in dinner duty, or they did go into lunch but were totally uninvolved with the childrens lunch.

FIGURE 4.5 : TO SHOW THE AVERAGE PERCENTAGE PLATE WASTE IN EACH FOOD GROUP FOR INFANT AND JUNIOR SCHOOL CHILDREN



It was very noticeable that in those schools where the teaching staff were uninvolved with the lunch, the dining room ladies who were under their supervision were too.

	Number of Observations.*							
Percentage Waste.	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35 and over.
High	105	41	17	14	10	3	6	8
Medium	179	45	22	16	10	8	11	13
Low	182	46	42	20	20	10	15	23

The chisquare test indicated that there was only a significant difference regarding plate waste between those schools with high and low teacher participation in dinner duties. The other two comparisons proved to be statistically insignificant. The plate wastage of food increased with decreasing teacher participation. (see figure 4.6) in five out of the six food groups - desserts being the exception.

4.425. Social Groups.

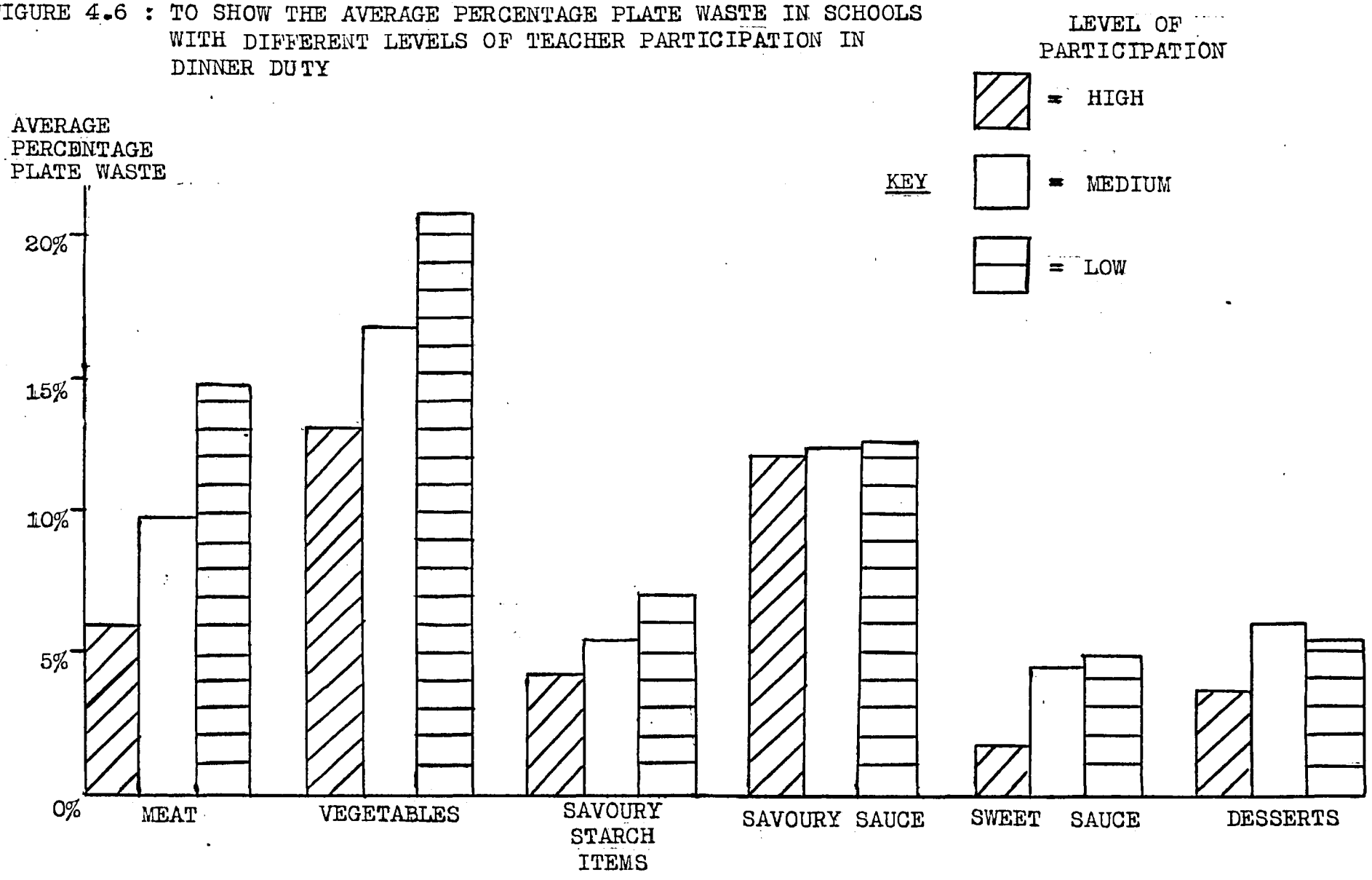
Schools were divided into three social groups depending on the percentage of free school meals in that school.

Group 1 0-10% Free school meals (10 schools)

Group 2 10-20% " " " (9 schools)

Group 3 20% - " " " (3 schools)

FIGURE 4.6 : TO SHOW THE AVERAGE PERCENTAGE PLATE WASTE IN SCHOOLS WITH DIFFERENT LEVELS OF TEACHER PARTICIPATION IN DINNER DUTY



Percentage Waste.	Number of Plate Waste Observations.*							
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35 and over.
Group 3	83	23	15	11	8	2	7	5
Group 2	231	55	31	12	12	10	7	4
Group 1	232	54	35	27	20	9	18	35

The chi square test indicated that there was a significant difference between each pair of social groups compared, e.g. between group 3 and group 2, group 2 and group 1 and group 3. Group 1 (lowest percentage free school meals) had the highest percentage of observations in the 35% plate waste and over grouping. Group 2 and 3 had more values at the lower end of the scale i.e. less plate waste. See figure 4.7.

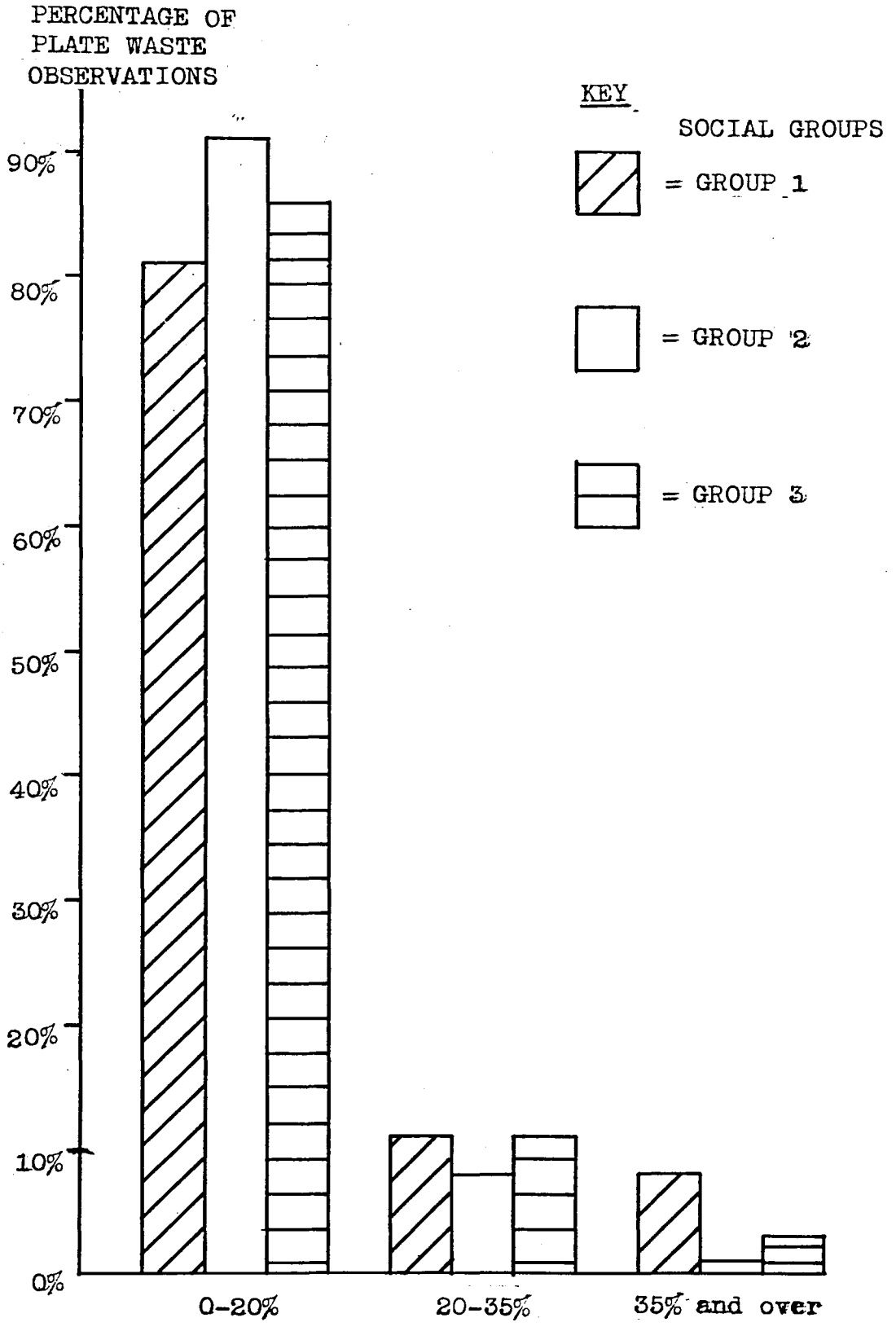
Discussion. (4.5)

Plate waste in school meals was found to be significantly affected by the following factors :- social groups, as indicated by the percentage of free school meals, teachers participation indinner duty, type of food service and type of food item.

There was more waste in the schools with the lowest percentage of free school meals. This is interesting as children receiving free school meals have been shown to be more socially and nutritionally at risk than children from more average circumstances and seem to be eating more of their school lunch than do the children from the more well-off families.

Teacher participation in dinner duty was also a very important factor. Plate waste was higher in schools

FIGURE 4.7 : TO SHOW THE PERCENTAGE OF PLATE WASTE OBSERVATIONS IN EACH OF THE THREE SOCIAL GROUPS INVESTIGATED



where teachers did not take dinner duty, the behaviour of the children was poor and noise was greater than in other schools. Poor control during the lunch hour has been shown to affect the amount of plate waste by Tracq and Kytespotter (1969)[24] in French schools. Teaching staff in Britain cannot be forced to take dinner duty because of union agreement, so some schools find it very difficult to keep proper control during the lunch hour. In this situation, a greater burden of responsibility falls onto the dining room ladies and the head teacher who have complete charge of the children. However, as previously mentioned, the attitude of the dining room ladies seemed to imitate the attitude of the head teacher, so that if he or she were not interested in school meals, the behaviour of the ladies became lax. Perhaps, teachers should be made to realise, if they do not already do so, that their attitude towards the school lunch is very important to other staff in the school and to the children. Bender (1977)[54] also discovered that the attitude of the dinner supervisors affected the amount of waste.

It was also discovered that the type of service affected plate waste. In most cases, waste appeared to be higher in hatch service than in family service. Thorough investigation is needed to make sure the type of service in practice in each school is the best for that area. In fact, the Sheffield school meals service was trying to convert as many primary school kitchens as possible to family service as it had already been noted that there appeared to be less waste in this type of service. However, not all kitchens could be converted because a large number of warming cabinets are needed for family service.

It was also noticed that the amount of plate waste was not distributed evenly over all the six food types: savoury items, vegetables, "savoury starch" items including potatoes and bread, sweet sauces, savoury sauces and desserts. More waste was collected from vegetables, than was from savoury items including sauces, and the carbohydrate foods (desserts and "savoury starch" items). Baker and Ehlers (1949)[52] have also found that plate wastage is higher for vegetable and some savoury items than it is for carbohydrate-type items. Other workers in Britain have not published plate waste results of individual food items.

During the investigation, it became apparent that another factor may possibly have some bearing on plate waste, unrelated to the fact that children may or may not like the meal offered to them, and this is the length of time allowed for the meal. This could vary considerably from school to school, two extremes being :-

School A - 75 minutes approx. - 1st sitting only.
School B - 11 minutes approx. - 1st sitting,
- 14 minutes approx. - 2nd sitting.

In the latter situation, the emphasis is more on speed than on establishing good eating habits or on finishing the meal at all. Reasons for making the children eat more quickly were 1) attitude of the staff and 2) a requirement for the dining hall to be used as a teaching area. Time was lost both at the beginning and at the end of the dinner hour arranging dining furniture and clearing up, thus leaving only a limited amount of time for one, two or three sittings. School A allowed plenty of time for lunch and the children were unhurried and could eat

their meal at leisure.

Plate waste is shown to be affected by various physical circumstances which may or may not be alterable by the teaching or school meals staff.

4.6. Nutritional Findings.

The nutritional content of Sheffield school meals for the food ordered was as follows :-

Food ordered week beg. 24/9/76.	Protein g.	Fat g	Energy MJ	(Kcals)
for the 8 supervisors in the study.	20	29.4	2.56	(611)
Average food ordered for all Sheffield primary schools in the Autumn term 1976.	21	-	2.88	(687)

The nutritional content of Sheffield school meals for infant and junior schools (5 - 12 years of age) was found to be as follows :-

	Protein g	Fat g	Energy MJ	(kcals)
DES requirements	27	30	3.04	(725)
Food offered to the children	18.8	27	2.45	(584)
Food eaten by the children	17.2	25.1	2.29	(546)

Food expressed as a percentage of the DES requirements.

	Protein %	Fat %	Energy %
Food ordered for one week	74	98	84
Food offered	69	90	80
Food eaten	64	84	75

Nutritional content of meals as served and eaten by infants (5 - 8 yrs.) and junior (8 - 12 yrs.) school children respectively.

	INFANTS.				JUNIORS.			
	Protein g	Fat g	Energy MJ	(Kcals)	Protein g	Fat g	Energy MJ	(Kcals)
Food served	16.1	23.3	2.14	(511)	20.8	29.6	2.67	(638)
Food eaten	14.7	21.5	1.98	(473)	19.0	27.7	2.51	(599)

4.61. Discussion.

As the children in the schools' which were investigated were between 5 and 12 years of age, the DES requirements were taken to be 27g protein (50% of the RDI) 30g fat (this value is no longer required[26, 27]) and 3.04 MJ (725 Kcals) energy (33% of the RDI). The food ordered, offered and eaten all fell below the DES requirements. Children consumed 64% of the target for protein, 84% for fat and 75% for energy. The nutritional contents were calculated by computer, using the food tables of McCance and Widdowson[56] and the recipes as used by the Sheffield school meals service, which were collected and collated during the survey period.

That these results fall below DES requirements is corroborated by several other workers, Bender et al (1977)[54] Richardson and Lawson (1972)[57], Osner and Thomas (1976)[21], Cooke et al (1975)[23] and Essex-Cater and Robert-Sargeant (1975)[19].

Significantly, not enough food, in terms of protein and energy, was ordered to meet these requirements, this fact being confirmed by Bender in the Brent Survey[54]. Thus, Sheffield School meals were found to be inadequate in respect of quantity if not of quality.

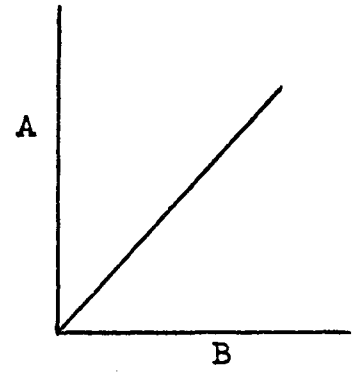
CHAPTER 5. INTERRELATIONSHIPS.

Comparison of the Results from Plate Waste Collections and the Food Preference Questionnaire.

On examination of the results, there appeared to be some correlation between the plate waste measurements and the preference ratios calculated from the questionnaire. This possible correlation was investigated in some detail using both the rank correlation coefficient and the Pearson correlation coefficient.

The rank correlation coefficient only shows a comparison of the order of the foods, i.e. how well does the ranking obtained from the waste measurements compare with that obtained from the questionnaire results.

The Pearson correlation coefficient, however, measures the degree of predictability of factor "A" from factor "B" as follows :-

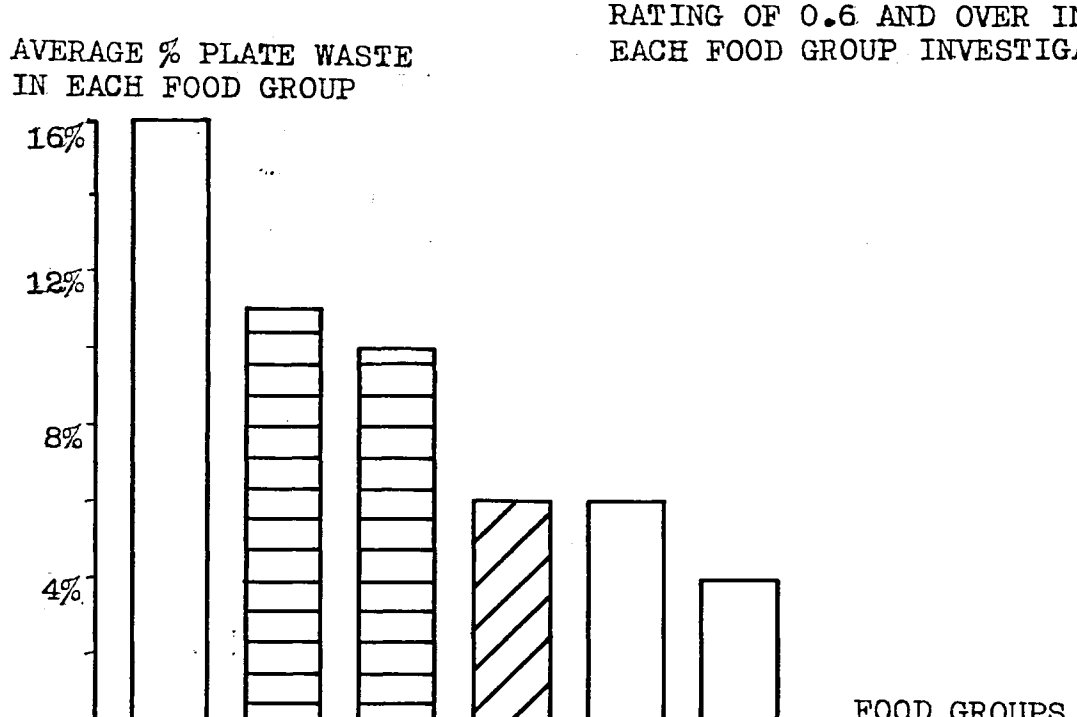


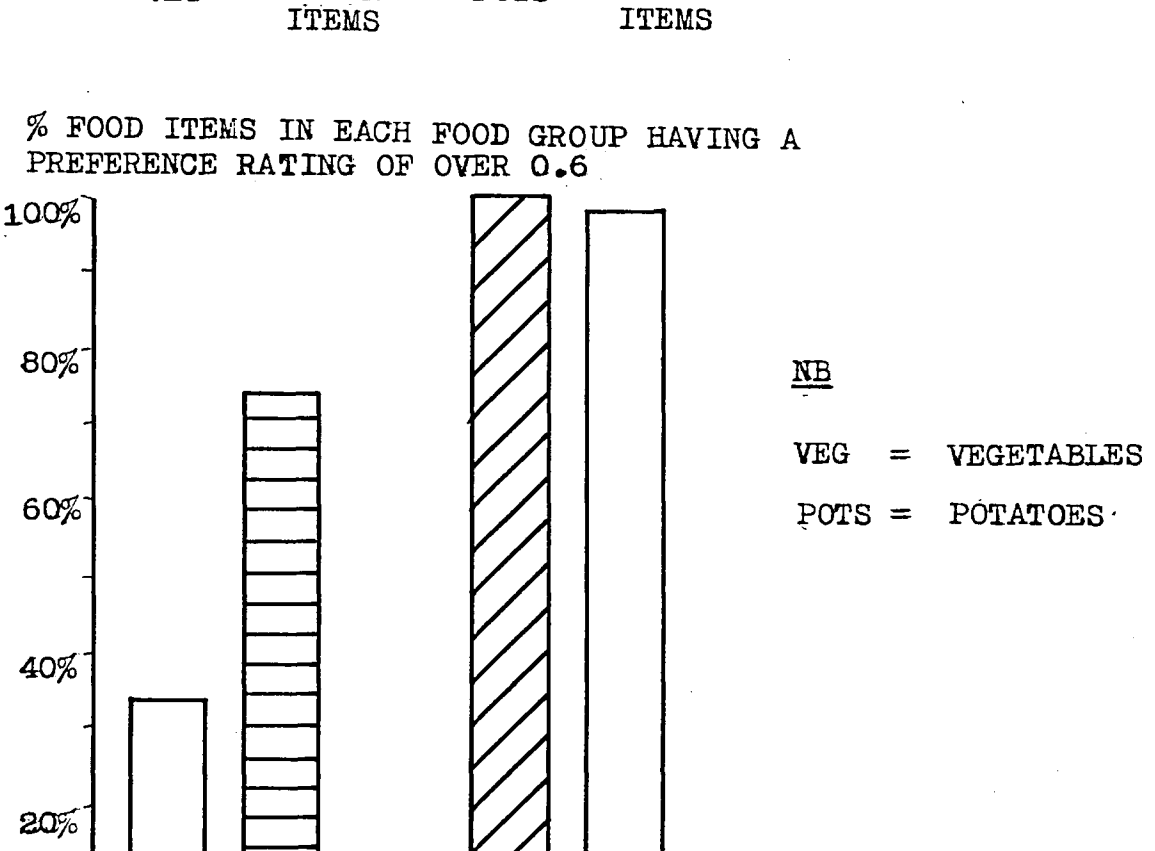
a graph can be drawn from the data which, if there is one hundred per cent correlation, will produce a straight line. Thus, if factor 'B's are known - "A" can be estimated or predicted. In this case, the two factors were average % plate waste and the preference ratings.

5.1. Comparison of Food Groups.

From the two histograms in figure 5.1, it would appear that there is some correlation between the amount of plate waste and the preference of the food. Vegetable foods had the lowest preference and the highest plate

FIGURE 5.1 : TO SHOW THE AVERAGE PERCENTAGE PLATE WASTE AND THE PERCENTAGE OF FOOD ITEMS WHICH HAVE A PREFERENCE RATING OF 0.6 AND OVER IN EACH FOOD GROUP INVESTIGATED





waste whilst the carbohydrate groups had the highest preference ratios and the lowest plate waste, with savoury items being in the middle, both in terms of preference and the amount of plate waste collected. The Pearson correlation coefficient was calculated for this data and was found to be - 0.99 which is significant at 99.9%. This result indicates that there might be a relationship between the degree of preference for a food group and the amount of plate waste of that type of food at the end of a meal, i.e. as the preference increases the wastage decreases.

5.2. Comparison of Individual Food Items.

Both rank and Pearson correlation coefficients were worked out for the individual food items.

5.21. Rank Correlations.

The foods were ranked in terms of their preference ratios. The food with the highest preference ratio was given a rank of 1 and so on down to 110. The food items were examined in three food groups: Savoury items, desserts and vegetables. The same groups were also ranked in terms of plate wastage with food items having little plate waste being ranked as 1. A rank correlation coefficient was then calculated to see how well the ranking order derived from the questionnaire compared with the ranking order derived from the plate waste measurements.

contd. over.

Vegetables.

Food item.	Preference Results. Rating of 0-1.	Rank.	Plate Waste Results. %	Rank.
Baked Beans	0.7784	1	3	1
Spaghetti	0.7671	2	5.5	2
Beetroot	0.6834	3	14.5	6
Peas - frozen	0.6187	4	13.5	4
Carrots	0.6067	5	14.5	5
Peas - mushy	0.5821	6	19.5	11
Tinned Tomatoes	0.5596	7	15.0	7
Winter Salad	0.5312	8	16.0	8
Cauliflower	0.5090	9	7.0	3
Cabbage	0.4974	10	30.0	12
Green Beans	0.4465	11	19.0	10
Macedoine	0.4382	12	53.0	13
Turnip	0.3898	13	18.0	9

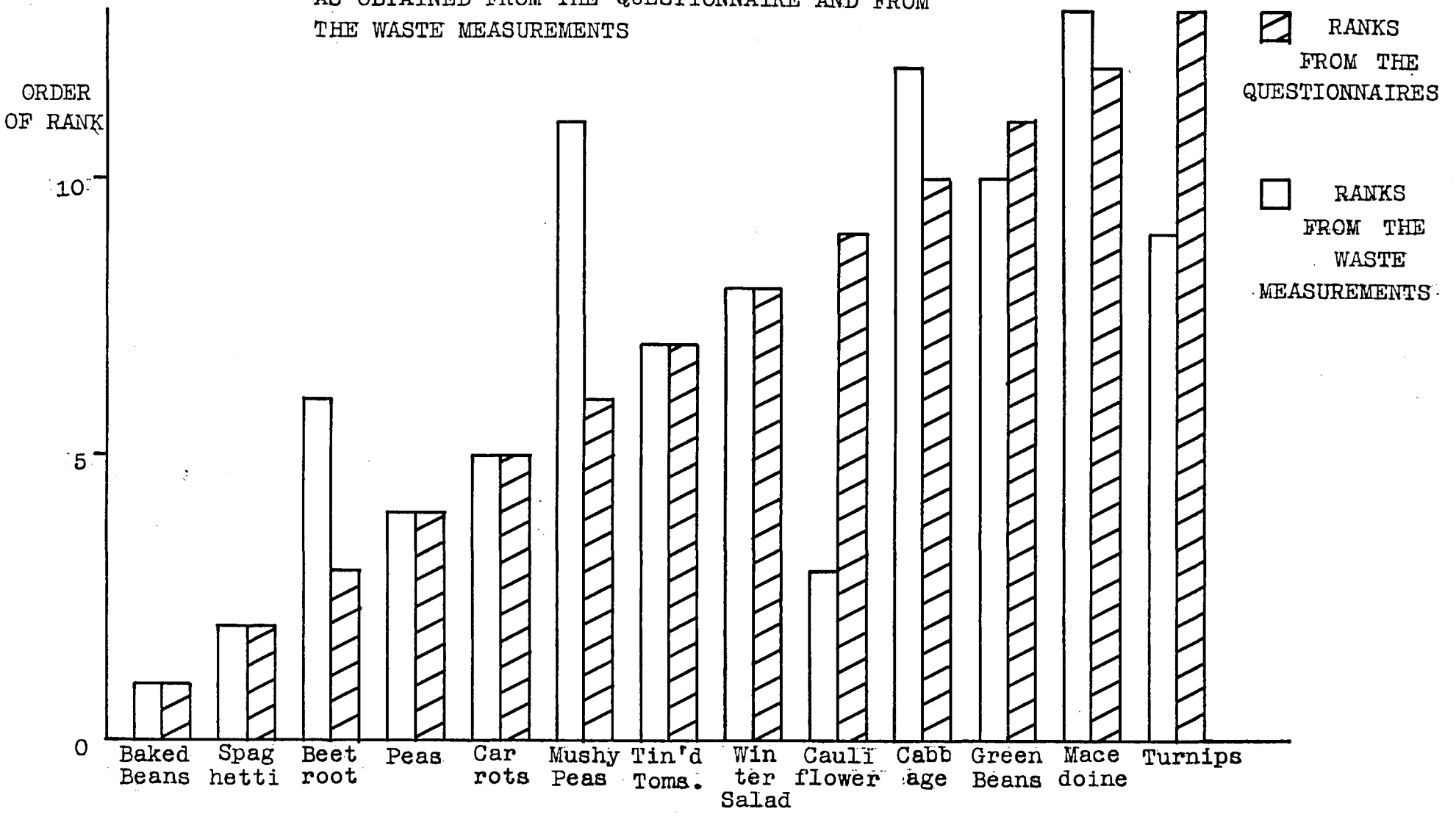
To calculate a rank correlation, the ranking of one variable was written down in order (preference results) and the other variable was fitted in (waste results).

The rank correlation for this data was significant at 99% level of significance.

See figure 5.2

It can be seen from these results that baked beans and tinned spaghetti were the most popular vegetables with green beans, macedoine and turnips being the least popular vegetables, as measured by both the preference questionnaire and the waste collections. Discrepancies arose in the case of beetroot, mushy peas and cauliflower. It was thought that a possible reason for the high waste value for mushy peas was because the cook did not steam them long enough and consequently the peas were

FIGURE 5.2 : TO COMPARE THE RANKING ORDERS FOR VEGETABLES AS OBTAINED FROM THE QUESTIONNAIRE AND FROM THE WASTE MEASUREMENTS



hard, not mushy, when served to the children. Many children left their peas as a result.

Beetroot and cauliflower may have been unfamiliar to the children as perhaps they were not served frequently at home. When the children tasted them at school lunch, however, they were found to be very palatable and so wastage was lower than the preference questionnaire would have indicated.

The two ranking orders had a significant correlation with one another so that an order of popularity could be decided either by questionnaire or by the measurement of plate waste.

Savoury Items.

Food items.	Preference Ratios	Rank.	Waste %	Rank.
Fish Fingers	0.8500	1	3.5	2.5
Roast Beef	0.8049	2	19.0	13.5
Sausages	0.7817	3	2.0	1
Shepherds Pie	0.7788	4	6.0	5
Roast Chicken	0.7763	5	3.5	2.5
Mince	0.7485	6	7.5	7
Cheese Pie	0.7201	7	10.0	9.5
Meat Pie	0.7197	8	18.0	12
Roast Pork	0.7120	9	25.0	18
Fishcakes	0.7090	10	8.0	8
Boiled Ham	0.7039	11	10.0	9.5
Luncheon Meat	0.7008	12	11.0	11
Fried Fish	0.6859	13	25.5	19
Scrambled Egg	0.6597	14	5.5.	4
Hash	0.6454	15	6.5	6
Ham & Pineapple	0.5913	16	19.0	13.5
Cheese Cutlets	0.5640	17	20.0	15
Braised Beef	0.5299	18	35.0	20
Liver	0.5222	19	23.0	17
Pork & Onion Pie	0.4822	20	22.8	16

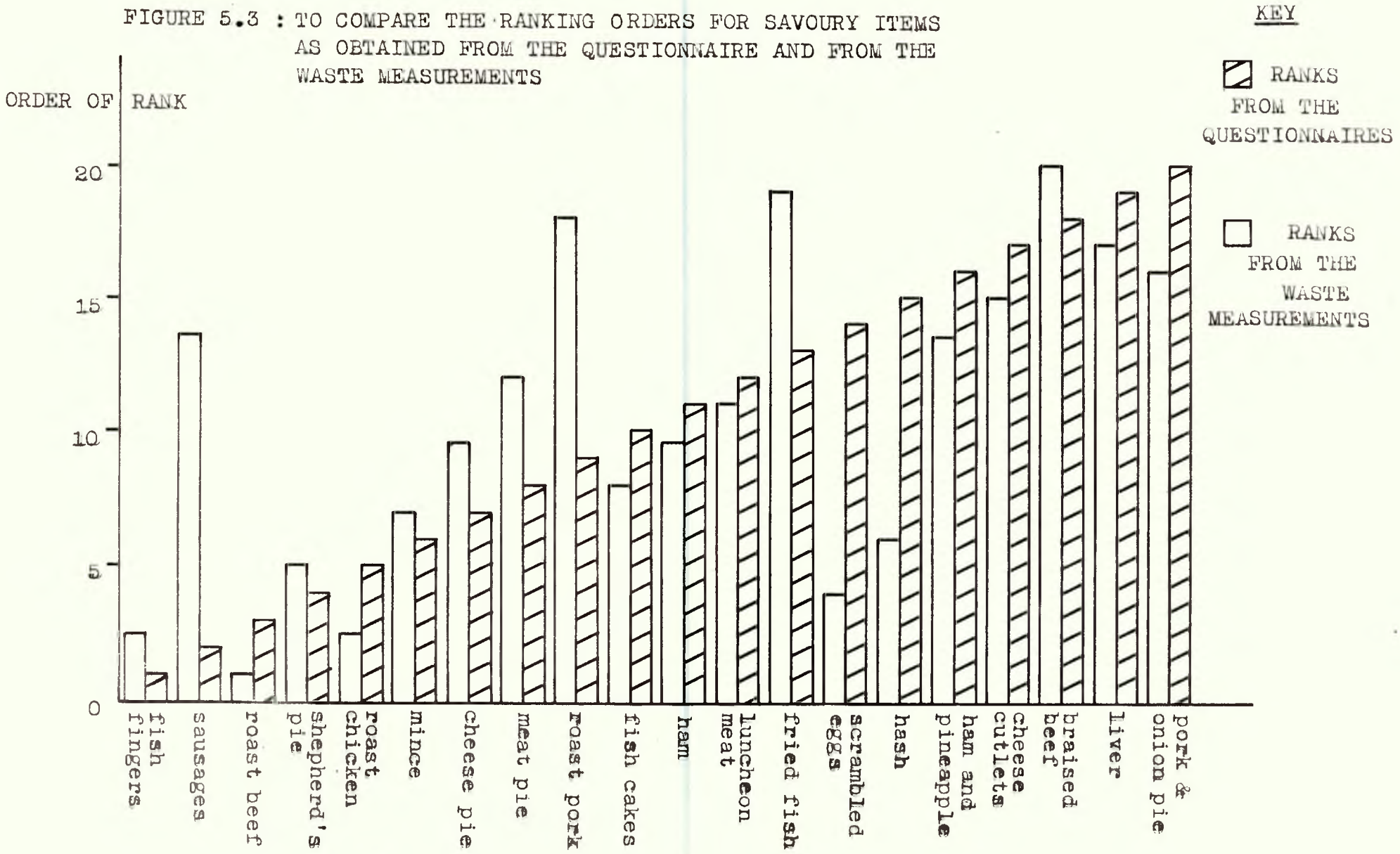
Rank (r) = 0.63 and r must be greater than .564 at correlation = 0.63 99% level significance

Therefore, there was a significant correlation between ranking methods for savoury items.

see figure 5.3

Roast beef, roast pork and fried fish all had lower ranks from the waste results than from the preference questionnaires. This was because the amount of plate waste from these three food items w as mainly string (used for binding cuts of meat) and fat in the case of the two roast meats and the fish skins in the case of fried fish. It was thought probable that hash had a lower wastage value than was expected because it was served on its own, without accompaniments. Hence, if the children disliked it, there was nothing else to eat, e.g. potatoes or vegetables and so all the hash was eaten even if it was unpopular. This would indicate that plate waste of individual items could be affected by the combination of food items used to produce a meal. Pilgrim (1961)[48] also found that menu combinations can alter preference for a food although not dramatically. Rice in America is more popular with chopped or ground meat than on its own or with solid meat, although in all cases, its preference is low.

FIGURE 5.3 : TO COMPARE THE RANKING ORDERS FOR SAVOURY ITEMS AS OBTAINED FROM THE QUESTIONNAIRE AND FROM THE WASTE MEASUREMENTS



Desserts.

Food items.	Preference Ratios (x)	Rank.	Plate Waste. (y)	Rank.
Icecream	0.9224	1	1	3
Waggon Wheeka	0.8774	2	2.95	8
Jelly	0.8633	3	3.4	12
Chocolate Sponge	0.8596	4	2.23	6
Shortbread	0.8516	5	0.5	1.5
Bakewell Tart	0.8083	6	4.25	13
Rainbow Sponge	0.8041	7	0.5	1.5
Apple Pie	0.7995	8	3.0	9
Apple Crumble	0.7924	9	3.13	10
Mousse	0.7839	10	2.2	5
Lemon Sponge	0.7770	11	3.17	11
Tinned Fruit	0.7685	12	2.0	4
Rice Pudding	0.7588	13	2.31	7
Lemon	0.7507	14	9.5	21
Giner Sponge	0.7426	15	16.13	17
Gruit Cocktail	0.7386	16	20.8	25
Fruit in Jelly	0.7309	17	9.26	20
Custard Whip	0.7160	18	6.7	19
Australian Crunch	0.7130	19	4.75	15
Rhubarb Crumble	0.6990	20	18.86	24
Blancmange	0.6980	21	52.6	26
Butterscotch Tart	0.6924	22	10.6	22
Eves Pudding	0.6749	23	4.3	14
Baked Sultana Sponge	0.6712	24	6.57	18
Mixed Fruit Short-cake	0.6576	25	14.37	23
Pineapple Sponge	0.6379	26	5.0	16

Rank correlation (r) = 0.74 and r must be greater than 0.486 at 99% level of significance.

Therefore, there is a significant correlation between the two ranking systems for dessert items.

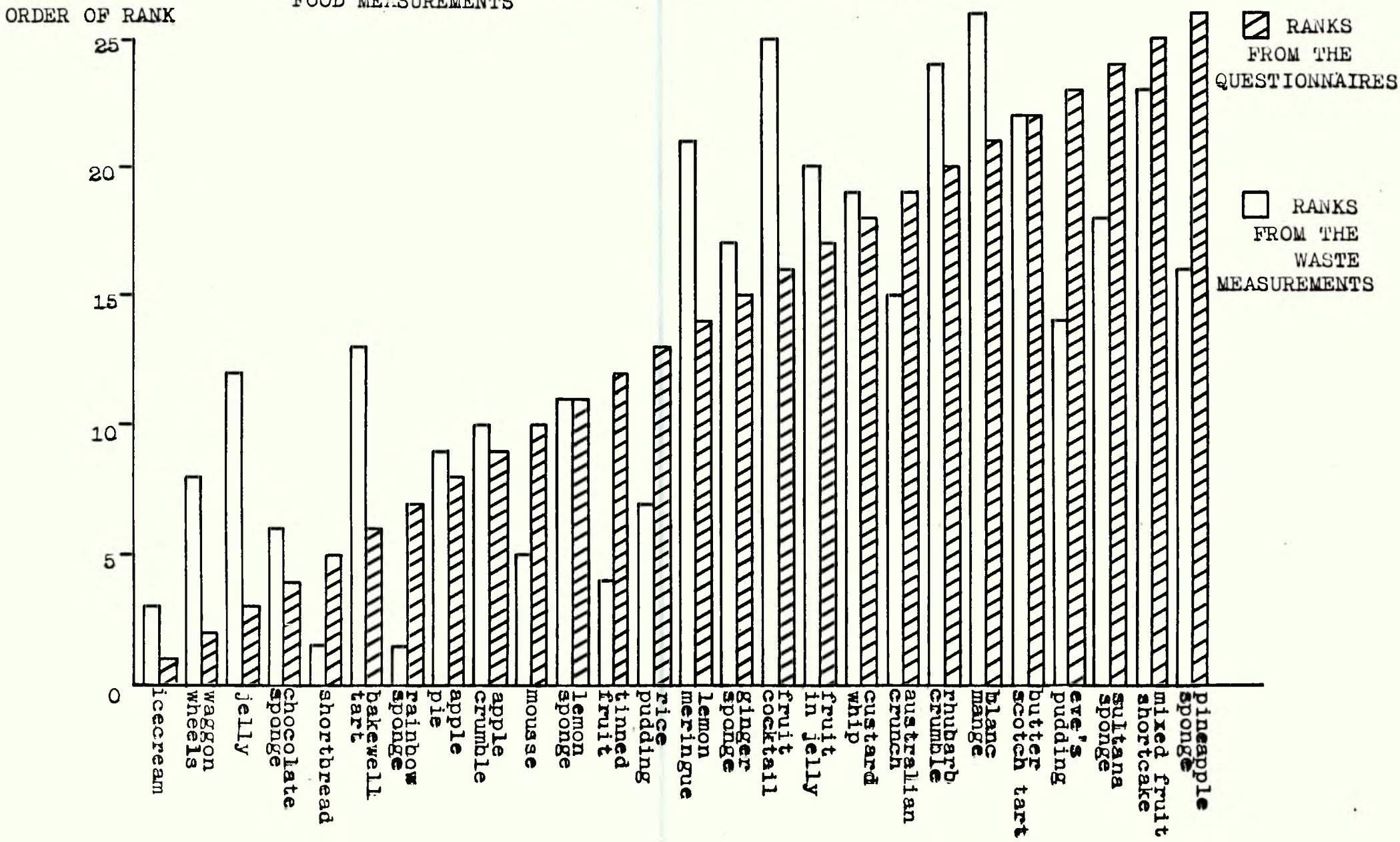
see figure 5.4.

Most of the food items showed similar rank values from the waste measurements and from the questionnaires. Jelly had more waste than its preference rank would have indicated. This was likely to be because jelly was served with blancmange, which was a relatively unpopular dessert. Bakewell tart had more waste than would have been expected from the preference ranks, because the tart could sometimes be very dry with a lot of pastry, which the children left. Fruit cocktail had a higher preference rank than waste rank. This could have been because the name "fruit cocktail" sounded very pleasant whereas, in practice, the children were relatively indifferent to tinned fruit salad. Eve's pudding was more acceptable at school lunch than preference would have indicated, possibly because the name of the dish was unfamiliar to the children. Pineapple sponge had a low preference rank because children generally appeared to dislike pineapple items. However, this sponge did, in fact, contain very little pineapple so that wastage was not as high as expected.

Conclusions.

From these results, it would appear that the ranking orders obtained for the food items, either from the preference questionnaire or from the measurement of plate waste, have good correlation with each other. Therefore, either method could be used to give meaningful preference

FIGURE 5.4 : TO COMPARE THE RANKING ORDERS FOR DESSERT ITEMS AS OBTAINED FROM THE QUESTIONNAIRES AND FROM THE FOOD MEASUREMENTS



ranking orders for foods. However, it would be better to carry out both tests if possible, so that the reliability of each result can be cross checked. Ranks for some foods gained by measuring plate waste may be particularly low due to incorrect cooking procedures or some other extraneous factor. Similarly, low preference could be attributed to a popular food in a questionnaire survey when there may have been some confusion in the naming of a dish. The two methods could be used together to give reliable results.

5.22. Pearson Correlation Coefficient.

It was also decided to see if there was any correlation between level of preference and the amount of plate waste for each individual food item.

Results.

PEARSON CORRELATION COEFFICIENT.

Desserts.	Savoury items.	Vegetables.
r = 0.16 where	r = 0.74 where	r = 0.52 where
r 0.388 at 95%	r 0.561 at 99%	r 0.55 at 95%
∴ not significant.	∴ significant.	∴ not significant.

The correlation coefficient for savoury items was the only one which was significant at 99%. Vegetable items were almost significant at 95% and dessert items showed no correlation at all. These results indicate that there may be some correlation between % plate waste and the degree of preference for individual savoury and vegetable items. It was difficult to get a good correlation for all three groups because other factors influence plate waste eg.

teacher's participation in dinner duty, type of service, social group, and probably the time allowed for the meal and the quality of preparation. This was particularly true for dessert items. Although these factors affect individual food items, they do not seem to influence the overall popularity and the degree of waste of the different food groups as seen earlier (5.1.)

However, this work has shown that estimating preference cannot be used to predict the amount of plate waste of foods, as the Pearson Correlation coefficient indicates, because other factors influence the amount of plate waste other than preference.

It would seem to indicate, however, that if a food with low preference is served for school lunch, there is a possibility that wastage will be high. This could be true for vegetables particularly. If vegetables are not eaten, then the vitamin and fibre intake may not be adequate. Energy intake is reasonable because all the starchy foods, either savoury or dessert, are being eaten. Protein intake is low, partly because savoury items have medium popularity and wastage values and also because not enough protein is ordered to meet DES requirements. This is due mainly to the high cost of protein foods and the low cost of a school meal.

CHAPTER 6.

6.1. Conclusions.

The nutritional content of the school meal in Sheffield as ordered, served and eaten did not reach the DES standards. It is very important that the school meal should be nutritionally adequate as many children rely heavily on the school meal as their main meal of the day.

The average plate waste of food at school lunch in Sheffield was 8%. This compared favourably with other authorities and indicated that the school meals service in Sheffield did much in providing meals which the children enjoyed. The amount of plate waste varied between the different groups, there being more waste for vegetable foods, a medium amount for protein foods e.g. meat, fish, cheese and eggs and little waste for potatoes and dessert items. Several other factors were found to affect plate waste significantly and these included social groups, as indicated by the percentage of free school meals, teachers' participation in dinner duty and the type of food service operating in each school.

Sheffield children preferredto eat chips, icecream, choclate pudding and fish fingers whilst they disliked pork and onion pie, vegetables particularly turnip, cheese cutlets and liver. These preference ratios were affected by the type of questionnaire used to obtain them. Therefore, great care is required when developing and designing a questionnaire which is to be used in any survey. Preferences were also affected by the age of the child but not by their sex or by the frequency of staying to school lunch. There was an indication that the name of the dish

might affect the preference ratio of a food.

The preference ratings of each food group correlated well with the plate waste values obtained for each food group, so that a group with high preference such as desserts had little plate waste. However, individual food item preference ratios and wastage values did not correlate well, as only the savoury items had a significant correlation. The reas on for this may be that both wastage and preference ratios were affected by factors apart from each other. Examples of such factors could be :- quality of preparation, appearance of the food, frequency of service, varying weather conditions as discussed by Pilgrim (1961)[51], Baker and Ehlers (1949)[52] as well as those factors which have already been discussed. Thus, by knowing only the preference ratio of a food, it is not possible to predict with any accuracy the amount of plate waste which may be left. However, it could be used perhaps to indicate the amount of waste which might be expected.

The ranks of food popularity estimated by measuring the plate waste and by calculating preference ratios correlated well when analysed statistically. So either method could be used to obtain an order of rank popularity for food items.

Preferences and various other factors including type of meal service were found to influence the amount of plate waste and so perhaps affect the nutritional intake of the children at lunch time. However, unpopular foods tended to have a low frequency of service which was designed to minimise the wastage of food, thus keeping the overall plate waste below 10%.

In conclusion, it would appear that the school lunch

should be as palatable as possible, in terms of quality and preference and that it should be eaten in an environment which is peaceful and relaxed so that the children are encouraged to eat the maximum amount of food served to them. This is particularly important as neither the amount of food served nor the amount of food ordered reached the nutritional standards set by the D.E.S. It is also important because for some children the school meal is their main meal of the day.

6.2. Indications for Further Work.

This survey attempted to investigate a large area of work and consequently not every aspect was examined in sufficient detail. It was felt that several areas could be investigated in more depth.

From the observations made during the survey, the time allowed for the service of the school lunch appeared to have some bearing on the amount of plate waste. It seemed that a school which allowed more time for each sitting at lunch time had less plate waste than those schools which were hurried. One reason for a short lunch hour is that schools can finish earlier than 4.00 p.m. if the time allowed for lunch is decreased, thus enabling children and staff to arrive home early. If it could be shown that the schools which have very hurried lunch times do have high food wastage problems, then the situation could be remedied.

Another area which the survey did not investigate was whether the s tandard of cooking and the appearance of the food when served could affect the plate wastage values at the end of the meal. It would seem logical that a well

cooked dish, moist and appetisingly served would tempt a child to try the dish. Visual factors e.g. colour and texture (a light or heavy sponge) and correct serving temperature are all factors to be considered.

If the survey had included senior school children as well as primary ones, then the food preferences of the children throughout their school life could have been examined. Here one could see if good food habits established in infant schools are retained in the teenage years or whether they are lost with the pressures of adulthood. Investigation of the refectory system in senior schools may yield more information as to whether the name of the dish does affect its uptake by the children.

Frequency of service of the individual items is another factor which is probally very closely linked with preference for a particular food. It was observed that the cooks and supervisors were aware that some foods e.g. baked beans could be served more frequently than others e.g. turnip without incurring high plate wastage values. Neither cook nor the supervisor wanted to see large quantities of food returned as waste at the end of the meal. This meant that unpopular foods such as liver had a much lower frequency of service. Carbohydrate items such as potato, however, may be served every day in different forms without high plate wastage. Thus, some foods must possess certain characteristics which enable us to eat them regularly without us tiring of them. On the other hand, some foods may be popular as they are served infrequently because they are regarded as a luxury food either because they are expensive to buy or because they are available during a limited season. It would also be useful to know how the

preference ratio of a food varies over a period of time and how the frequency of service may affect it. For example, this survey showed that chips, baked beans and fish fingers followed by icecream would be a very popular meal. However, if it were served to the children every day for a week, how long would these items remain popular. This knowledge would be particularly useful with regard to the cheaper food items. It would be very useful indeed to know the maximum frequency a cheap food could be served without incurring high wastage values, particularly as cost is a vital aspect of school meals today.

APPENDICES.

1. Menu Items in Sheffield.
2. Self Administered Questionnaire.
3. Group Administered Questionnaire.
4. Teacher Administered Questionnaire.
5. Tin Weights.
6. Table for Plate Waste Collections.

1 - MENU ITEMS IN SHEFFIELD.

1 Bacon & Bean Pie
2 Bacon Burgers
3 Bacon & Egg Flan
4 Bacon - Fried
5 Bacon Olives

Beef.

6 Beef Braised in Tomato
7 Beef Burgers
8 Beef Curry
9 Brisket
10 Brown Stew/Hash/All in Stew
11 Cornish Pasties
12 Danish/Savoury Meat Balls
13 Meat & Potato Pie
14 Meat Rissoles
15 Mince - Savoury/All In
16 Mince Squares
17 Mince & Tomato Hotpot
18 Minced Beef Cobbler
19 Minced Beef Crumble
20 R. Beef & Yorkshire Pudd.
21 Savoury Mince Loaf
22 Shepherds Pie
23 Steak - Braised
24 Steak & Kidney Dumpling/ Pudding
25 Steak & Kidney Pie
26 Steak & Mushrooms - Braised
27 Steak & Mushrooms - Pie
28 Steak Pie

Cheese.

29 Cheese Croquettes
30 Cheese Hot pot
31 Cheese Jacket Potatoes
32 Cheese Savoury
33 Flans - Cheese & Bacon
34 Cheese Flan
35 Cheese & Ham Tart
36 Cheese & Onion
37 Cheese & Tomato
38 Savoury Flan
39 Pizza

Chicken.

40 Chicken Curry
41 Chicken & Ham Cobbler
42 Chicken Pie
43 Chicken Risotto
44 R. Chicken & Stuffing

Egg.

45 Egg - Curried
46 Egg - Fried
47 Scotch Eggs
48 Scrambled Eggs

Fish.

49 Fish - Baked
50 Fish-cakes
51 Fish Fingers
52 Fish - Fried
53 Fish - Savoury
54 Fish Slice

Ham.

55 Ham - Boiled
56 Ham & Egg & Mushroom Tart
57 Ham & Pineapple
58 Leek & Ham Savoury

Lamb.

59 Lamb Hot Pot
60 Lamb Stew
61 R. Lamb & Mint Sauce

Liver.

62 Italian Liver
63 Liver & Bacon
64 Liver & Bacon Rolls
65 Liver Casserole
66 Liver - Fried
67 Liver & Onions - Braised

Luncheon Meat.

68 Luncheon Meat Fritters
69 Luncheon Meat

Pork.

70 Loin of Pork - Tinned
71 Pork Burgers
72 Pork Cobbler
73 Pork & Onion Pie
74 Pork & Pineapple Curry
75 Pork Stew
76 R. Pork & Apple Sauce

Sausages.

77 Sausages
78 Sausage Baked Potato
79 Sausage Cakes
80 Sausages in Batter
81 Sausage Pie
82 Sausage Rolls - Flaky/Plain
83 Sausage & Tomato Cakes
84 Savoury Sausage Meat
85 Toad in the Hole
86 Tomato Sausage

Sauces.

87 Gravy
88 Onion Gravy
89 Parsley Sauce
90 Tomato Sauce
91 White Sauce

Soups.

92 Chicken Broth
93 Chicken Soup
94 Oxtail Soup
95 Tomato Soup
96 Veg. Soup.

Carbohydrates.

97 Batter
98 Dumplings
99 Yorkshire Pudding

Almond.

100 Almond Slices

Apple.

101 Apple & Blackberry Crumble
102 Apple & Blackberry Pie
103 Apple Cobbler
104 Apple & Cornflake Tart
105 Apple Crumble
106 Apple Dumplings
107 Apple - Fresh
108 Apple & Lemon Fluff
109 Apple Meringue Pie
110 Apple Pie
111 Apples - Stewed
112 Danish Apple Pudding
113 Delaware Roll
114 Eves Pudding - Baked
115 Eves Pudding - Steamed
116 Swedish Apple Cake

Apricot.

117 Apricot Crumble
118 Apricot Flan
119 Apricot Gateaux
120 Flan Jenette

Bakewells.

121 Apple Bakewell
122 Bakewell Sponge
123 Bakewell Tart
124 Derbyshire Bakewell
125 Franzipan Tart
126 Ground Rice Bakewell

Banana.

127 Banana & Custard - Cold
128 Banana & Custard - Hot
129 Banana - Fresh
130 Banana in Jelly
131 Banana Split

Bilberry.

132 Bilberry & Apple Flan
133 Bilberry Flan

Blackcurrant.

134 Blackcurrant Jelly

Blancmange.

135 Blancmange - Various

Butterscotch.

136 Butterscotch Meringue Pie
137 Butterscotch Tart

Bread.

138 Bread Rolls
139 Bread & Butter

Cheese.

140 Cheese & Biscuits

Cherry.

141 Cherry Meringue
142 Cherry Shortcake
143 Cherry Sponge - Baked
144 Cherry Sponge - Steamed

Chocolate.

145 Chocolate Crunch
146 Chocolate Fudge Flan/
Wellington Fudge Pudd.
147 Chocolate Iced Shortbread
148 Chocolate Iced Sponge-
Baked
149 Chocolate Pinwheels
150 Chocolate Shortbread
151 Chocolate Sponge -
Baked
152 Chocolate Sponge -
Steamed

Coconut.

153 Coconut Flapjack/
Crusty Oatcake
154 Coconut & Quaker Tart
155 Coconut Shortcake
156 Coconut Sponge - Baked
157 Coconut Sponge - Steamed
158 Coconut Tart
159 Flaky Bar
160 Sultana Coconut Tart
161 Treacle Coconut Tart

Coffee.

162 Coffee - Beverage
163 Coffee Iced Sponge -
Baked
164 Coffee Sponge - Baked
165 Coffee Sponge - Steamed

Cornflakes.

166 Cornflake Tart

Cream.

167 Cream - Mock
168 Cream Tart
169 Evap. Milk - Straight
170 Evap. Milk - Whipped
171 Dream Topping

Currants.

172 Currant Sponge - Baked
173 Currant Sponge - Steamed
or Spotted Dick
174 Currant & Syrup Roll
175 Eccles Tart

Custard.

176 Custard Whip
177 Manchester Tart
178 Trifle

Dates.

179 Date Slice
180 Date Sponge - Baked
181 Date Sponge - Steamed

Doughnuts.

182 Doughnuts - American
183 Doughnuts - Plain

Egg.

184 Bread & Butter Pudding
185 Egg Custard - Baked

Fruit Salad.

186 Fruit Cocktail Flan
187 Fruit in Jelly
188 Fruit Salad - Fresh
189 Fruit Salad - Tinned
190 Syrup for Fruit Salad

Ginger.

191 Australian Crunch/
Shortbread
192 Damp Gingerbread
193 Ginger Sponge - Baked
194 Ginger Sponge - Steamed
195 Ginger & Syrup Sponge -
Baked
196 Ginger & Syrup Sponge -
Steamed
197 Parkin

Gooseberry.

198 Gooseberry Crumble

Grapefruit.

199 ½ Grapefruit

Grapes.

200 Grapes - Fresh

Ground Rice.

201 Ground Rice Pudding
202 Ground Rice Tart

Ice Cream.

203 Ice-Cream

Jam.

204 Clifton Grids
205 Jam Flan Crumble
206 Jam Roll (Baked or Steamed)
207 Jam Shortbread
208 Jam Sponge - Baked
209 Jam Sponge - Steamed
210 Jam Tart

Lemon.

211 Lemon Curd Brumble
212 Lemon Curd Shortbread
213 Lemon Curd Sponge - Baked
214 Lemon Curd Ta rt (Viennese Topping)
215 Lemon Jelly
216 Lemon Meringue Pie
217 Lemon Mousse
218 Lemon Roll
219 Lemon Shortbread
220 Lemon Sponge - Baked
221 Lemon Sponge - Steamed

Lime.

222 Lime Jelly
223 Lime Mousse

Mandarins.

224 Mandarin Orange Flan

Marmalade.

225 Marmalade Tart

Marshmallow.

226 Marshmallow Flan
227 Marshmallow Shortbread

Melon.

228 Melon - Fresh

Mincemeat.

229 Mincemeat Roll
230 Mince Pie
231 Winter Tart

Mixed Fruit.

232 College Pudding
233 Majorca Slice
234 Mixed Fruit Shortbread
235 Mixed Fruit Sponge-Baked
236 Mixed Fruit Sponge-Steamed
237 Palma Pudding

Others.

238 Farmhouse Tart
239 Gainsborough Tart
240 Madeleine Sponge

Oats.

241 Bristol/Crunch Tart
242 Flapjack
243 Fruit Crunch
244 Raisin Oatcake
245 Sultana Oatsake

Orange.

246 Orange - Fresh
247 Orange Gateau
248 Orange Jelly
249 Orange Mousse
250 Orange Shortbread
251 Orange Sponge - Baked
252 Orange Sponge - Steamed
253 Orange Tart/Orange Meringue Pie

Peach.

254 Peach Gateau
255 Peach Melba
256 Peaches - Tinned

Pear.

257 Pear - Fresh
258 Pear Helene - Ice Cream & Chocolate Sauce
259 Pears - Tinned

Pineapple.

260 Pineapple Flan/Meringue Pie
261 Pineapple Jelly
262 Pineapple Mousse
263 Pineapple - Tinned
264 Pineapple Upside-down Sponge - Baked

Plum.

265 Plum Cobbler
266 Plum Crumble
267 Plum Pie

Prunes.

268 Prunes - Stewed

Raspberry.

269 Raspberry Jelly
270 Raspberry Layer/Jelly Layer Cream Pudding

Rhubarb.

272 Eves Pudding - Rhubarb
273 Rhubarb Cobbler
274 Rhubarb Crumble
275 Rhubarb Dumpling
276 Rhubarb Flan
277 Rhubarb Pie

Rice.

278 Rice Pudding

Rice Crispie.

279 Peach Crispie Flan
280 Pineapple Crunchies
281 Rice Crispie Crunch
282 Rice Crispie Tart

Sago.

283 Sago Cremola
284 Sago Pudding

Sauces.

285 Butterscotch
286 Caramel
287 Chocolate
288 Custard
289 Lemon
290 Melba/Jam
291 Orange
292 Pink
293 Strawberry
294 Vanilla

Scones.

295 Scones

Semolina.

296 Semolina
297 Semolina Cremola

Shortbread.

298 German Shortbread
299 Plain Shortbread
300 Shortbread Biscuit Fingers

Shortcake.

301 Plain Shortcake
302 Viennese Festival Shortcake

Shrewsbury Biscuits.

303 Shrewsbury Biscuits

Sponge.

304 Iced Sponge - Baked
305 Rainbow Sponge - Baked
306 Rainbow Sponge - Steamed
307 Sponge - Steamed
308 Trifle Sponges

Strawberry.

309 Strawberry Jelly
310 Strawberry Mousse
311 Strawberry Sponge - Steamed

Sultana.

312 Sultana Sponge - Baked
313 Sultana Sponge - Steamed

Syrup.

314 Syrup Sponge - Baked
315 Syrup Sponge - Steamed

Tapioca.

316 Tapioca Pudding

Vanilla.

317 Vanilla Sponge - Baked

Yoghurt.

318 Yoghurt - Various

Vegetables.

319 Beans - Baked
320 Beans - French (Dehydrated)
321 Beans - Green
322 Beans - Kidney
323 Beetroot
324 Beetroot in Vinegar
325 Cabbage
326 Carrots - Fresh
327 Carrots - Tinned
328 Carrots & Turnip Mixed
329 Cauliflower
330 Coleslaw
331 Macedoine
332 Peas - Frozen
333 Peas - Mushy/Dried
334 Peas - Tinned
335 Ravioli
336 Salad - Summer
337 Salad - Winter

Vegetables contd.

338 Spaghetti in Tomato
339 Spaghetti Rings.
340 Sprouts - Fresh
341 Sprouts - Frozen
342 Swede/Turnip
343 Tomatoes

Starches.

344 Pasta - Macaroni
345 " - Spaghetti
346 Potatoes - Baked
347 " - Boiled
348 " - Chipped
349 " - Creamed
350 " - Crisps
351 " - Roast
352 " - Saute
353 " - Scallops
354 Rice

2 - SELF ADMINISTERED QUESTIONNAIRE.

2 - SELF ADMINISTERED QUESTIONNAIRE.

SHEFFIELD SCHOOL MEALS PROJECT.

We are trying to find out which foods school children like to eat. To do this, we need your help in answering the following questions. Please answer them carefully and in the order shown.

SCHOOL..... AGE.....

PLEASE TICK WHICH YOU ARE BOY ☐ GIRL ☐

Would you answer the questions by putting a tick in the box next to the answer you want to give - as shown in the following example.

OFFICE USE ONLY.

e.g. Cornflakes are crunchy flakes (usually served with milk and sugar.)

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question -

If your answer is YES -

did you

dislike them	
neither like nor dislike them.	
like them	

Now fill in the rest of the questions yourself.

SHEFFIELD SCHOOL MEALS PROJECT.

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1. Scotch eggs are half a boiled egg surrounded by sausagemeat.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on the question 2.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

2. Chicken pie is small pieces of chopped chicken in gravy covered with pastry.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 3.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

3. Ham and pineapple is a slice of ham with a piece of yellow fruit on top.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 4.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

4. Mince is small pieces of brown meat in gravy.
Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 5.
If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

5. Braised beef in gravy is slices or chunks of beef in gravy which is usually tomato flavoured.
Have you ever eaten this?

NO	
YES	

If your answer is NO - pass on to question 6.
If your answer is YES - did you

Dislike it	
neither like nor dislike it	
like it	

6. Pork and onion pie is pork and onion in pastry served hot with gravy.
Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 7.
If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

7. Cheese pie is soft cheese filling in pastry case.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 8.

If your answer is YES - did you

Dislike it	
neither like nor dislike it	
like it	

8. Boiled ham is served cold, usually with beetroot.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 9.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

9. Roast lamb is sliced hot meat served with green mint sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 10.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

10. Cheese cutlets are oblong log shapes made with cheese and rice - fried in breadcrumbs.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 11.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

11. Sausage rolls are oblong shaped sausage meat in pastry - usually served cold.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 12.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

12. Stew is gravy containing chunks of meat and vegetables.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 13.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

13. Shepherd's pie is soft minced meat topped with mashed potato which is brown and crispy on top.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 14.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

14. Fried fish is fish fried in golden batter.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 15.

If your answer is YES - did you

dislike it	
NEITHER like nor dislike it	
like it	

15. Brisket is circles of sliced cold meat often with fat running through it.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 16.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

16. Bread and butter is one slice of buttered bread.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 17.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

17. White sauce is savoury creamy sauce served with vegetables or fish.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 18.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

18. Chicken soup is hot white creamy soup - served with bread.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 19.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

19. Fish fingers are oblong finger shapes of fish. (Often served fried.)

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 20.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

20. Stew is meat and vegetables in gravy.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 21.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

21. Gravy is savoury brown sauce (served with meat or pies).

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 22.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

E USE ONLY

22. Tomato sauce is savoury red sauce (- served with fish or cheese dishes.)

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 23.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

23. Scrambled eggs are yellow soft beaten eggs with white flecks served hot.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 24.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

24. Meat pie is meat in pastry (-served with gravy).

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 25.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

25. Roast Pork is hot sliced meat (-served with apple sauce) and gravy.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 26.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

26. Beefburgers are rounds of mince and onion served hot with gravy.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 27.

If your answer is YES - did you

dislike them.	
neither like nor dislike them	
like them	

27. Sausages are long links served with onions and gravy.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 28.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

OFFICE USE ONLY

28. Roast chicken and stuffing is slices of white meat served hot with stuffing in gravy.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 29.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

29. Liver is pieces of liver and onions cooked in gravy.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 30.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

30. Luncheon meat is round slices of pink meat served cold.

Have you ever eaten it?

NO	
YES	

If your answer is No - pass on to question 31.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

31. Roast beef and yorkshire pudding is sliced hot meat and small round puddings served with gravy.

Have you ever eaten it?

NO	
YES	

If your answer if NO - pass on to question 32.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

32. Fishcakes are round flat fish and potato cakes - served fried.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 33.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

33. Tomato soup is hot red soup - served with bread.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 34.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

34. Roast lamb is sliced hot meat - served with mint sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 35.

If your answer is YES - did you

DISLIKE IT	
neither like nor dislike it	
like it	

35. Cheese flan is a pastry case filled withsoft cheese misture.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 36.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

36. Turnip/swede is orange vegetable served mashed or diced.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 37.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

37. Peas are small green peas which run all over the plate.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 38.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

38. Green beans are sliced green beans in small long pieces.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 39.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

39. Baked potatoes are potatoes baked in their skins - split and served with butter.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 40.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

OFFICE USE ONLY

40. Cabbage is a green vegetable served chopped up.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 41.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

41. Mushy peas are soft green peas which stick to-gether.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 42.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

42. Creamed potatoes are mashed creamy potatoes served in rounds.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 43.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

OFFICE USE ONLY

43. Boiled potatoes are small chunks of potato.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 44.

If your answer is YES - did you

dislike them.	
neither like nor dislike them	
like them	

44. Carrots are bright orange vegetables served in slices or rings.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 45.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

45. Beetroot is a deep red vegetable served cold in vinegar with cold meat or salad.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 46.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

46. Cauliflower is a white flowery vegetable.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 47.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

47. Macedoine or mixed vegetables is small pieces of different coloured vegetables e.g. carrot (orange) peas (green) sweetcorn (yellow) etc.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 48.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

48. Roast potatoes are crispy golden chunks of potato which have been fried.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 49.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

49. Sprouts are small round green leafy vegetables.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 50.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

50. SPAGHETTI is in rings or strands served in tomato sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 51.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

51. Winter salad is salad based on shredded white cabbage, carrot, beetroot, etc. and served with salad cream.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 52.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

52. Chips are fried sticks of potato.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 53.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

53. Baked beans are small orange beans in a red tomato sauce.

Have you ever eaten theM?

NO	
YES	

If your answer in NO - pass on to question 54.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

54. Summer salad is salad based on lettuce, tomatoes, cucumber etc. served with salad cream.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 55.

If your answer is YES - did you

dislike it	
neither like nor dislike them	
like it	

OFFICE USE ONLY

55. Tinned tomatoes are red vegetables with yellow seeds in a red juice.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 56.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

56. Cauliflower is a white flowery vegetable.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 57.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

57. Boiled potatoes are small white chunks of potato.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 58.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

OFFICE USE ONLY

58. Mushy peas are soft green peas which stick together.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 59.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

59. College pudding is a rich mixed fruit pudding served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 60.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

60. Bakewell tart is a pastry case lined with jam and filled with a cake-like mixture served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 61.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

61. Custard whip is cold whipped custard - served with jelly or fruit salad.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 62.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

62. Lemon sauce is a yellow sweet lemon flavoured sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 63.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

63. Jam Tart is red jam in a pastry case - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 64.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

64. Lemon sponge pudding is a moist cake-like sponge with lemon curd at the bottom or flavoured with lemon - served with custard.

Have your ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 65.

If your answer is YES - did you

dislike it	
neither like no r dislike it	
like it	

65. Flapjack is a crunchy biscuit-like containing syrup pudding - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 66

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

66. Mincemeat tart is a pastry case with a sweet Mincemeat filling - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 67.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

FFICE USE ONLY

Lemon

67. Leom meringue pie is a pastry case filled with smooth lemon filling covered with a white crispy topping.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 68.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

68. Syrup sponge pudding is sponge with golden syrup at base - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 69.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

69. Cherry sponge pudding is moist cake-like pudding with red cherries and icing topping - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 70

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

70. Shortbread is a plain biscuit-like pudding occasionally iced(and served with custard).

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 71.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it.	

71. Eves pudding is a layer of apple covered by a layer of sponge - served with custard.

Have your ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 72.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

72. Tinned fruit is peaches, pears or oranges in sweet syrup - served with ice cream or chocolate cause.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 73.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

73. Bananas and custard is bananas chopped up in custard served hot or cold.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 74.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

74. Coconut sponge pudding is moist cake-like pudding containing white chewy flakes - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 75.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

75. Bakewell tart is pastry filled with cake-like mixture and jam - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 76.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

76. Custard is creamy yellow sweet sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 77.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

77. Fruit flan is pastry case filled with fruit - usually served cold.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 78.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

78. Ice cream is frozen creamy dessert served in blocks.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 79.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

79. Fruit salad or cocktail is fresh or tinned - contains a variety of fruit including apples, oranges, bananas, pears, cherries, grapes etc. in a sweet juice.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 80.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

80. Jam sauce is a red or pink clear sweet sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 81.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

81. Jelly is smooth cold clear dessert in various flavours, e.g. lemon, lime, blackcurrant, raspberry or strawberry.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 82.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

82. Chocolate pinwheels are circles of biscuit-like pudding with plain and chocolate rings - served with custard.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 83.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

83. Chocolate sauce is a brown smooth creamy sweet sauce.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 84.

If your answer is YES - did you

dislike it	
NEither like nor dislike it	
like it	

84. Shortbread is a plain biscuit-like pudding served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 85.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

85. Custard whip is cold whipped yellow custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 86.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

86. Apple pie is apples in a pastry case and lid - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 87.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

87. Currant sponge pudding is a moist cake-like pudding dotted with small black currants - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 88.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

88. RICE PUDDING is white milk pudding served hot with jam.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 89.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

89. Fruit in jelly is fruit cocktail set in jelly (usually red).

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 90.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

90. Butterscotch tart is a pastry case with brown smooth sweet filling decorated with cream.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 91.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

91. Stewed apples are cooked apples in juice - served with custard.

Have you ever eaten them?

NO	
YES	

If your answer is NO - pass on to question 92.

If your answer is YES - did you

dislike them	
neither like nor dislike them	
like them	

92. Rhubarb crumble is a rhubarb layer topped with crumble - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 93.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

93. Sultana sponge pudding is cake-like pudding containing brown sultanas - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 94.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

94. Mixed fruit shortbread is biscuit-like pudding containing currants and raisins - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 95.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

95. Trifle is layers of cake, fruit, jelly and custard decorated with cream.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 96.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

96. Jam tart is a pastry case filled with red jam - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 97.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

97. Jam sponge is moist cake-like pudding with red jam at the bottom - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 98.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
LIKE IT	

98. Stewed rhubarb is chunks of pink fruit in sweet syrup - served hot with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 99.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

99. Rainbow sponge pudding is moist cake-like pudding with different coloured layers - pink, chocolate and plain - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 100.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

100. Ginger sponge pudding is moist cake-like pudding flavoured with ginger.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 101.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

101. Flapjack is a crunchy biscuit-like pudding made with oats or cornflakes - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 102.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

102. Australian crunch is ginger flavoured biscuit-like pudding topped with ginger icing - served with custard. (Ginger is a hot spice.)

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 103.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

103. Lemon curd shortbread is plain biscuit-like pudding topped with lemon curd - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 104.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

104. Mousse is jelly whipped with evaporated milk in orange, lemon, raspberry flavours and decorated with cream, dream topping or fruit.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 105.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

105. Apple crumble is apple base topped with crumble - served with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 106.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

ONLY

106. Blancmange is cold smooth milky pudding in several flavours e.g. raspberry and strawberry.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 107.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

107. Pineapple upside-down-pudding is moist cake-like pudding with yellow pineapple on top - served with custard.

Have your ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 108.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

108. Fresh fruit is a fresh apple, orange or pear.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 109.

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

OFFICE USE ONLY

109. Chocolate sponge pudding is a pudding similar to chocolate cake - served hot with custard.

Have you ever eaten it?

NO	
YES	

If your answer is NO - pass on to question 110

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

110. Chocolate sauce is a sweet brown sauce.

Have you ever eaten it?

NO	
YES	

If your answer is YES - did you

dislike it	
neither like nor dislike it	
like it	

Would you please return the questionnaire to your class teacher.

3 - GROUP ADMINISTERED QUESTIONNAIRE.

3 - GROUP ADMINISTERED QUESTIONNAIRE.

SHEFFIELD SCHOOL MEALS PROJECT.

SCHOOL..... CLASS.....

AGE OF CHILDREN..... NUMBER OF CHILDREN ON REGISTER.....

SESSION	SERIES OF FOOD ITEMS COVERED, e.g. 12-20 etc.	NUMBER OF CHILDREN PRESENT WHO STAYED TO SCHOOL LUNCH FOR AT LEAST ONE WEEK LAST TERM. (Spring 1975)	NUMBER OF ABSENTE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Food Item.	No. of Children who have eaten the food item.	Suggested descriptions which may be given to those children not understanding any food item.	Childrens Opinions of Food items. Dislike.	Like nor dislike	Li
1 Scotch Eggs		Half a hard boiled egg covered with sausage meat.			
2 Chicken pie		Small pieces of chopped chicken in gravy covered with pastry.			
3 Ham & Pineapple		A slice of ham with a piece of yellow fruit on top.			
4 Mince		Small pieces of brown meat in gravy.			
5 Braised beef in Gravy		Slices or chunks of beef in gravy which is usually tomato flavoured.			
6 Pork & Onion Pie		Pork & Onion in pastry served hot with gravy.			
7 Cheese pie		Soft cheese filling in pastry case.			
8 Boiled Ham		Served cold, usually with beetroot.			
9 Roast Lamb		Sliced hot meat - served with green mint sauce.			
10 Cheese cutlets		Oblong log shaped made with cheese and rice - fried in breadcrumbs.			
11 Causage rolls		Oblong shaped sausage meat in pastry - usually served cold.			
12 Stew		Gravy containing chunks of meat & vegetables			
13 Shepherds Pie		Soft minced meat topped with mashed potato which is brown & crispy on top.			
14 Fried Fish		Fish fried in golden batter.			
15 Brisket		Circles of sliced cold meat, often with fat running through it.			
16 Bread & Butter		One slice of buttered bread.			

Food Item.	No. of children who have eaten the food item	Suggested descriptions which may be given to those children not understanding any food item.	Childrens opinions of food items.		
			Dis-like	Like nor dis-like	Li
17 White Sauce		Savoury white creamy sauce (served with vegetables or fish)			
18 Chicken Soup		Hot white creamy soup (served with bread).			
19 Fish Fingers		Oblong finger shapes of fish (often served fried.)			
20 Stew		Meat & vegetables in gravy.			
21 Gravy		Savoury brown sauce (served with meat or pies.)			
22 Tomato Sauce		Savoury red sauce (served with fish or cheese dishes.)			
23 Scrambled eggs.		Yellow soft beaten eggs with white flecks served hot.			
24 Meat Pie		Meat in pastry (served with gravy.)			
25 Roast Pork		Hot sliced meat (served with apple sauce.)			
26 Beefburgers		Rounds of mince and onion served hot with gravy.			
27 Sausages					
28 Roast Chicken & Stuffing.		Slices of white meat served hot with stuffing in gravy.			
29 Liver		Pieces of liver and onions cooked in gravy.			
30 Luncheon Meat		Round slices of pink meat served cold.			
31 Roast beef & Yorkshire Pudding.		Sliced hot meat and small round puddings served with gravy.			
32 Fishcakes		Round flat fish and potato cakes - served fried.			
33 Tomato Soup		Hot red soup (served with bread.)			
34 Roast Lamb.		Sliced hot meat (served with mint sauce.)			

Food Item.	No. of children who have eaten the food item.	Suggested descriptions which may be given to those children not understanding any food item.	Childrens opinions of Food items. Dis-like	Like nor Dis like	Lik
35 Cheese Flan		Pastry case filled with soft cheese mixture.			
VEGETABLES. 36 Turnip/Swede		Orange vegetable served mashed or diced.			
37 Peas		Small green peas which run all over the plate			
38 Green Beans		Sliced green beans in small long pieces.			
39 Baked Potatoes		Potatoes baked in their skins - split and served with butter.			
40 Cabbage		Green vegetable served chopped up.			
41 Mushy Peas		Soft green peas which stick together.			
42 Creamed Potatoes		Mashed creamy potatoes served in rounds.			
43 Boiled Potatoes		Small chunks of Potato			
44 Carrots		Bright orange vegetable served in slices or rings.			
45 Beetroot		Deep red vegetable served cold in vinegar with cold meat or salad.			
46 Cauliflower		White flowery vegetable			
47 Macedoine or Mixed Vegetables		Small pieces of different coloured vegetables e.g. carrot (orange) peas (green) sweetcorn (yellow) etc.			
48 Roast Potatoes Saute Potatoes		Crispy golden chunks of potato which have been fried.			
49 Sprouts		Small round green leafy vegetables.			
50 Spaghetti		In rings or strands served in tomato sauce.			
51 Winter Salad		Salad based on shredded white cabbage, carrot, beetroot, etc. and served with salad cream.			
52 Chips		Fried sticks of potato			

Food Items.	No. of Children who have eaten the food item	Suggested descriptions which may be given to those children not understanding any food item.	Childrens opinions of food items.		
			Dislike	Like nor dislike	Like
53 Baked Beans		Small orange beans in a red tomato sauce.			
54 Summer Salad		Salad based on lettuce, tomatoes, cucumber etc. (served with salad cream.)			
55 Tinned Tomatoes		Red vegetable with yellow seeds in a red juice.			
56 Cauliflower		White flowery vegetable			
57 Boiled Potatoes		Small white chunks of potato.			
58 Mushy Peas		Soft green peas which stick together.			
SWEETS.					
59 College Pudding		Rich mixed fruit pudding (served with custard.			
60 Bakewell Tart		Pastry case lined with jam & filled with a cake-like mixture (served with custard.			
61 Custard Whip		Cold whipped custard (served with jelly or fruit salad.)			
62 Lemon Sauce		A yellow sweet lemon-flavoured sauce.			
63 Jam Tart		Red jam in a pastry case (served with custard.			
64 Lemon Sponge Pudding		Moist cake-like sponge with lemon curd at the bottom or flavoured with lemon (served with custard.			
65 Flapjack		Crunchy biscuit-like pudding containing syrup (served with custard.)			
66 Mincemeat Tart		Pastry case with a sweet mincemeat filling, (served with custard.)			
67 Lemon Meringue Pie		Pastry case filled with smooth lemon filling covered with a white crispy topping.			

Food Items.	No. of children who have eaten item.	Suggested descriptions which may be given to those children not understanding any food item.	Childrens opinions of food items. Dis-like	Like nor Dis-like	Lik
68 Syrup Sponge Pudding		Sponge with golden syrup at base (served with custard.			
69 Cherry Sponge Pudding		Moist cake-like pudding with red cherries and an icing topping (served with custard)			
70 Shortbread		Plain biscuit-like pudding occasionally iced (served with custard)			
71 Eves Pudding		Layer of apple covered by a layer of sponge (served with custard)			
72 Tinned Fruit		Peaches, pears or oranges in sweet syrup (served with ice cream or chocolate sauce)			
73 Bananas & Custard.		Bananas chopped up in custard - served hot or cold.			
74 Coconut Sponge Pudding		Moist cake-like pudding containing white chewy flakes (served with custard.			
75 Bakewell Tart		Pastry filled with cake-like mixture and jam (served with custard)			
76 Custard		Creamy yellow sweet sauce			
77 Fruit Flan		Pastry case filled with fruit.			
78 Ice Cream		Frozen creamy dessert served in blocks			
79 Fruit Salad or Cocktail		Fresh or tinned - containing a variety of fruit including apples, oranges, bananas, pears, cherries, grapes, etc. in a sweet juice			
80 Jam Sauce		A red or pink clear sweet sauce			
81 Jelly		Smooth cold clear dessert in various flavours, e.g. lemon, lime, blackcurrant raspberry or strawberry.			
82 Chocolate Pinwheels		Circles of biscuit-like pudding with plain and chocolate rings (served with custard			

Food Items.	No. of children who have eaten food item.	Suggested descriptions which may be given to those children not understanding any food item.	Childrens opinions of Food Items.		
			Dis-like	Like nor Dis-Like	Lik
83 Chocolate Sauce		Brown smooth creamy sweet sauce.			
84 Shortbread		Plain biscuit-like pudding (served with custard)			
85 Custard Whip		Cold whipped yellow custard			
86 Apple Pie		Apples in a pastry case with a lid. (served with custard)			
87 Currant Sponge Pudding		Moist cake-like pudding dotted with small black currants (served with custard.)			
88 Rice Pudding		White milk pudding served hot with jam.			
89 Fruit in Jelly		Fruit cocktail set in Jelly (usually red) & decorated with cream.			
90 Butterscotch Tart		Pastry case with brown smooth sweet filling decorated with cream			
91 Stewed Apples		Cooked apples in juice (served with custard)			
92 Rhubarb Crumble		Rhubarb layer topped with crumble (served with custard			
93 Sultana Sponge Pudding		Cake-like pudding containing large brown sultanas (served with custard)			
94 Mixed fruit Shortbread		Biscuit-like pudding containing currants & Raisins (served with custard)			
95 Trifle		Layers of cake, fruit, jelly & custard decorated with cream			
96 Jam Tart		Pas try case filled with red jam (served with custard)			
97 Jam Sponge Pudding		Moist cake-like pudding with red jam at bottom (served with custard)			
98 Stewed Rhubarb		Chunks of pink fruit in sweet syrup (served hot with custard)			

Food Item.	No. of children who have eaten the food item.	Suggested descriptions which may be given to those children not understanding any food item.	Childrens Opinions of Food Items. Dis-like	Like nor dis-like	Lik
99 Rainbow Sponge Pudding		Moist cake-like pudding with different coloured layers - pink chocolate & plain (served with custard)			
100 Ginger Sponge Pudding		Moist cake-like pudding flavoured with ginger (served with custard)			
101 Flapjack		Crunchy biscuit-like pudding made with oats or cornflakes (served with custard)			
102 Australian Crunch		Ginger flavoured biscuit like pudding topped with ginger icing (served with custard)- ginger is a hot spice.			
103 Lemon Curd shortbread		Plain biscuit-like pudding topped with lemon curd (served with custard)			
104 Mousse		Jelly whipped with evaporated milk in orange, lemon, raspberry flavours and decorated with cream, dream topping or fruit			
105 Apple Crumble		Apple base topped with crumble (served with custard)			
106 Blancmange		Cold smooth milk pudding in several flavours, e.g. raspberry & strawberry			
107 Pineapple up-side-down Pudding		Moist cake-like pudding with yellow pineapple on top (served with custard)			
108 Fresh Fruit		Fresh apple, orange or pear			
109 Chocolate Sponge Pudding		A pudding similar to chocolate cake (served hot with custard)			
110 Chocolate (Sauce)		A sweet brown sauce.			

4 - TEACHER ADMINISTERED QUESTIONNAIRE.

(Sheet for pupils).

4 - TEACHER ADMINISTERED QUESTIONNAIRE.

(sheet for pupils)

FOOD ITEM.	HAVE YOU EVER EATEN THIS FOOD?			DIS-LIKE	NEITHER LIKE NOR DISLIKE	LI
	NO	YES				
1 SCOTCH EGGS						
2 CHICKEN PIE						
3 HAM & PINEAPPLE						
4 MINCE						
5 BRAISED BEEF IN GRAVY						
6 PORK & ONION PIE						
7 CHEESE PIE						
8 BOILED HAM						
9 ROAST LAMB						
10 CHEESE CUTLETS						
11 SAUSAGE ROLLS						
12 STEW						
13 SHEPHERD'S PIE						
14 FRIED FISH						
15 BRISKET						
16 BREAD & BUTTER						
17 WHITE SAUCE						
18 CHICKEN SOUP						
19 FISH FINGERS						
20 STEW						
21 GRAVY						
22 TOMATO SAUCE						
23 SCRAMBLED EGGS						
24 MEAT PIE						
25 ROAST PORK						
26 BEEFBURGERS						
27 SAUSAGES						

FOOD ITEM.	HAVE YOU EVER EATEN THIS FOOD? NO	YES		DIS-LIKE	NEITHER LIKE NOR DISLIKE	LI
28 ROAST CHICKEN & STUFFING						
29 LIVER						
30 LUNCHEON MEAT						
31 ROAST BEEF & YORKSHIRE PUDDING						
32 FISHCAKES						
33 TOMATO SOUP						
34 ROAST LAMB						
35 CHEESE FLAN						
VEGETABLES. 36 TURNIP/SWEDE						
37 PEAS						
38 GREEN BEANS						
39 BAKED POTATOES						
40 CABBAGE						
41 MUSHY PEAS						
42 CREAMED POTATOES						
43 BOILED POTATOES						
44 CARROTS						
45 BEETROOT						
46 CAULIFLOWER						
47 MACEDOINE OR MIXED VEGE-TABLES						
48 ROAST POTATOES						
49 SPROUTS						
50 SPAGHETTI						
51 WINTER SALAD						
52 CHIPS						
53 BAKED BEANS						

FOOD ITEM	HAVE YOU EVER EATEN THIS FOOD? NO	YES		DIS-LIKE	NEITHER LIKE NOR DISLIKE	LIKE
54 SUMMER SALAD						
55 TINNED TOMATOES						
56 CAULIFLOWER						
57 BOILED POTATOES						
58 MUSHY PEAS						
SWEETS 59 COLLEGE PUDDING						
60 BAKEWELL TART						
61 CUSTARD WHIP						
62 LEMON SAUCE						
63 JAM TART						
64 LEMON SPONGE PUDDING						
65 FLAPJACK						
66 MINCEMEAT TART						
67 LEMON MERINGUE PIE						
68 SYRUP SPONGE PUDDING						
69 CHERRY SPONGE PUDDING						
70 SHORTBREAD						
71 EVES PUDDING						
72 TINNED FRUIT						
73 BANANAS & CUSTARD						
74 COCONUT SPONGE PUDDING						
75 BAKEWELL TART						
76 CUSTARD						
77 FRUIT FLAN						
78 ICE CREAM						
79 FRUIT SALAD OR COCKTAIL						
80 JAM SAUCE						

FOOD ITEM	HAVE YOU EVER EATEN THIS FOOD? NO	YES		DIS-LIKE	NEITHER LIKE NOR DISLIKE	LI
81 JELLY						
82 CHOCOLATE PINWHEELS						
83 CHOCOLATE SAUCE						
84 SHORTBREAD						
85 CUSTARD WHIP						
86 APPLE PIE						
87 CURRANT SPONGE PUDDING						
88 RICE PUDDING						
89 FRUIT IN JELLY						
90 BUTTERSCOTCH TART						
91 STEWED APPLES						
92 RHUBARB CRUMBLE						
93 SULTANA SPONGE PUDDING						
94 MIXED FRUIT SHORTBREAD						
95 TRIFLE						
96 JAM TART						
97 JAM SPONGE PUDDING						
98 STEWED RHUBARB						
99 RAINBOW SPONGE PUDDING						
100 GINGER SPONGE PUDDING						
101 FLAPJACK						
102 AUSTRALIAN CRUNCH						
103 LEMON CURD SHORTBREAD						
104 MOUSSE						
105 APPLE CRUMBLE						
106 BLANCMANGE						

FOOD ITEM.	HAVE YOU EVER EATEN THIS FOOD? NO	YES	DIS-LIKE	NEITHER LIKE NOR DISLIKE	LI
107 PINEAPPLE UPSIDEDOWN PUDDING					
108 FRESH FRUIT					
109 CHOCOLATE SPONGE PUDDING					
110 CHOCOLATE SAUCE					

5 - WEIGHTS OF TINS.

		oz.
H.S.	British Standard tin	39.5
H.S.	British Standard tin lid (also used as a tray for Family Service tins)	23.0
H.S.	British Standard tin plus lid	62.5
	Medium square deep tin	18.5
	Medium s quare deep tin lid	9.0
	Medium square deep tin plus lid	27.5
H.S.	Large flat oblong tin	24.0
H.S.	Large flat oblong tin lid	23.0
H.S.	Large flat oblong tin plus lid	27.0
F.S.	Small flat oblong tin	8.0
F.S.	Small flat oblong tin lid	6.5
F.S.	Small flat oblong tin plus lid	14.5
F.S.	Small deep vegetable tin	8.5
F.S.	Small deep vegetable tin lid	4.0
F.S.	Small deep vegetable tin plus lid	12.5
F.S.	Deep potato tin (with lip)	12.0
F.S.	Deep potato tin lid	6.5
F.S.	Deep potato tin plus lid	18.5
	Shallow s quare tin	12.0
	Shallow square tin lid	9.0
	Shallow square tin plus lid	21.0
F.S.	Small flat oblong with lip	8.0
F.S.	Small flat oblong with lip lid	6.5
F.S.	Small flat oblong with lip plus lid	9.0

NB. H.S. = those tins used in hatch service
F.S. = those tins used in family service

		oz.
F.S.	Oblong deep tin (flat sides)	13.5
F.S.	Oblong deep tin lid	6.0
F.S.	Oblong deep tin (flat sides) plus lid	19.5
F.S.	Oblong deep tin plus handle	13.0
F.S.	Very small flat square tin	5.25
F.S.	Very small flat s quare tin lid	4.0
F.S.	Very small flat square tin plus lid	9.25
	St. Marie's deep long oblong flat tin with lip	11.5
	St. Marie's deep long oblong flat tin lid	6.5
	St. Marie's deep long oblong flat tin with lip plus lid	18.0
F.S.	Boat shaped vegetable tin	10.0
	Boat shaped vegetable tin lid	5.0
	Boat shaped vegetable tin plus lid	15.0
F.S.	Oblong flat tin (no lip)	7.0

JUGS.

F.S.	Small gravy/custard jug with plastic handles	4.0
F.S.	Small gravy/custard jug with metal handles	5.0
	1 gallon jug with plastic handle	20.0
	1 gallon jug with metal handle	19.0
	Medium sized metal jug	9.0
	4 pint metal jug	14.0
	3 pint metal jug	12.0
	1 pint metal jug with metal handle	5.5
	1 pint metal jug with plastic handle	9.0
	4 pint white pot jug	37.5
	2 pint white pot jug	24.0
	1 pint white pot jug	14.5

Miscellaneous Articles.

	oz.
Large metal bowl	5.5
Small metal bowl	4.0
Pludding plate (Junior size)	5.0
Savoury plate (Junior size)	7.0
Plastic beakers - red and lipless	1.0
Large pot bowl	139.0
Small pot bowl	73.0
Pudding basin	23.5
Oval stone bowl used for staff	35.0
Metal pan with 2 side handles and lid	116.0
Plastic beakers - pale coloured, with lips	0.75
Small staff tureen and lid	38.5
Large staff tureen and lid	66.0

6 - TABLE FOR PLATE WASTE COLLECTIONS.

SCHOOL..... DATE.....

AGE GROUP..... TYPE OF SERVICE.....

SITTING NO:.....

WEIGHT OF FOOD PREPARED.

FOOD							
TIN 1							
TIN 2							
TIN 3							
TIN 4							
TIN 5							
TIN 6							
TIN 7							
TIN 8							
TIN 9							
TIN 10							
TYPE OF TIN							

ANY FOOD LEFT IN TINS AFTER SERVICE.

FOOD							
TIN 1							
TIN 2							

WEIGHT OF WASTE.

FOOD							
WEIGHT OF WASTE.							
TYPE OF TIN							

HATCH: NO. OF CHILDREN..... FAMILY: NO. OF TABLES.....

ANY ODD NO'S.....

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